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CANADIAN PATENT

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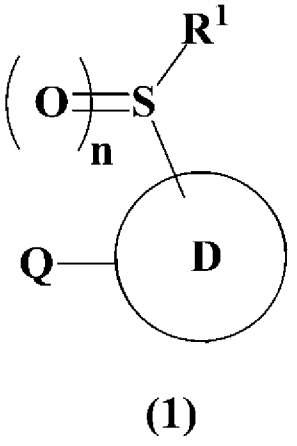
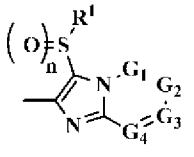
(54) Titre : COMPOSE HETEROCYCLIQUE CONDENSE ET AGENT DE LUTTE CONTRE DES ORGANISMES NUISIBLES

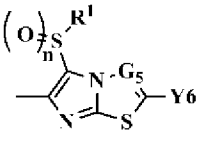
(54) Title: CONDENSED HETEROCYCLIC COMPOUNDS AND PESTICIDES



(1)



D1



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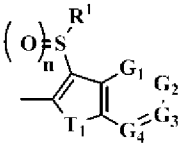
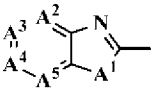
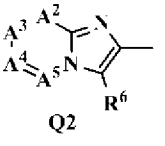


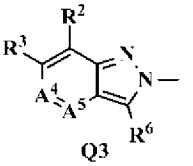
D3



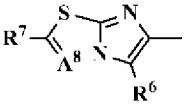
Q1



Q2



Q3



Q4

(57) Abrégé/Abstract:
To provide novel pesticides, especially insecticides or acaricides. A condensed heterocyclic compound represented by the formula (1) or its salt or an N-oxide thereof: (see above formula) wherein D substituted with $-S(O)_nR^1$ is a ring represented by any one of D1, D2 and D3, Q is a ring represented by any one of Q1, Q2, Q3 and Q4, $R^1$ is $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, ($C_1$-$C_6$) alkyl optionally substituted with $R^{1a}$, $C_2C_6$ alkenyl, $C_2$-$C_6$ haloalkenyl, $C_2$-$C_6$ alkynyl, $C_2$-$C_6$ haloalkynyl, $C_3$-$C_6$ cycloalkyl, $C_3$-$C_6$ halocycloalkyl, $C_3$-$C_6$ cycloalkyl ($C_1$°$C_6$) alkyl, $C_3$-$C_6$ halocycloalkyl ($C_1$-$C_6$) alkyl or hydroxy ($C_1$-$C_6$) alkyl, $R^{1a}$ is $C_1$-$C_8$ alkoxycarbonyl, and n is an integer of 0, 1 or 2.

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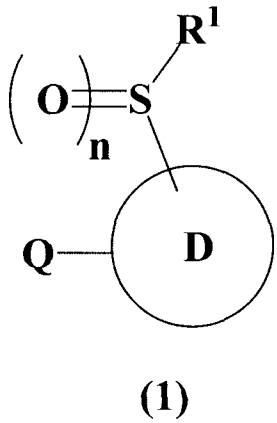
(73) Propriétaires(suite)/Owners(continued):NISSAN CHEMICAL INDUSTRIES, LTD., JP
(74) Agent: SMART & BIGGAR LLP

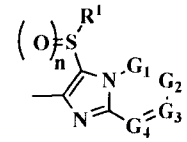
## ABSTRACT

To provide novel pesticides, especially insecticides or acaricides.

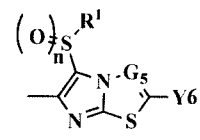
A condensed heterocyclic compound represented by the formula (1) or its salt or an N-oxide thereof:



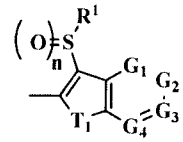
(1)



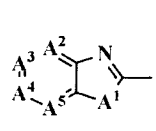
D1



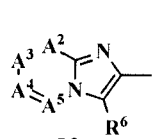
D2



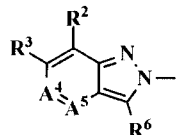
D3



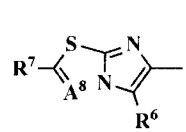
Q1



Q2



Q3



Q4

wherein D substituted with $-S(O)_nR^1$ is a ring represented by any one of D1, D2 and D3, Q is a ring represented by any one of Q1, Q2, Q3 and Q4, $R^1$ is $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, ($C_1$-$C_6$) alkyl optionally substituted with $R^{1a}$, $C_2$-$C_6$ alkenyl, $C_2$-$C_6$ haloalkenyl, $C_2$-$C_6$ alkynyl, $C_2$-$C_6$ haloalkynyl, $C_3$-$C_6$ cycloalkyl, $C_3$-$C_6$ halocycloalkyl, $C_3$-$C_6$ cycloalkyl ($C_1$-$C_6$) alkyl, $C_3$-$C_6$ halocycloalkyl ($C_1$-$C_6$) alkyl or hydroxy ($C_1$-$C_6$) alkyl, $R^{1a}$ is $C_1$-$C_8$ alkoxycarbonyl, and n is an integer of 0, 1 or 2.

# DEMANDES OU BREVETS VOLUMINEUX

**LA PRÉSENTE PARTIE DE CETTE DEMANDE OU CE BREVETS COMPREND PLUS D'UN TOME.**

**CECI EST LE TOME __1___ DE __2___**

NOTE: Pour les tomes additionels, veillez contacter le Bureau Canadien des Brevets.

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# JUMBO APPLICATIONS / PATENTS

**THIS SECTION OF THE APPLICATION / PATENT CONTAINS MORE THAN ONE VOLUME.**

**THIS IS VOLUME __1___ OF __2___**

NOTE: For additional volumes please contact the Canadian Patent Office.

# DESCRIPTION

TITLE OF INVENTION:

CONDENSED HETEROCYCLIC COMPOUNDS AND PESTICIDES

## TECHNICAL FIELD

The present invention relates to a novel condensed heterocyclic compound and its salt, and a pesticide containing the compound as an active ingredient.

## BACKGROUND ART

For example, Patent Documents 1 to 31 disclose condensed heterocyclic compounds, however, they failed to disclose the condensed heterocyclic compounds of the present invention. Usefulness of the compounds as pesticides, especially, as insecticides, acaricides or parasiticides against internal or external parasites in or on a mammal or bird is not known at all.

## PRIOR ART DOCUMENTS

### PATENT DOCUMENTS

Patent Document 1: WO2016/005263

Patent Document 2: WO2015/198859

Patent Document 3: WO2015/133603

Patent Document 4: WO2015/121136

Patent Document 5: WO2015/091945

Patent Document 6: WO2015/087458

Patent Document 7: WO2015/071180

Patent Document 8: WO2015/059088

Patent Document 9: WO2015/002211

Patent Document 10: WO2015/000715

Patent Document 11: WO2014/157600

Patent Document 12: WO2014/148451

Patent Document 13: WO2014/142292

Patent Document 14: WO2014/132972

Patent Document 15: WO2014/132971

Patent Document 16: WO2014/123206

Patent Document 17: WO2014/123205

Patent Document 18: WO2014/104407

Patent Document 19: WO2013/180194

Patent Document 20: WO2013/180193

Patent Document 21: WO2013/191113

Patent Document 22: WO2013/191189

Patent Document 23: WO2013/191112

Patent Document 24: WO2013/191188

Patent Document 25: WO2013/018928

Patent Document 26: WO2012/086848

Patent Document 27: WO2012/074135

Patent Document 28: WO2011/162364

Patent Document 29: WO2011/043404

Patent Document 30: WO2010/125985

Patent Document 31: WO2009/131237

## DISCLOSURE OF INVENTION

### TECHNICAL PROBLEM

With the advance of development of pesticides targeted at various pest insects such as agricultural pest insects, forest pest insects or hygienic pest insects, various pesticides have been put into practical use.

However, recently, control of pest insects with conventional insecticides or fungicides has become difficult in more and more cases, as pest insects acquire resistance to them over many years of their use. Problems of the high toxicity of some conventional pesticides and of the disturbance of the ecosystem by some conventional pesticides which remain in the environment for a long period are becoming apparent. Under these circumstances, development of novel pesticides with high pesticidal activity, low toxicity and low persistence is always expected.

It is an object of the present invention to provide a novel pesticide which has excellent pesticidal activities, which has low toxicity, for example, which has little harmful effect on non-target organisms such as mammals, fishes and useful insects,

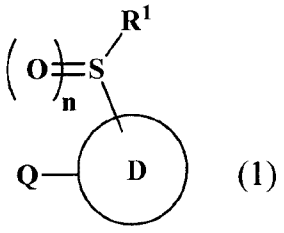
and which has low persistence.

SOLUTION TO PROBLEMS

The present inventors have conducted extensive studies to achieve the above object and as a result, found that a novel condensed heterocyclic compound represented by the following formula (1) of the present invention is a very useful compound which has excellent pesticidal activities particularly insecticidal and acaricidal activities, and which has little harmful effect on non-target organisms such as mammals, fishes and useful insects, and accomplished the present invention.

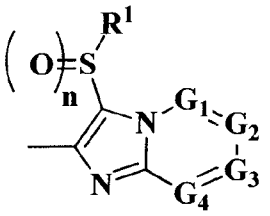
That is, the present invention relates to the following [1] to [167].

[1] A condensed heterocyclic compound represented by the formula (1) or its salt or an N-oxide thereof:

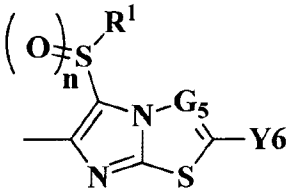


(1)

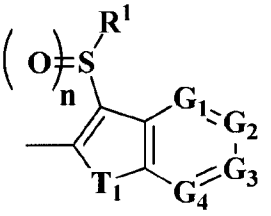
wherein D substituted with $-S(O)_nR^1$ is a ring represented by any one of D1, D2 and D3:



D1

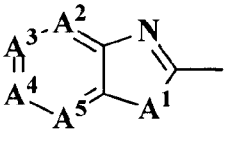


D2

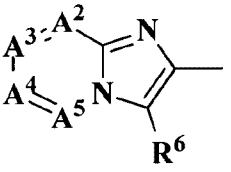


D3

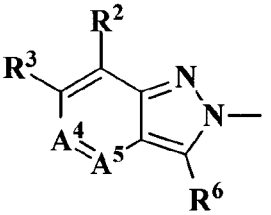
Q is a ring represented by any one of Q1, Q2, Q3 and Q4:



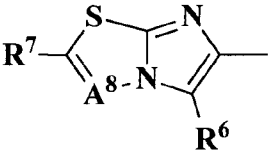
Q1



Q2



Q3



Q4

$G_1$ is a nitrogen atom or C(Y1),

$G_2$ is a nitrogen atom or C(Y2),

$G_3$ is a nitrogen atom or C(Y3),

$G_4$ is a nitrogen atom or C(Y4),

$G_5$ is a nitrogen atom or C(Y5),

$T_1$ is N($T_{1a}$), an oxygen atom or a sulfur atom,

$A^1$ is N($A^{1a}$), an oxygen atom or a sulfur atom,

$A^2$ is a nitrogen atom or C($R^2$),

$A^3$ is a nitrogen atom or C($R^3$),

$A^4$ is a nitrogen atom or C($R^4$),

$A^5$ is a nitrogen atom or C($R^5$),

$A^8$ is a nitrogen atom or C($R^8$),

$R^1$ is $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, ($C_1$-$C_6$) alkyl optionally substituted with $R^{1a}$, $C_2$-$C_6$ alkenyl, $C_2$-$C_6$ haloalkenyl, $C_2$-$C_6$ alkynyl, $C_2$-$C_6$ haloalkynyl, $C_3$-$C_6$ cycloalkyl, $C_3$-$C_6$ halocycloalkyl, $C_3$-$C_6$ cycloalkyl ($C_1$-$C_6$) alkyl, $C_3$-$C_6$ halocycloalkyl ($C_1$-$C_6$) alkyl or hydroxy ($C_1$-$C_6$) alkyl,

$R^{1a}$ is $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, $C_1$-$C_8$ alkoxycarbonyl, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ haloalkylthio, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ haloalkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl, $C_1$-$C_6$ haloalkylsulfonyl or cyano,

$R^2$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, $C_3$-$C_6$ cycloalkyl, $C_3$-$C_6$ halocycloalkyl, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ haloalkylthio, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ haloalkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl, $C_1$-$C_6$ haloalkylsulfonyl, -C(O)$R^{20a}$, -C(O)OH, hydroxy, -$NH_2$, -$NHR^{20g}$, -N($R^{20h}$)$R^{20g}$, mercapto, cyano or nitro,

$R^3$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_2$-$C_6$ haloalkenyl, $C_2$-$C_6$ haloalkynyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, $C_3$-$C_6$ cycloalkyl, $C_3$-$C_6$ halocycloalkyl, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ haloalkylthio, ($C_1$-$C_6$) alkylthio optionally substituted with $R^{3a}$, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ haloalkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl, $C_1$-$C_6$ haloalkylsulfonyl, -C(O)$R^{30a}$, -C(O)OH, hydroxy, -OC(O)$R^{30e}$, -OS(O)$_2R^{30f}$, -$NH_2$, -$NHR^{30g}$, -N($R^{30h}$)$R^{30g}$, mercapto, -SC(O)$R^{30i}$, -$SF_5$, cyano, nitro, phenyl, phenyl optionally substituted with $R^{3b}$, heterocyclyl or heterocyclyl optionally substituted with $R^{3b}$,

$R^{3a}$ is $C_1$-$C_8$ alkoxycarbonyl,

$R^{3b}$ is a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy,

cyano or nitro,

$R^4$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_2$-$C_6$ haloalkenyl, $C_2$-$C_6$ haloalkynyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, $C_3$-$C_6$ cycloalkyl, $C_3$-$C_6$ halocycloalkyl, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ haloalkylthio, ($C_1$-$C_6$) alkylthio optionally substituted with $R^{4a}$, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ haloalkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl, $C_1$-$C_6$ haloalkylsulfonyl, -C(O)$R^{40a}$, -C(O)OH, hydroxy, -OC(O)$R^{40e}$, -OS(O)$_2R^{40f}$, -$NH_2$, -$NHR^{40g}$, -N($R^{40h}$)$R^{40g}$, mercapto, -SC(O)$R^{40i}$, -$SF_5$, cyano, nitro, phenyl, phenyl optionally substituted with $R^{4b}$, heterocyclyl or heterocyclyl optionally substituted with $R^{4b}$,

$R^{4a}$ is $C_1$-$C_8$ alkoxycarbonyl,

$R^{4b}$ is a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, cyano or nitro,

$R^5$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, $C_3$-$C_6$ cycloalkyl, $C_3$-$C_6$ halocycloalkyl, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ haloalkylthio, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ haloalkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl, $C_1$-$C_6$ haloalkylsulfonyl, -C(O)$R^{50a}$, -C(O)OH, hydroxy, -$NH_2$, -$NHR^{50g}$, -N($R^{50h}$)$R^{50g}$, mercapto, cyano or nitro,

$R^6$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, $C_3$-$C_6$ cycloalkyl, $C_3$-$C_6$ halocycloalkyl, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ haloalkylthio, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ haloalkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl, $C_1$-$C_6$ haloalkylsulfonyl, -C(O)$R^{60a}$, -C(O)OH, hydroxy, -$NH_2$, -$NHR^{60g}$, -N($R^{60h}$)$R^{60g}$, mercapto, cyano or nitro,

$R^7$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ haloalkylthio, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ haloalkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl, $C_1$-$C_6$ haloalkylsulfonyl, mercapto, -$SF_5$, cyano or nitro,

$R^8$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy or cyano,

$A^{1a}$ is a hydrogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, ($C_1$-$C_6$) alkyl optionally substituted with $A^{1a-a}$, ($C_1$-$C_6$) haloalkyl optionally substituted with $A^{1a-a}$, $C_2$-$C_6$ alkenyl, $C_2$-$C_6$ haloalkenyl, $C_2$-$C_6$ alkynyl, $C_2$-$C_6$ haloalkynyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, $C_3$-$C_6$ cycloalkyl, $C_3$-$C_6$ halocycloalkyl, $C_3$-$C_6$ cycloalkyl ($C_1$-$C_6$) alkyl, $C_3$-$C_6$ halocycloalkyl

($C_1$-$C_6$) alkyl, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ haloalkylthio, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ haloalkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl, $C_1$-$C_6$ haloalkylsulfonyl, $C(O)R^{10a}$, hydroxy or cyano,

$A^{1a-a}$ is $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, $C_1$-$C_8$ alkoxycarbonyl, $C_1$-$C_8$ haloalkoxycarbonyl, $C_1$-$C_6$ alkylcarbonyl, $C_1$-$C_6$ haloalkylcarbonyl, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ haloalkylthio, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ haloalkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl, $C_1$-$C_6$ haloalkylsulfonyl, hydroxy or cyano,

$T_{1a}$ is a hydrogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_2$-$C_6$ alkenyl, $C_2$-$C_6$ haloalkenyl, $C_2$-$C_6$ alkynyl, $C_2$-$C_6$ haloalkynyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, $C_3$-$C_6$ cycloalkyl, $C_3$-$C_6$ halocycloalkyl, $C_3$-$C_6$ cycloalkyl ($C_1$-$C_6$) alkyl or $C_3$-$C_6$ halocycloalkyl ($C_1$-$C_6$) alkyl,

each of Y1, Y2, Y3 and Y4 is independently a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, ($C_1$-$C_6$) alkyl optionally substituted with $Y^a$, ($C_1$-$C_6$) haloalkyl optionally substituted with $Y^a$, $C_2$-$C_6$ alkenyl, $C_2$-$C_6$ haloalkenyl, ($C_2$-$C_6$) alkenyl optionally substituted with $Y^a$, $C_2$-$C_6$ alkynyl, $C_2$-$C_6$ haloalkynyl, ($C_2$-$C_6$) alkynyl optionally substituted with $Y^b$, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, ($C_1$-$C_8$) alkoxy optionally substituted with $Y^a$, $C_2$-$C_6$ alkenyloxy, $C_2$-$C_6$ haloalkenyloxy, ($C_2$-$C_6$) alkenyloxy optionally substituted with $Y^a$, $C_2$-$C_6$ alkynyloxy, $C_2$-$C_6$ haloalkynyloxy, ($C_2$-$C_6$) alkynyloxy optionally substituted with $Y^a$, $C_3$-$C_6$ cycloalkyl, $C_3$-$C_6$ halocycloalkyl, $C_3$-$C_6$ cycloalkyl ($C_1$-$C_6$) alkyl, $C_3$-$C_6$ halocycloalkyl ($C_1$-$C_6$) alkyl, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ haloalkylthio, ($C_1$-$C_6$) alkylthio optionally substituted with $Y^a$, $C_2$-$C_6$ alkenylthio, $C_2$-$C_6$ haloalkenylthio, $C_2$-$C_6$ alkynylthio, $C_2$-$C_6$ haloalkynylthio, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ haloalkylsulfinyl, ($C_1$-$C_6$) alkylsulfinyl optionally substituted with $Y^a$, $C_2$-$C_6$ alkenylsulfinyl, $C_2$-$C_6$ haloalkenylsulfinyl, $C_2$-$C_6$ alkynylsulfinyl, $C_2$-$C_6$ haloalkynylsulfinyl, $C_1$-$C_6$ alkylsulfonyl, $C_1$-$C_6$ haloalkylsulfonyl, ($C_1$-$C_6$) alkylsulfonyl optionally substituted with $Y^a$, $C_2$-$C_6$ alkenylsulfonyl, $C_2$-$C_6$ haloalkenylsulfonyl, $C_2$-$C_6$ alkynylsulfonyl, $C_2$-$C_6$ haloalkynylsulfonyl, $-C(O)R^{90a}$, $-C(O)NHR^{90b}$, $-C(O)N(R^{90c})R^{90b}$, $-C(O)OH$, $-C(=NOR^{90d})R^{90a}$, $-C(O)NH_2$, hydroxy, $-OC(O)R^{90e}$, $-OS(O)_2R^{90f}$, $-NH_2$, $-NHR^{90g}$, $-N(R^{90h})R^{90g}$, mercapto, $-SC(O)R^{90i}$, $-S(O)_2NHR^{90j}$, $-S(O)_2N(R^{90k})R^{90j}$, $-SF_5$, cyano, nitro, phenyl, phenyl optionally substituted with $Y^c$, heterocyclyl or heterocyclyl optionally substituted with $Y^c$,

each of Y5 and Y6 is independently a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl,

$C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ haloalkylthio, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ haloalkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl, $C_1$-$C_6$ haloalkylsulfonyl, mercapto, $-SF_5$, cyano or nitro,

$Y^a$ is $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, $C_1$-$C_8$ alkoxycarbonyl, $C_1$-$C_8$ haloalkoxycarbonyl, $C_1$-$C_6$ alkylcarbonyl, $C_1$-$C_6$ haloalkylcarbonyl, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ haloalkylthio, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ haloalkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl, $C_1$-$C_6$ haloalkylsulfonyl, hydroxy or cyano,

$Y^b$ is $C_1$-$C_6$ alkyl, $C_3$-$C_6$ cycloalkyl, trimethylsilyl or phenyl,

$Y^c$ is a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, cyano or nitro,

each of $R^{10a}$, $R^{20a}$, $R^{30a}$, $R^{30e}$, $R^{40a}$, $R^{40e}$, $R^{50a}$, $R^{60a}$ and $R^{90a}$ is independently a hydrogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy or $C_1$-$C_8$ haloalkoxy,

each of $R^{20g}$, $R^{20h}$, $R^{30f}$, $R^{30g}$, $R^{30h}$, $R^{30i}$, $R^{40f}$, $R^{40g}$, $R^{40h}$, $R^{40i}$, $R^{50g}$, $R^{50h}$, $R^{60g}$, $R^{60h}$, $R^{90b}$, $R^{90c}$, $R^{90i}$, $R^{90j}$ and $R^{90k}$ is independently $C_1$-$C_6$ alkyl or $C_1$-$C_6$ haloalkyl,

$R^{90d}$ is a hydrogen atom, $C_1$-$C_6$ alkyl or $C_1$-$C_6$ haloalkyl,

$R^{90e}$ is a hydrogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, $C_1$-$C_6$ alkylamino, $C_1$-$C_6$ haloalkylamino, di($C_1$-$C_6$) alkylamino or di($C_1$-$C_6$) haloalkylamino,

$R^{90f}$ is $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_6$ alkylamino, $C_1$-$C_6$ haloalkylamino, di($C_1$-$C_6$) alkylamino or di($C_1$-$C_6$) haloalkylamino,

each of $R^{90g}$ and $R^{90h}$ is independently $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_6$ alkylcarbonyl, $C_1$-$C_6$ haloalkylcarbonyl, $C_1$-$C_8$ alkoxycarbonyl, $C_1$-$C_8$ haloalkoxycarbonyl, $C_1$-$C_6$ alkylaminocarbonyl, $C_1$-$C_6$ haloalkylaminocarbonyl, $C_1$-$C_6$ alkylaminothiocarbonyl, $C_1$-$C_6$ haloalkylaminothiocarbonyl, phenylcarbonyl, $C_1$-$C_6$ alkylsulfonyl, $C_1$-$C_6$ haloalkylsulfonyl, $C_1$-$C_6$ alkylaminosulfonyl or di($C_1$-$C_6$) alkylaminosulfonyl, and

n is an integer of 0, 1 or 2.

[2] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [1], wherein

D substituted with $-S(O)_nR^1$ is a ring represented by D1,

$G_1$ is C(Y1),

$G_2$ is C(Y2),

$G_3$ is C(Y3),

$G_4$ is C(Y4),

$A^2$ is $C(R^2)$,

$A^3$ is $C(R^3)$,

$R^1$ is $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_2$-$C_6$ alkenyl, $C_2$-$C_6$ haloalkenyl, $C_2$-$C_6$ alkynyl, $C_2$-$C_6$ haloalkynyl, $C_3$-$C_6$ cycloalkyl ($C_1$-$C_6$) alkyl or $C_3$-$C_6$ halocycloalkyl ($C_1$-$C_6$) alkyl,

$R^2$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl or $C_1$-$C_6$ haloalkyl,

$R^3$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ haloalkylthio, ($C_1$-$C_6$) alkylthio optionally substituted with $R^{3a}$, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ haloalkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl or $C_1$-$C_6$ haloalkylsulfonyl,

$R^4$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ haloalkylthio, ($C_1$-$C_6$) alkylthio optionally substituted with $R^{4a}$, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ haloalkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl or $C_1$-$C_6$ haloalkylsulfonyl,

each of $R^5$, $R^6$ and $R^8$ is independently a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl or $C_1$-$C_6$ haloalkyl,

$R^7$ is a hydrogen atom, a halogen atom or $C_1$-$C_6$ haloalkyl,

$A^{1a}$ is a hydrogen atom, $C_1$-$C_6$ alkyl, ($C_1$-$C_6$) alkyl optionally substituted with $A^{1a\text{-}a}$, $C_2$-$C_6$ alkenyl, $C_2$-$C_6$ alkynyl, $C_1$-$C_8$ alkoxy, $C_3$-$C_6$ cycloalkyl or $C(O)R^{10a}$,

$A^{1a\text{-}a}$ is $C_1$-$C_8$ alkoxy, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl or cyano,

$R^{10a}$ is a hydrogen atom, $C_1$-$C_6$ alkyl or $C_1$-$C_8$ alkoxy,

each of Y1, Y2, Y3 and Y4 is independently a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_2$-$C_6$ alkenyl, $C_2$-$C_6$ alkynyl, ($C_2$-$C_6$) alkynyl optionally substituted with $Y^b$, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ haloalkylthio, ($C_1$-$C_6$) alkylthio optionally substituted with $Y^a$, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ haloalkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl, $C_1$-$C_6$ haloalkylsulfonyl, $-C(O)R^{90a}$, $-C(O)NHR^{90b}$, $-C(O)N(R^{90c})R^{90b}$, -C(O)OH, hydroxy, $-OC(O)R^{90e}$, $-OS(O)_2R^{90f}$, $-NH_2$, $-NHR^{90g}$, $-N(R^{90h})R^{90g}$, mercapto, $-SC(O)R^{90i}$, $-S(O)_2NHR^{90j}$, $-S(O)_2N(R^{90k})R^{90j}$, $-SF_5$, cyano, nitro, phenyl, phenyl optionally substituted with $Y^c$, heterocyclyl or heterocyclyl optionally substituted with $Y^c$, and

$Y^a$ is $C_1$-$C_8$ alkoxycarbonyl.

[3] The condensed heterocyclic compound or its salt or an N-oxide thereof according

to the above [1], wherein

D substituted with $-S(O)_nR^1$ is a ring represented by D2,

Q is a ring represented by Q1,

$A^1$ is $N(A^{1a})$,

$A^2$ is $C(R^2)$,

$A^3$ is $C(R^3)$,

$A^4$ is $C(R^4)$,

$A^5$ is a nitrogen atom,

$R^1$ is $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_2$-$C_6$ alkenyl, $C_2$-$C_6$ haloalkenyl, $C_2$-$C_6$ alkynyl, $C_2$-$C_6$ haloalkynyl, $C_3$-$C_6$ cycloalkyl ($C_1$-$C_6$) alkyl or $C_3$-$C_6$ halocycloalkyl ($C_1$-$C_6$) alkyl,

$R^2$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl or $C_1$-$C_6$ haloalkyl,

$R^3$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ haloalkylthio, ($C_1$-$C_6$) alkylthio optionally substituted with $R^{3a}$, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ haloalkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl or $C_1$-$C_6$ haloalkylsulfonyl,

$R^4$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ haloalkylthio, ($C_1$-$C_6$) alkylthio optionally substituted with $R^{4a}$, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ haloalkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl or $C_1$-$C_6$ haloalkylsulfonyl,

$A^{1a}$ is a hydrogen atom, $C_1$-$C_6$ alkyl, ($C_1$-$C_6$) alkyl optionally substituted with $A^{1a\text{-}a}$, $C_2$-$C_6$ alkenyl, $C_2$-$C_6$ alkynyl, $C_1$-$C_8$ alkoxy, $C_3$-$C_6$ cycloalkyl or $C(O)R^{10a}$,

$A^{1a\text{-}a}$ is $C_1$-$C_8$ alkoxy, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl or cyano,

$R^{10a}$ is a hydrogen atom, $C_1$-$C_6$ alkyl or $C_1$-$C_8$ alkoxy,

Y5 is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl or $C_1$-$C_6$ haloalkyl, and

Y6 is a hydrogen atom, a halogen atom or $C_1$-$C_6$ haloalkyl.

[4] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [1], wherein

D substituted with $-S(O)_nR^1$ is a ring represented by D3,

Q is a ring represented by Q1,

$G_1$ is C(Y1),

$G_2$ is C(Y2),

$G_3$ is C(Y3),

$G_4$ is C(Y4),

$T_1$ is $N(T_{1a})$ or a sulfur atom,

$A^1$ is $N(A^{1a})$

$A^2$ is $C(R^2)$,

$A^3$ is $C(R^3)$,

$A^4$ is $C(R^4)$,

$A^5$ is a nitrogen atom,

$R^1$ is $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_2$-$C_6$ alkenyl, $C_2$-$C_6$ haloalkenyl, $C_2$-$C_6$ alkynyl, $C_2$-$C_6$ haloalkynyl, $C_3$-$C_6$ cycloalkyl ($C_1$-$C_6$) alkyl or $C_3$-$C_6$ halocycloalkyl ($C_1$-$C_6$) alkyl,

$R^2$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl or $C_1$-$C_6$ haloalkyl,

$R^3$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ haloalkylthio, ($C_1$-$C_6$) alkylthio optionally substituted with $R^{3a}$, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ haloalkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl or $C_1$-$C_6$ haloalkylsulfonyl,

$R^4$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ haloalkylthio, ($C_1$-$C_6$) alkylthio optionally substituted with $R^{4a}$, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ haloalkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl or $C_1$-$C_6$ haloalkylsulfonyl,

$A^{1a}$ is a hydrogen atom, $C_1$-$C_6$ alkyl, ($C_1$-$C_6$) alkyl optionally substituted with $A^{1a\text{-}a}$, $C_2$-$C_6$ alkenyl, $C_2$-$C_6$ alkynyl, $C_1$-$C_8$ alkoxy, $C_3$-$C_6$ cycloalkyl or $C(O)R^{10a}$,

$A^{1a\text{-}a}$ is $C_1$-$C_8$ alkoxy, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl or cyano,

$R^{10a}$ is a hydrogen atom, $C_1$-$C_6$ alkyl or $C_1$-$C_8$ alkoxy,

$T_{1a}$ is a hydrogen atom or $C_1$-$C_6$ alkyl, and

each of Y1, Y2, Y3 and Y4 is independently a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ haloalkylthio, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ haloalkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl, $C_1$-$C_6$ haloalkylsulfonyl, cyano or nitro.

[5] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [2], wherein

Q is a ring represented by Q1,

$A^1$ is $N(A^{1a})$,

$R^1$ is $C_1$-$C_6$ alkyl,

$R^3$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ haloalkyl, $C_1$-$C_6$ haloalkylthio, ($C_1$-$C_6$) alkylthio optionally substituted with $R^{3a}$, $C_1$-$C_6$ haloalkylsulfinyl or $C_1$-$C_6$ haloalkylsulfonyl,

$R^4$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ haloalkyl, $C_1$-$C_6$ haloalkylthio, ($C_1$-$C_6$) alkylthio optionally substituted with $R^{4a}$, $C_1$-$C_6$ haloalkylsulfinyl or $C_1$-$C_6$ haloalkylsulfonyl, and

$A^{1a}$ is a hydrogen atom or $C_1$-$C_6$ alkyl.

[6] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [5], wherein

$A^4$ is $C(R^4)$, and

$A^5$ is a nitrogen atom.

[7] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [5] or [6], wherein

$A^4$ is $C(R^4)$,

$A^5$ is a nitrogen atom,

$R^2$ is a hydrogen atom,

$R^4$ is a hydrogen atom or $C_1$-$C_6$ haloalkyl,

Y1 is a hydrogen atom, $C_1$-$C_6$ alkyl or $C_1$-$C_6$ haloalkyl,

Y2 is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_2$-$C_6$ alkenyl, ($C_2$-$C_6$) alkynyl optionally substituted with $Y^b$, $C_1$-$C_8$ alkoxy, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ haloalkylthio, ($C_1$-$C_6$) alkylthio optionally substituted with $Y^a$, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl, $-NH_2$, $-NHR^{90g}$, nitro, phenyl, phenyl optionally substituted with $Y^c$, thiophen-2-yl, pyridin-3-yl or pyridin-4-yl,

Y3 is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_6$ alkylthio, ($C_1$-$C_6$) alkylthio optionally substituted with $Y^a$, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl, $-C(O)R^{90a}$, $-C(O)N(R^{90c})R^{90b}$, $-C(O)OH$, cyano or nitro,

Y4 is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ alkylsulfonyl, $-N(R^{90h})R^{90g}$ or cyano,

$Y^a$ is $C_1$-$C_8$ alkoxycarbonyl,

$Y^b$ is $C_3$-$C_6$ cycloalkyl or trimethylsilyl,

$Y^c$ is a halogen atom or $C_1$-$C_6$ haloalkyl,

$R^{90a}$ is $C_1$-$C_8$ alkoxy,

each of $R^{90b}$ and $R^{90c}$ is independently $C_1$-$C_6$ alkyl,

$R^{90g}$ is $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkylcarbonyl, $C_1$-$C_8$ alkoxycarbonyl or phenylcarbonyl, and

$R^{90h}$ is $C_1$-$C_6$ alkyl.

[8] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [5], wherein

$A^4$ is a nitrogen atom, and

$A^5$ is $C(R^5)$.

[9] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [5] or [8], wherein

$A^4$ is a nitrogen atom,

$A^5$ is $C(R^5)$,

$R^2$ is a hydrogen atom,

$R^3$ is $C_1$-$C_6$ haloalkyl,

$R^5$ is a hydrogen atom or $C_1$-$C_6$ alkyl,

Y1 is a hydrogen atom,

Y2 is a hydrogen atom, a halogen atom or $C_1$-$C_6$ haloalkyl,

Y3 is a hydrogen atom, a halogen atom, $C_1$-$C_6$ haloalkyl or cyano, and

Y4 is a hydrogen atom, a halogen atom or $C_1$-$C_8$ alkoxy.

[10] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [2], wherein

Q is a ring represented by Q2,

$A^4$ is a nitrogen atom or $C(R^4)$,

$A^5$ is a nitrogen atom or $C(R^5)$,

(excluding a case where both $A^4$ and $A^5$ are nitrogen atoms)

$R^1$ is $C_1$-$C_6$ alkyl,

$R^2$ is a hydrogen atom,

$R^3$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ haloalkyl, $C_1$-$C_6$ haloalkylthio, ($C_1$-$C_6$) alkylthio optionally substituted with $R^{3a}$, $C_1$-$C_6$ haloalkylsulfinyl or $C_1$-$C_6$ haloalkylsulfonyl, and

$R^4$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ haloalkyl, $C_1$-$C_6$ haloalkylthio, ($C_1$-$C_6$) alkylthio optionally substituted with $R^{4a}$, $C_1$-$C_6$ haloalkylsulfinyl or $C_1$-$C_6$ haloalkylsulfonyl.

[11] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [10], wherein

$A^4$ is $C(R^4)$, and

$A^5$ is $C(R^5)$.

[12] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [10], wherein

$A^4$ is $C(R^4)$, and

$A^5$ is a nitrogen atom.

[13] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [10], wherein

$A^4$ is a nitrogen atom, and

$A^5$ is $C(R^5)$.

[14] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [10] or [13], wherein

$A^4$ is a nitrogen atom,

$A^5$ is $C(R^5)$,

$R^3$ is $C_1$-$C_6$ haloalkyl,

$R^5$ is a hydrogen atom or $C_1$-$C_6$ alkyl,

$R^6$ is a hydrogen atom, a halogen atom or $C_1$-$C_6$ alkyl,

each of Y1 and Y4 is a hydrogen atom,

Y2 is a hydrogen atom, a halogen atom or $C_1$-$C_6$ haloalkyl, and

Y3 is a hydrogen atom or $C_1$-$C_6$ haloalkyl.

[15] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [2], wherein

Q is a ring represented by Q3,

$A^4$ is a nitrogen atom or $C(R^4)$,

$A^5$ is a nitrogen atom or $C(R^5)$,

(excluding a case where both $A^4$ and $A^5$ are nitrogen atoms),

$R^1$ is $C_1$-$C_6$ alkyl,

$R^2$ is a hydrogen atom,

$R^3$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ haloalkyl, $C_1$-$C_6$ haloalkylthio, ($C_1$-$C_6$)alkylthio optionally substituted with $R^{3a}$, $C_1$-$C_6$ haloalkylsulfinyl or $C_1$-$C_6$ haloalkylsulfonyl, and

$R^4$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ haloalkyl, $C_1$-$C_6$ haloalkylthio, ($C_1$-$C_6$) alkylthio optionally substituted with $R^{4a}$, $C_1$-$C_6$ haloalkylsulfinyl or $C_1$-$C_6$ haloalkylsulfonyl.

[16] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [15], wherein

$A^4$ is $C(R^4)$, and

$A^5$ is $C(R^5)$.

[17] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [15], wherein

$A^4$ is $C(R^4)$, and

$A^5$ is a nitrogen atom.

[18] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [15], wherein

$A^4$ is a nitrogen atom, and

$A^5$ is $C(R^5)$.

[19] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [15] or [18], wherein

$A^4$ is a nitrogen atom,

$A^5$ is $C(R^5)$,

$R^3$ is $C_1$-$C_6$ haloalkyl,

$R^5$ is a hydrogen atom,

$R^6$ is a hydrogen atom,

Y1 is a hydrogen atom,

each of Y2 and Y3 is independently a hydrogen atom, a halogen atom or $C_1$-$C_6$ haloalkyl, and

Y4 is a hydrogen atom or a halogen atom.

[20] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [2], wherein Q is a ring represented by Q4.

[21] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [20], wherein

$A^8$ is a nitrogen atom.

[22] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [20], wherein

$A^8$ is $C(R^8)$.

[23] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [20], [21] or [22], wherein

$R^1$ is $C_1$-$C_6$ alkyl,

$R^6$ is a hydrogen atom,

$R^7$ is $C_1$-$C_6$ haloalkyl,

$R^8$ is a hydrogen atom or $C_1$-$C_6$ alkyl,

each of Y1 and Y4 is a hydrogen atom,

Y2 is a hydrogen atom, a halogen atom or $C_1$-$C_6$ haloalkyl, and

Y3 is a hydrogen atom or $C_1$-$C_6$ haloalkyl.

[24] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [3], wherein

$R^1$ is $C_1$-$C_6$ alkyl,

$R^2$ is a hydrogen atom,

$R^3$ is $C_1$-$C_6$ haloalkyl,

$R^4$ is a hydrogen atom,

$A^{1a}$ is $C_1$-$C_6$ alkyl,

Y5 is a hydrogen atom, and

Y6 is $C_1$-$C_6$ haloalkyl.

[25] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [4], wherein

$R^1$ is $C_1$-$C_6$ alkyl,

$R^2$ is a hydrogen atom,

$R^3$ is $C_1$-$C_6$ haloalkyl,

$R^4$ is a hydrogen atom,

$A^{1a}$ is $C_1$-$C_6$ alkyl,

$T_{1a}$ is $C_1$-$C_6$ alkyl,

each of Y1, Y3 and Y4 is a hydrogen atom, and

Y2 is $C_1$-$C_6$ haloalkyl.

[26] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [2], wherein

$A^1$ is N($A^{1a}$) or an oxygen atom,

$R^2$ is a hydrogen atom,

$R^3$ is $C_1$-$C_6$ haloalkyl, $C_1$-$C_6$ haloalkylthio, $C_1$-$C_6$ haloalkylsulfinyl or $C_1$-$C_6$ haloalkylsulfonyl,

$R^4$ is a hydrogen atom,

$R^5$ is a hydrogen atom or $C_1$-$C_6$ alkyl,

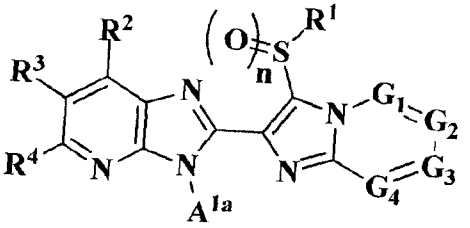
$R^6$ is a hydrogen atom,

$A^{1a}$ is $C_1$-$C_6$ alkyl,

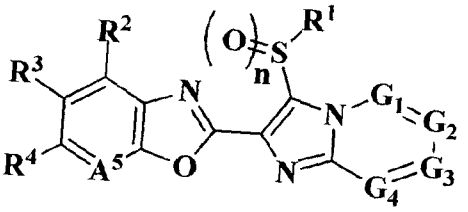
each of Y1 and Y4 is a hydrogen atom, and

each of Y2 and Y3 is independently a hydrogen atom or $C_1$-$C_6$ haloalkyl.

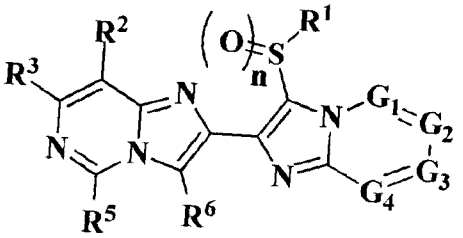
[27] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [1] or [2], wherein the formula (1) is the folloinwg formula (1-A-A1), (1-A-B1), (1-A-C1), (1-A-D1), (1-A-E1), (1-A-F1), (1-A-G1), (1-A-H1), (1-A-I1), (1-A-J1), (1-A-K1), (1-A-L1), (1-A-M1) or (1-A-N1):



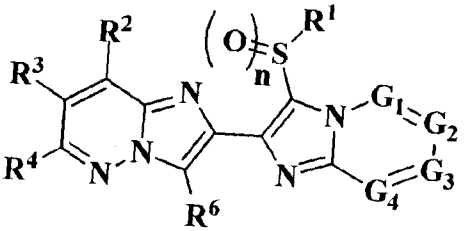
(1-A-A1)



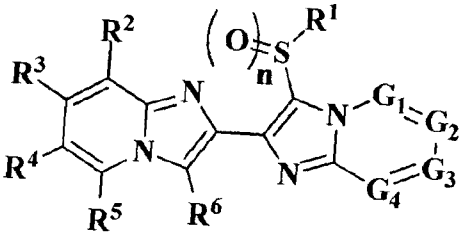
(1-A-B1)



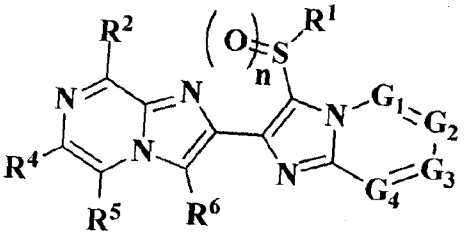
(1-A-C1)



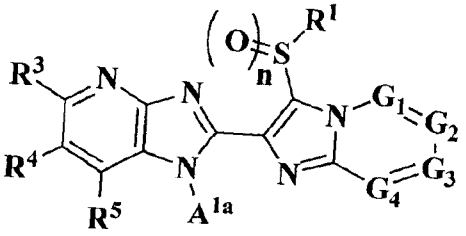
(1-A-D1)



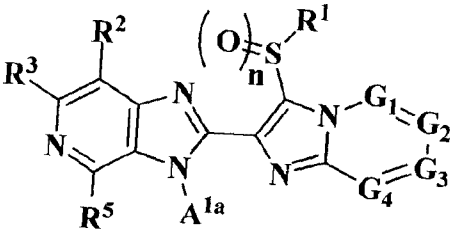
(1-A-E1)



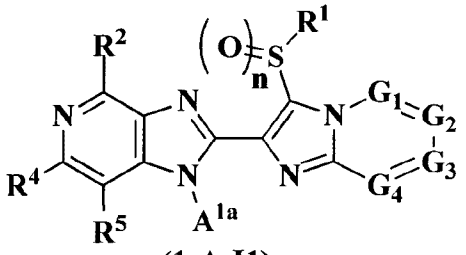
(1-A-F1)



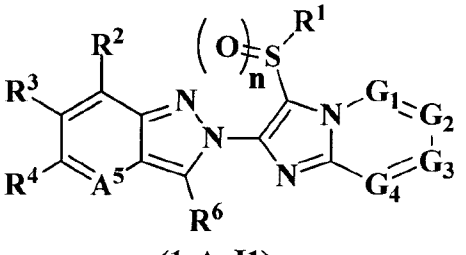
(1-A-G1)



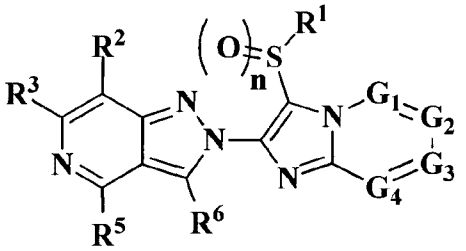
(1-A-H1)



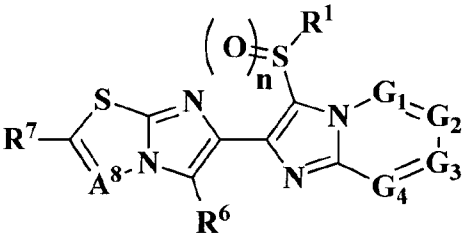
(1-A-I1)



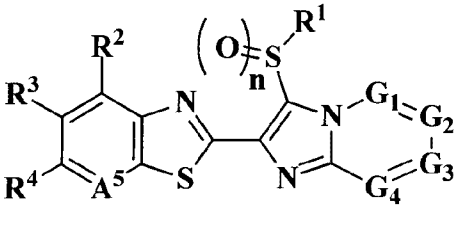
(1-A-J1)



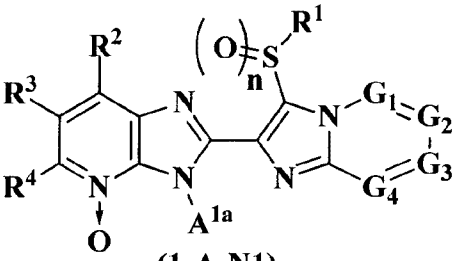
(1-A-K1)



(1-A-L1)

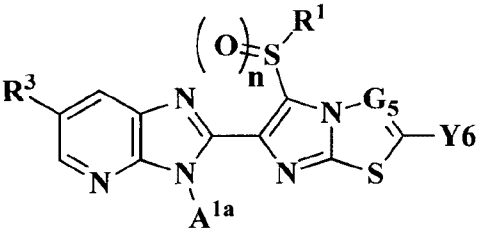


(1-A-M1)



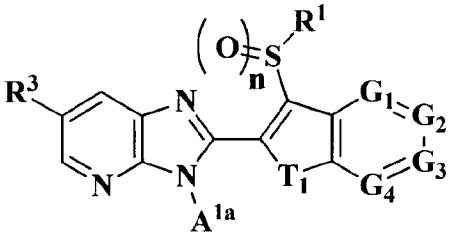
(1-A-N1)

[28] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [1] or [3], wherein the formula (1) is the folloinwg formula (1-B-A1):



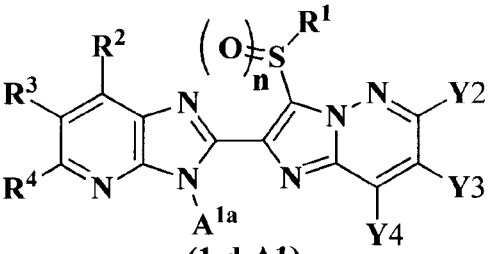
(1-B-A1)

[29] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [1] or [4], wherein the formula (1) is the folloinwg formula (1-C-A1):



(1-C-A1)

[30] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [1], wherein the formula (1) is the folloinwg formula (1-d-A1):



(1-d-A1)

wherein

$R^1$ is $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_2$-$C_6$ alkenyl, $C_2$-$C_6$ haloalkenyl, $C_2$-$C_6$ alkynyl or $C_2$-$C_6$ haloalkynyl,

$R^3$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ haloalkylthio, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ haloalkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl or $C_1$-$C_6$ haloalkylsulfonyl,

$A^{1a}$ is a hydrogen atom, $C_1$-$C_6$ alkyl, $C_2$-$C_6$ alkenyl or $C_2$-$C_6$ alkynyl, and

each of $R^2$, $R^4$, Y2, Y3 and Y4 is independently a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl or $C_1$-$C_6$ haloalkyl.

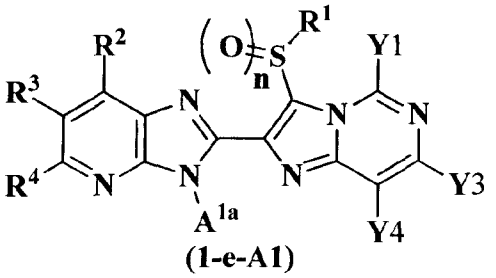
[31] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [30], wherein

each of $R^1$ and $A^{1a}$ is independently $C_1$-$C_6$ alkyl,

each of $R^3$ and Y3 is independently $C_1$-$C_6$ haloalkyl, and

each of $R^2$, $R^4$, Y2 and Y4 is a hydrogen atom.

[32] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [1], wherein the formula (1) is the folloinwg formula (1-e-A1):



(1-e-A1)

wherein

$R^1$ is $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_2$-$C_6$ alkenyl, $C_2$-$C_6$ haloalkenyl, $C_2$-$C_6$ alkynyl or $C_2$-$C_6$ haloalkynyl,

$R^3$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ haloalkylthio, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ haloalkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl or $C_1$-$C_6$ haloalkylsulfonyl,

$A^{1a}$ is a hydrogen atom, $C_1$-$C_6$ alkyl, $C_2$-$C_6$ alkenyl or $C_2$-$C_6$ alkynyl, and

each of $R^2$, $R^4$, Y1, Y3 and Y4 is independently a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl or $C_1$-$C_6$ haloalkyl.

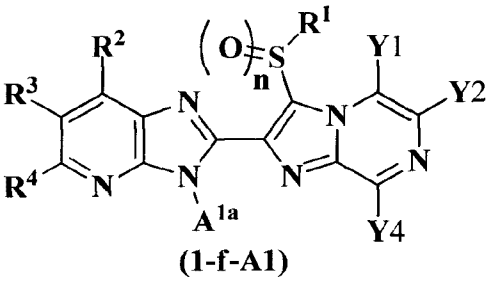
[33] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [32], wherein

each of $R^1$ and $A^{1a}$ is independently $C_1$-$C_6$ alkyl,

each of $R^3$ and Y3 is independently $C_1$-$C_6$ haloalkyl, and

each of $R^2$, $R^4$, Y1 and Y4 is a hydrogen atom.

[34] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [1], wherein the formula (1) is the folloinwg formula (1-f-A1):



(1-f-A1)

wherein

$R^1$ is $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_2$-$C_6$ alkenyl, $C_2$-$C_6$ haloalkenyl, $C_2$-$C_6$ alkynyl or $C_2$-$C_6$ haloalkynyl,

$R^3$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ haloalkylthio, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$

haloalkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl or $C_1$-$C_6$ haloalkylsulfonyl,

$A^{1a}$ is a hydrogen atom, $C_1$-$C_6$ alkyl, $C_2$-$C_6$ alkenyl or $C_2$-$C_6$ alkynyl, and

each of $R^2$, $R^4$, Y1, Y2 and Y4 is independently a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl or $C_1$-$C_6$ haloalkyl.

[35] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [34], wherein

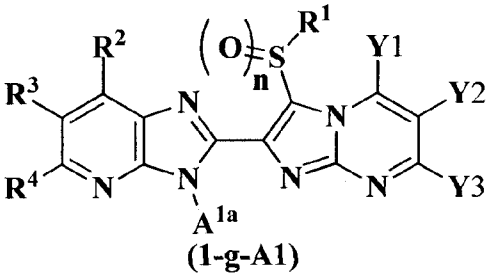
each of $R^1$ and $A^{1a}$ is independently $C_1$-$C_6$ alkyl,

$R^3$ is $C_1$-$C_6$ haloalkyl,

each of $R^2$, $R^4$, Y1 and Y4 is a hydrogen atom, and

Y2 is a hydrogen atom or a halogen atom.

[36] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [1], wherein the formula (1) is the folloinwg formula (1-g-A1):



(1-g-A1)

wherein

$R^1$ is $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_2$-$C_6$ alkenyl, $C_2$-$C_6$ haloalkenyl, $C_2$-$C_6$ alkynyl or $C_2$-$C_6$ haloalkynyl,

$R^3$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ haloalkylthio, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ haloalkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl or $C_1$-$C_6$ haloalkylsulfonyl,

$A^{1a}$ is a hydrogen atom, $C_1$-$C_6$ alkyl, $C_2$-$C_6$ alkenyl or $C_2$-$C_6$ alkynyl, and

each of $R^2$, $R^4$, Y1, Y2 and Y3 is independently a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl or $C_1$-$C_6$ haloalkyl.

[37] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [36], wherein

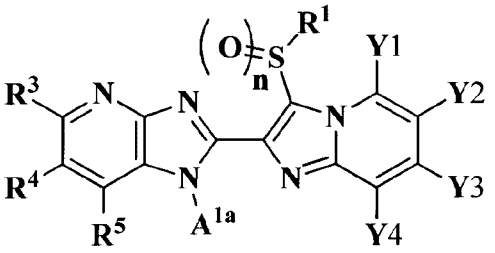
each of $R^1$ and $A^{1a}$ is independently $C_1$-$C_6$ alkyl,

$R^3$ is $C_1$-$C_6$ haloalkyl,

each of $R^2$, $R^4$, Y1 and Y3 is a hydrogen atom, and

Y2 is a halogen atom or $C_1$-$C_6$ haloalkyl.

[38] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [1], wherein the formula (1) is the folloinwg formula (1-a-G1):



**(1-a-G1)**

wherein

$R^1$ is $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_2$-$C_6$ alkenyl, $C_2$-$C_6$ haloalkenyl, $C_2$-$C_6$ alkynyl or $C_2$-$C_6$ haloalkynyl,

$R^3$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ haloalkylthio, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ haloalkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl or $C_1$-$C_6$ haloalkylsulfonyl,

$A^{1a}$ is a hydrogen atom, $C_1$-$C_6$ alkyl, $C_2$-$C_6$ alkenyl or $C_2$-$C_6$ alkynyl, and

each of $R^4$, $R^5$, Y1, Y2, Y3 and Y4 is independently a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl or $C_1$-$C_6$ haloalkyl.

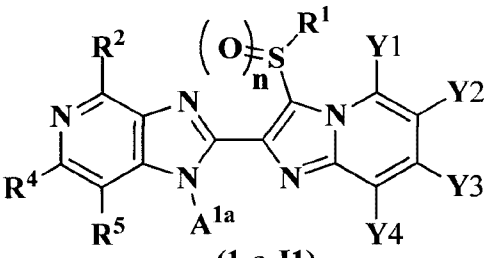
[39] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [38], wherein

each of $R^1$ and $A^{1a}$ is independently $C_1$-$C_6$ alkyl,

each of $R^3$ and Y3 is independently $C_1$-$C_6$ haloalkyl, and

each of $R^4$, $R^5$, Y1, Y2 and Y4 is a hydrogen atom.

[40] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [1], wherein the formula (1) is the folloinwg formula (1-a-I1):



**(1-a-I1)**

wherein

$R^1$ is $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_2$-$C_6$ alkenyl, $C_2$-$C_6$ haloalkenyl, $C_2$-$C_6$ alkynyl

or $C_2$-$C_6$ haloalkynyl,

$R^4$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ haloalkylthio, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ haloalkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl or $C_1$-$C_6$ haloalkylsulfonyl,

$A^{1a}$ is a hydrogen atom, $C_1$-$C_6$ alkyl, $C_2$-$C_6$ alkenyl or $C_2$-$C_6$ alkynyl, and

each of $R^2$, $R^5$, Y1, Y2, Y3 and Y4 is independently a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl or $C_1$-$C_6$ haloalkyl.

[41] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [40], wherein

each of $R^1$ and $A^{1a}$ is independently $C_1$-$C_6$ alkyl,

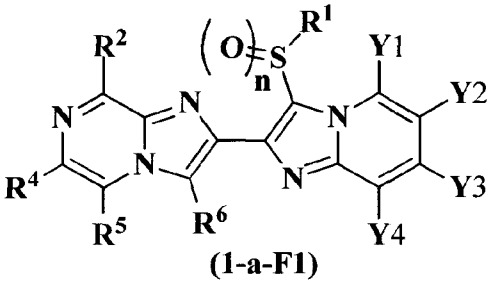
$R^4$ is $C_1$-$C_6$ haloalkyl,

Y2 is a hydrogen atom or $C_1$-$C_6$ haloalkyl,

Y3 is a hydrogen atom, a halogen atom or $C_1$-$C_6$ haloalkyl, and

each of $R^2$, $R^5$, Y1 and Y4 is a hydrogen atom.

[42] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [1], wherein the formula (1) is the folloinwg formula (1-a-F1):



**(1-a-F1)**

wherein

$R^1$ is $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_2$-$C_6$ alkenyl, $C_2$-$C_6$ haloalkenyl, $C_2$-$C_6$ alkynyl or $C_2$-$C_6$ haloalkynyl,

$R^4$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ haloalkylthio, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ haloalkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl or $C_1$-$C_6$ haloalkylsulfonyl, and

each of $R^2$, $R^5$, $R^6$, Y1, Y2, Y3 and Y4 is independently a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl or $C_1$-$C_6$ haloalkyl.

[43] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [42], wherein

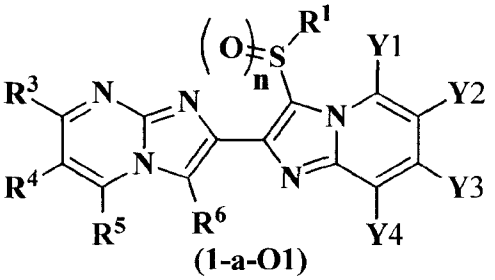
$R^1$ is $C_1$-$C_6$ alkyl,

$R^4$ is $C_1$-$C_6$ haloalkyl,

each of Y2 and Y3 is independently a hydrogen atom or $C_1$-$C_6$ haloalkyl, and

each of $R^2$, $R^5$, $R^6$, Y1 and Y4 is a hydrogen atom.

[44] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [1], wherein the formula (1) is the folloinwg formula (1-a-O1):




**(1-a-O1)**

wherein

$R^1$ is $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_2$-$C_6$ alkenyl, $C_2$-$C_6$ haloalkenyl, $C_2$-$C_6$ alkynyl or $C_2$-$C_6$ haloalkynyl,

$R^4$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ haloalkylthio, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ haloalkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl or $C_1$-$C_6$ haloalkylsulfonyl, and

each of $R^3$, $R^5$, $R^6$, Y1, Y2, Y3 and Y4 is independently a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl or $C_1$-$C_6$ haloalkyl.

[45] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [44], wherein

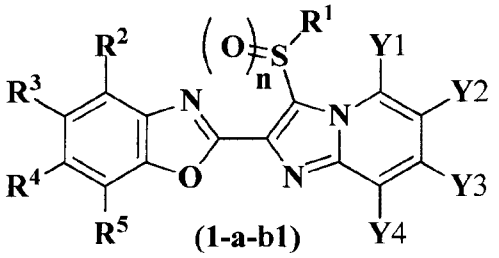
$R^1$ is $C_1$-$C_6$ alkyl,

$R^4$ is $C_1$-$C_6$ haloalkyl,

each of $R^6$ and Y2 is independently a halogen atom, and

each of $R^3$, $R^5$, Y1, Y3 and Y4 is a hydrogen atom.

[46] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [1] or [2], wherein the formula (1) is the folloinwg formula (1-a-b1):



(1-a-b1)

wherein

$R^1$ is $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_2$-$C_6$ alkenyl, $C_2$-$C_6$ haloalkenyl, $C_2$-$C_6$ alkynyl or $C_2$-$C_6$ haloalkynyl,

each of $R^3$ and $R^4$ is independently a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ haloalkylthio, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ haloalkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl or $C_1$-$C_6$ haloalkylsulfonyl, and

each of $R^2$, $R^5$, Y1, Y2, Y3 and Y4 is independently a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl or $C_1$-$C_6$ haloalkyl.

[47] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [46], wherein

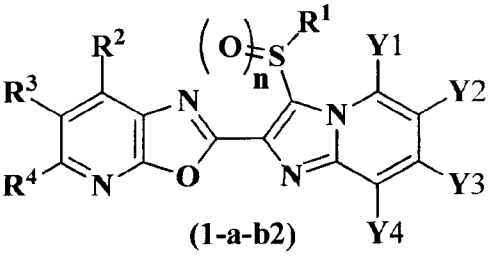
$R^1$ is $C_1$-$C_6$ alkyl,

$R^3$ is $C_1$-$C_6$ haloalkylthio, $C_1$-$C_6$ haloalkylsulfinyl or $C_1$-$C_6$ haloalkylsulfonyl,

each of Y2 and Y3 is independently a hydrogen atom or $C_1$-$C_6$ haloalkyl, and

each of $R^2$, $R^4$, $R^5$, Y1 and Y4 is a hydrogen atom.

[48] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [1] or [2], wherein the formula (1) is the folloinwg formula (1-a-b2):



(1-a-b2)

wherein

$R^1$ is $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_2$-$C_6$ alkenyl, $C_2$-$C_6$ haloalkenyl, $C_2$-$C_6$ alkynyl or $C_2$-$C_6$ haloalkynyl,

each of $R^3$ and $R^4$ is independently a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl,

$C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ haloalkylthio, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ haloalkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl or $C_1$-$C_6$ haloalkylsulfonyl, and

each of $R^2$, Y1, Y2, Y3 and Y4 is independently a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl or $C_1$-$C_6$ haloalkyl.

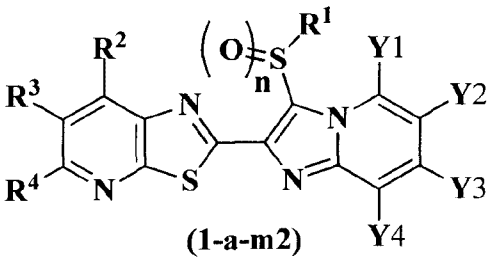
[49] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [48], wherein

$R^1$ is $C_1$-$C_6$ alkyl,

each of $R^3$ and Y3 is independently $C_1$-$C_6$ haloalkyl, and

each of $R^2$, $R^4$, Y1, Y2 and Y4 is a hydrogen atom.

[50] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [1] or [2], wherein the formula (1) is the folloinwg formula (1-a-m2):



**(1-a-m2)**

wherein

$R^1$ is $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_2$-$C_6$ alkenyl, $C_2$-$C_6$ haloalkenyl, $C_2$-$C_6$ alkynyl or $C_2$-$C_6$ haloalkynyl,

$R^3$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ haloalkylthio, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ haloalkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl or $C_1$-$C_6$ haloalkylsulfonyl, and

each of $R^2$, $R^4$, Y1, Y2, Y3 and Y4 is independently a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl or $C_1$-$C_6$ haloalkyl.

[51] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [50], wherein

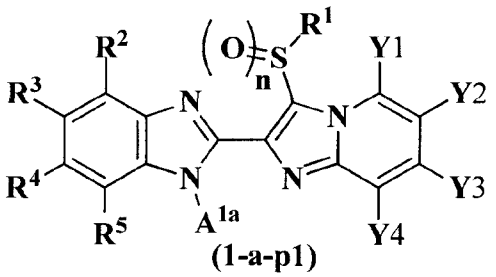
$R^1$ is $C_1$-$C_6$ alkyl,

each of $R^3$ and Y3 is independently $C_1$-$C_6$ haloalkyl, and

each of $R^2$, $R^4$, Y1, Y2 and Y4 is a hydrogen atom.

[52] The condensed heterocyclic compound or its salt or an N-oxide thereof according

to the above [1], [2] or [5], wherein the formula (1) is the folloinwg formula (1-a-p1):



(1-a-p1)

wherein

$R^1$ is $C_1$-$C_6$ alkyl,

$R^3$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ haloalkyl, $C_1$-$C_6$ haloalkylthio, $C_1$-$C_6$ haloalkylsulfinyl or $C_1$-$C_6$ haloalkylsulfonyl,

$R^4$ is a hydrogen atom, a halogen atom or $C_1$-$C_6$ haloalkyl,

$A^{1a}$ is a hydrogen atom or $C_1$-$C_6$ alkyl, and

each of $R^2$, $R^5$, Y1, Y2, Y3 and Y4 is independently a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl or $C_1$-$C_6$ haloalkyl.

[53] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [52], wherein

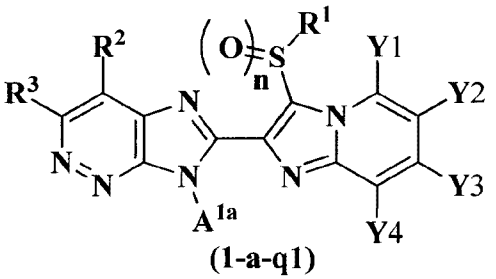
each of $R^2$ and $R^5$ is independently a hydrogen atom or a halogen atom,

each of $R^3$ and $R^4$ is independently a hydrogen atom or $C_1$-$C_6$ haloalkyl,

Y3 is $C_1$-$C_6$ haloalkyl, and

each of Y1, Y2 and Y4 is a hydrogen atom.

[54] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [1], [2] or [5], wherein the formula (1) is the folloinwg formula (1-a-q1):



(1-a-q1)

wherein

$R^1$ is $C_1$-$C_6$ alkyl,

$R^3$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ haloalkyl, $C_1$-$C_6$ haloalkylthio, $C_1$-$C_6$ haloalkylsulfinyl or $C_1$-$C_6$ haloalkylsulfonyl,

$A^{1a}$ is a hydrogen atom or $C_1$-$C_6$ alkyl, and

each of $R^2$, Y1, Y2, Y3 and Y4 is independently a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl or $C_1$-$C_6$ haloalkyl.

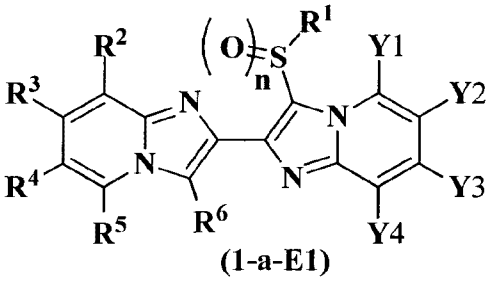
[55] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [54], wherein

each of $R^3$ and Y2 is independently $C_1$-$C_6$ haloalkyl,

$A^{1a}$ is $C_1$-$C_6$ alkyl, and

each of $R^2$, Y1, Y3 and Y4 is a hydrogen atom.

[56] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [1], [2], [10] or [11], wherein the formula (1) is the folloinwg formula (1-a-E1):



(1-a-E1)

wherein

$R^1$ is $C_1$-$C_6$ alkyl,

$R^2$ is a hydrogen atom,

$R^3$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ haloalkyl, $C_1$-$C_6$ haloalkylthio, $C_1$-$C_6$ haloalkylsulfinyl or $C_1$-$C_6$ haloalkylsulfonyl,

$R^4$ is a hydrogen atom, a halogen atom or $C_1$-$C_6$ haloalkyl, and

each of $R^5$, $R^6$, Y1, Y2, Y3 and Y4 is independently a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl or $C_1$-$C_6$ haloalkyl.

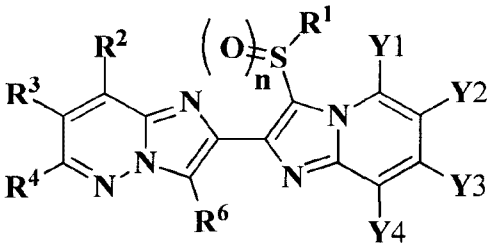
[57] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [56], wherein

each of $R^3$, $R^4$, Y2 and Y3 is independently a hydrogen atom or $C_1$-$C_6$ haloalkyl, and

each of $R^5$, $R^6$, Y1 and Y4 is a hydrogen atom.

[58] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [1], [2], [10] or [12], wherein the formula (1) is the folloinwg formula (1-a-

D1):



(1-a-D1)

wherein

$R^1$ is $C_1$-$C_6$ alkyl,

$R^2$ is a hydrogen atom,

$R^3$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ haloalkyl, $C_1$-$C_6$ haloalkylthio, $C_1$-$C_6$ haloalkylsulfinyl or $C_1$-$C_6$ haloalkylsulfonyl,

$R^4$ is a hydrogen atom, a halogen atom or $C_1$-$C_6$ haloalkyl, and

each of $R^6$, Y1, Y2, Y3 and Y4 is independently a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl or $C_1$-$C_6$ haloalkyl.

[59] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [58], wherein

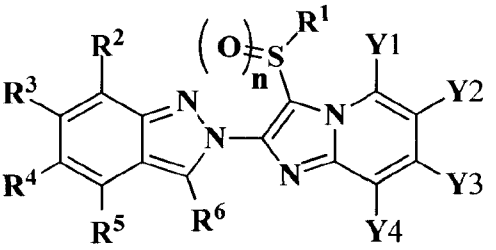
$R^3$ is $C_1$-$C_6$ haloalkyl,

Y2 is a hydrogen atom, a halogen atom or $C_1$-$C_6$ haloalkyl,

Y3 is a hydrogen atom or $C_1$-$C_6$ haloalkyl, and

each of $R^4$, $R^6$, Y1 and Y4 is a hydrogen atom.

[60] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [1], [2], [15] or [16], wherein the formula (1) is the folloinwg formula (1-a-j1):



(1-a-j1)

wherein

$R^1$ is $C_1$-$C_6$ alkyl,

$R^2$ is a hydrogen atom,

$R^3$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ haloalkyl, $C_1$-$C_6$ haloalkylthio, $C_1$-$C_6$ haloalkylsulfinyl or $C_1$-$C_6$ haloalkylsulfonyl,

$R^4$ is a hydrogen atom, a halogen atom or $C_1$-$C_6$ haloalkyl, and

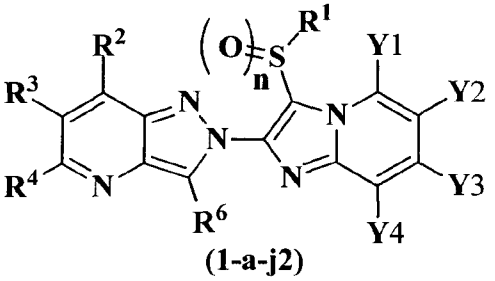
each of $R^5$, $R^6$, Y1, Y2, Y3 and Y4 is independently a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl or $C_1$-$C_6$ haloalkyl.

[61] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [60], wherein

each of $R^3$ and Y3 is independently $C_1$-$C_6$ haloalkyl, and

each of $R^4$, $R^5$, $R^6$, Y1, Y2 and Y4 is a hydrogen atom.

[62] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [1], [2], [15] or [17], wherein the formula (1) is the folloinwg formula (1-a-j2):



**(1-a-j2)**

wherein

$R^1$ is $C_1$-$C_6$ alkyl,

$R^2$ is a hydrogen atom,

$R^3$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ haloalkyl, $C_1$-$C_6$ haloalkylthio, $C_1$-$C_6$ haloalkylsulfinyl or $C_1$-$C_6$ haloalkylsulfonyl,

$R^4$ is a hydrogen atom, a halogen atom or $C_1$-$C_6$ haloalkyl, and

each of $R^6$, Y1, Y2, Y3 and Y4 is independently a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl or $C_1$-$C_6$ haloalkyl.

[63] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [62], wherein

$R^3$ is $C_1$-$C_6$ haloalkyl,

Y2 is a hydrogen atom or a halogen atom,

Y3 is a hydrogen atom or $C_1$-$C_6$ haloalkyl, and

each of $R^4$, $R^6$, Y1 and Y4 is a hydrogen atom.

[64] The condensed heterocyclic compound or its salt or an N-oxide thereof according

to the above [1], wherein

D substituted with $-S(O)_nR^1$ is a ring represented by either D1 or D2,

Q is a ring represented by either Q1 or Q2,

$R^{1a}$ is $C_1$-$C_8$ alkoxycarbonyl,

$R^2$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy or $C_1$-$C_8$ haloalkoxy,

each of $R^3$ and $R^4$ is independently a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ haloalkylthio, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ haloalkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl, $C_1$-$C_6$ haloalkylsulfonyl, mercapto, cyano or nitro,

$R^5$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl or $C_1$-$C_6$ haloalkyl,

$R^6$ is a hydrogen atom, a halogen atom or $C_1$-$C_6$ alkyl,

$A^{1a}$ is a hydrogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_2$-$C_6$ alkenyl, $C_2$-$C_6$ haloalkenyl, $C_2$-$C_6$ alkynyl, $C_2$-$C_6$ haloalkynyl, $C_3$-$C_6$ cycloalkyl ($C_1$-$C_6$) alkyl or $C_3$-$C_6$ halocycloalkyl ($C_1$-$C_6$) alkyl, and

each of Y1, Y2, Y3, Y4, Y5 and Y6 is independently a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, cyano or nitro.

[65] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [2], wherein

D substituted with $-S(O)_nR^1$ is a ring represented by D1,

$G_1$ is C(Y1),

$G_2$ is C(Y2),

$G_3$ is C(Y3),

$G_4$ is C(Y4),

$A^1$ is $N(A^{1a})$ or an oxygen atom,

$A^2$ is $C(R^2)$,

$A^3$ is $C(R^3)$,

each of $R^1$ and $A^{1a}$ is independently $C_1$-$C_6$ alkyl,

$R^3$ is $C_1$-$C_6$ haloalkyl, $C_1$-$C_6$ haloalkylthio, $C_1$-$C_6$ haloalkylsulfinyl or $C_1$-$C_6$ haloalkylsulfonyl,

$R^5$ is a hydrogen atom or $C_1$-$C_6$ alkyl,

each of Y2 and Y3 is independently a hydrogen atom or $C_1$-$C_6$ haloalkyl, and

each of $R^2$, $R^4$, $R^6$, Y1 and Y4 is a hydrogen atom.

[66] The condensed heterocyclic compound or its salt or an N-oxide thereof according to the above [3], wherein

D substituted with $-S(O)_n R^1$ is a ring represented by D2,

Q is a ring represented by Q1,

$G_5$ is C(Y5),

$A^1$ is $N(A^{1a})$,

$A^2$ is $C(R^2)$,

$A^3$ is $C(R^3)$,

$A^4$ is $C(R^4)$,

$A^5$ is a nitrogen atom,

each of $R^1$ and $A^{1a}$ is independently $C_1$-$C_6$ alkyl,

each of $R^2$, $R^4$ and Y5 is a hydrogen atom, and

each of $R^3$ and Y6 is independently $C_1$-$C_6$ haloalkyl.

[67] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [66], wherein

$R^1$ is $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_2$-$C_6$ alkenyl, $C_2$-$C_6$ haloalkenyl, $C_2$-$C_6$ alkynyl, $C_2$-$C_6$ haloalkynyl, $C_3$-$C_6$ cycloalkyl ($C_1$-$C_6$) alkyl or $C_3$-$C_6$ halocycloalkyl ($C_1$-$C_6$) alkyl.

[68] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [66], wherein

$R^1$ is $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl or $C_3$-$C_6$ cycloalkyl ($C_1$-$C_6$) alkyl.

[69] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [66], wherein

$R^1$ is $C_1$-$C_6$ alkyl or $C_1$-$C_6$ haloalkyl.

[70] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [66], wherein

$R^1$ is $C_1$-$C_6$ alkyl.

[71] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [66], wherein

$R^1$ is $C_1$-$C_6$ haloalkyl.

[72] The condensed heterocyclic compound or its salt or an N-oxide thereof according

to any one of the above [1] to [71], wherein

$R^{1a}$ is $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ alkoxycarbonyl or cyano.

[73] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [71], wherein

$R^{1a}$ is $C_1$-$C_8$ alkoxycarbonyl.

[74] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [73], wherein

$R^2$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl or $C_1$-$C_6$ haloalkyl.

[75] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [73], wherein

$R^2$ is a hydrogen atom.

[76] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [75], wherein

$R^3$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ haloalkylthio, ($C_1$-$C_6$) alkylthio optionally substituted with $R^{3a}$, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ haloalkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl or $C_1$-$C_6$ haloalkylsulfonyl.

[77] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [75], wherein

$R^3$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ haloalkyl, $C_1$-$C_6$ alkylthio, ($C_1$-$C_6$) alkylthio optionally substituted with $R^{3a}$, $C_1$-$C_6$ haloalkylthio, $C_1$-$C_6$ haloalkylsulfinyl or $C_1$-$C_6$ haloalkylsulfonyl.

[78] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [75], wherein

$R^3$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ haloalkyl, $C_1$-$C_6$ haloalkylthio, $C_1$-$C_6$ haloalkylsulfinyl or $C_1$-$C_6$ haloalkylsulfonyl.

[79] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [75], wherein

$R^3$ is $C_1$-$C_6$ haloalkylthio, $C_1$-$C_6$ haloalkylsulfinyl or $C_1$-$C_6$ haloalkylsulfonyl.

[80] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [75], wherein

$R^3$ is a halogen atom.

[81] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [75], wherein

$R^3$ is $C_1$-$C_6$ haloalkyl.

[82] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [75], wherein

$R^3$ is $C_1$-$C_6$ haloalkylthio.

[83] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [75], wherein

$R^3$ is $C_1$-$C_6$ haloalkylsulfinyl.

[84] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [75], wherein

$R^3$ is $C_1$-$C_6$ haloalkylsulfonyl.

[85] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [84], wherein

$R^4$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ haloalkylthio, ($C_1$-$C_6$) alkylthio optionally substituted with $R^{4a}$, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ haloalkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl or $C_1$-$C_6$ haloalkylsulfonyl.

[86] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [84], wherein

$R^4$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ haloalkyl, $C_1$-$C_6$ alkylthio, ($C_1$-$C_6$) alkylthio optionally substituted with $R^{4a}$, $C_1$-$C_6$ haloalkylthio, $C_1$-$C_6$ haloalkylsulfinyl or $C_1$-$C_6$ haloalkylsulfonyl.

[87] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [84], wherein

$R^4$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ haloalkyl, $C_1$-$C_6$ haloalkylthio, $C_1$-$C_6$ haloalkylsulfinyl or $C_1$-$C_6$ haloalkylsulfonyl.

[88] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [84], wherein

$R^4$ is a hydrogen atom.

[89] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [84], wherein

$R^4$ is a halogen atom.

[90] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [84], wherein

$R^4$ is $C_1$-$C_6$ haloalkylthio, $C_1$-$C_6$ haloalkylsulfinyl or $C_1$-$C_6$ haloalkylsulfonyl.

[91] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [84], wherein

$R^4$ is $C_1$-$C_6$ haloalkyl.

[92] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [91], wherein

$R^5$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl or $C_1$-$C_6$ haloalkyl.

[93] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [91], wherein

$R^5$ is a halogen atom.

[94] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [91], wherein

$R^5$ is a hydrogen atom.

[95] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [91], wherein

$R^5$ is $C_1$-$C_6$ alkyl.

[96] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [95], wherein

$R^6$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl or $C_1$-$C_6$ haloalkyl.

[97] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [95], wherein

$R^6$ is a hydrogen atom.

[98] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [95], wherein

$R^6$ is a halogen atom.

[99] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [95], wherein

$R^6$ is $C_1$-$C_6$ alkyl.

[100] The condensed heterocyclic compound or its salt or an N-oxide thereof according

to any one of the above [1] to [99], wherein

$R^7$ is a hydrogen atom, a halogen atom or $C_1$-$C_6$ haloalkyl.

[101] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [99], wherein

$R^7$ is $C_1$-$C_6$ haloalkyl.

[102] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [101], wherein

$R^8$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl or $C_1$-$C_6$ haloalkyl.

[103] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [101], wherein

$R^8$ is $C_1$-$C_6$ alkyl.

[104] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [103], wherein

$A^{1a}$ is a hydrogen atom, $C_1$-$C_6$ alkyl, ($C_1$-$C_6$) alkyl optionally substituted with $A^{1a-a}$, $C_2$-$C_6$ alkenyl, $C_2$-$C_6$ alkynyl, $C_1$-$C_8$ alkoxy, $C_3$-$C_6$ cycloalkyl or $C(O)R^{10a}$.

[105] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [103], wherein

$A^{1a}$ is a hydrogen atom, $C_1$-$C_6$ alkyl, $C_2$-$C_6$ alkenyl, $C_2$-$C_6$ alkynyl or $C_3$-$C_6$ cycloalkyl.

[106] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [103], wherein

$A^{1a}$ is a hydrogen atom.

[107] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [103], wherein

$A^{1a}$ is $C_1$-$C_6$ alkyl.

[108] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [107], wherein

each of Y1, Y2, Y3 and Y4 is independently a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_2$-$C_6$ alkenyl, $C_2$-$C_6$ alkynyl, ($C_2$-$C_6$) alkynyl optionally substituted with $Y^b$, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ haloalkylthio, ($C_1$-$C_6$) alkylthio optionally substituted with $Y^a$, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ haloalkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl, $C_1$-$C_6$ haloalkylsulfonyl, $-C(O)R^{90a}$, -

$C(O)NHR^{90b}$, $-C(O)N(R^{90c})R^{90b}$, -C(O)OH, hydroxy, $-OC(O)R^{90e}$, $-OS(O)_2R^{90f}$, $-NH_2$, $-NHR^{90g}$, $-N(R^{90h})R^{90g}$, mercapto, $-SC(O)R^{90i}$, $-S(O)_2NHR^{90j}$, $-S(O)_2N(R^{90k})R^{90j}$, $-SF_5$, cyano, nitro, phenyl, phenyl optionally substituted with $Y^c$, heterocyclyl or heterocyclyl optionally substituted with $Y^c$.

[109] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [107], wherein

each of Y1, Y2, Y3 and Y4 is independently a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_2$-$C_6$ alkenyl, ($C_2$-$C_6$) alkynyl optionally substituted with $Y^b$, $C_1$-$C_8$ alkoxy, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ haloalkylthio, ($C_1$-$C_6$) alkylthio optionally substituted with $Y^a$, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl, $-C(O)R^{90a}$, $-C(O)N(R^{90c})R^{90b}$, -C(O)OH, $-NH_2$, $-NHR^{90g}$, $-N(R^{90h})R^{90g}$, mercapto, cyano, nitro, phenyl, phenyl optionally substituted with $Y^c$, heterocyclyl or heterocyclyl optionally substituted with $Y^c$.

[110] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [109], wherein

Y1 is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl or $C_1$-$C_6$ haloalkyl.

[111] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [109], wherein

Y1 is a hydrogen atom.

[112] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [109], wherein

Y1 is a halogen atom.

[113] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [109], wherein

Y1 is $C_1$-$C_6$ alkyl.

[114] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [109], wherein

Y1 is $C_1$-$C_6$ haloalkyl.

[115] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [114], wherein

Y2 is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_2$-$C_6$ alkenyl, ($C_2$-$C_6$) alkynyl optionally substituted with $Y^b$, $C_1$-$C_8$ alkoxy, $C_1$-$C_6$ alkylthio,

$C_1$-$C_6$ haloalkylthio, ($C_1$-$C_6$) alkylthio optionally substituted with $Y^a$, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl, $-NH_2$, $-NHR^{90g}$, nitro, phenyl, phenyl optionally substituted with $Y^c$ or heterocyclyl.

[116] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [114], wherein

Y2 is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl or $C_1$-$C_6$ haloalkyl.

[117] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [114], wherein

Y2 is a hydrogen atom.

[118] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [114], wherein

Y2 is a halogen atom.

[119] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [114], wherein

Y2 is $C_1$-$C_6$ alkyl.

[120] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [114], wherein

Y2 is $C_1$-$C_6$ haloalkyl.

[121] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [120], wherein

Y3 is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_6$ alkylthio, ($C_1$-$C_6$) alkylthio optionally substituted with $Y^a$, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl, $-C(O)R^{90a}$, $-C(O)N(R^{90c})R^{90b}$, -C(O)OH, cyano or nitro.

[122] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [120], wherein

Y3 is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl or $C_1$-$C_6$ haloalkyl.

[123] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [120], wherein

Y3 is a hydrogen atom.

[124] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [120], wherein

Y3 is a halogen atom.

[125] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [120], wherein

Y3 is $C_1$-$C_6$ alkyl.

[126] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [120], wherein

Y3 is $C_1$-$C_6$ haloalkyl.

[127] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [126], wherein

Y4 is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ alkylsulfonyl, $-N(R^{90h})R^{90g}$ or cyano.

[128] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [126], wherein

Y4 is $C_1$-$C_8$ alkoxy, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ alkylsulfonyl, $-N(R^{90h})R^{90g}$ or cyano.

[129] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [126], wherein

Y4 is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl or $C_1$-$C_6$ haloalkyl.

[130] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [126], wherein

Y4 is a hydrogen atom.

[131] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [126], wherein

Y4 is a halogen atom.

[132] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [126], wherein

Y4 is $C_1$-$C_6$ alkyl.

[133] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [126], wherein

Y4 is $C_1$-$C_6$ haloalkyl.

[134] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [133], wherein

$Y^a$ is $C_1$-$C_8$ alkoxycarbonyl or $C_1$-$C_6$ alkylcarbonyl.

[135] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [133], wherein

$Y^a$ is $C_1$-$C_8$ alkoxycarbonyl.

[136] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [135], wherein

$Y^b$ is $C_1$-$C_6$ alkyl, $C_3$-$C_6$ cycloalkyl, trimethylsilyl or phenyl.

[137] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [135], wherein

$Y^b$ is $C_3$-$C_6$ cycloalkyl or trimethylsilyl.

[138] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [135], wherein

$Y^b$ is $C_3$-$C_6$ cycloalkyl.

[139] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [135], wherein

$Y^b$ is trimethylsilyl.

[140] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [139], wherein

$Y^c$ is a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, cyano or nitro.

[141] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [139], wherein

$Y^c$ is a halogen atom or $C_1$-$C_6$ haloalkyl.

[142] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [139], wherein

$Y^c$ is a halogen atom.

[143] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [139], wherein

$Y^c$ is $C_1$-$C_6$ haloalkyl.

[144] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [143], wherein

each of $R^{10a}$, $R^{20a}$, $R^{30a}$, $R^{30e}$, $R^{40a}$, $R^{40e}$, $R^{50a}$, $R^{60a}$ and $R^{90a}$ is independently a hydrogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy or $C_1$-$C_8$

haloalkoxy.

[145] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [143], wherein

each of $R^{10a}$, $R^{20a}$, $R^{30a}$, $R^{30e}$, $R^{40a}$, $R^{40e}$, $R^{50a}$, $R^{60a}$ and $R^{90a}$ is independently a hydrogen atom, $C_1$-$C_6$ alkyl or $C_1$-$C_8$ alkoxy.

[146] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [143], wherein

each of $R^{10a}$, $R^{20a}$, $R^{30a}$, $R^{30e}$, $R^{40a}$, $R^{40e}$, $R^{50a}$, $R^{60a}$ and $R^{90a}$ is a hydrogen atom.

[147] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [143], wherein

each of $R^{10a}$, $R^{20a}$, $R^{30a}$, $R^{30e}$, $R^{40a}$, $R^{40e}$, $R^{50a}$, $R^{60a}$ and $R^{90a}$ is independently $C_1$-$C_6$ alkyl.

[148] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [143], wherein

each of $R^{10a}$, $R^{20a}$, $R^{30a}$, $R^{30e}$, $R^{40a}$, $R^{40e}$, $R^{50a}$, $R^{60a}$ and $R^{90a}$ is independently $C_1$-$C_8$ alkoxy.

[149] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [148], wherein

each of $R^{20g}$, $R^{20h}$, $R^{30f}$, $R^{30g}$, $R^{30h}$, $R^{30i}$, $R^{40f}$, $R^{40g}$, $R^{40h}$, $R^{40i}$, $R^{50g}$, $R^{50h}$, $R^{60g}$, $R^{60h}$, $R^{90b}$, $R^{90c}$, $R^{90i}$, $R^{90j}$ and $R^{90k}$ is independently $C_1$-$C_6$ alkyl or $C_1$-$C_6$ haloalkyl.

[150] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [148], wherein

each of $R^{20g}$, $R^{20h}$, $R^{30f}$, $R^{30g}$, $R^{30h}$, $R^{30i}$, $R^{40f}$, $R^{40g}$, $R^{40h}$, $R^{40i}$, $R^{50g}$, $R^{50h}$, $R^{60g}$, $R^{60h}$, $R^{90b}$, $R^{90c}$, $R^{90i}$, $R^{90j}$ and $R^{90k}$ is independently $C_1$-$C_6$ alkyl.

[151] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [150], wherein

each of $R^{90g}$ and $R^{90h}$ is independently $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_6$ alkylcarbonyl, $C_1$-$C_6$ haloalkylcarbonyl, $C_1$-$C_8$ alkoxycarbonyl, $C_1$-$C_8$ haloalkoxycarbonyl, $C_1$-$C_6$ alkylaminocarbonyl, $C_1$-$C_6$ haloalkylaminocarbonyl, $C_1$-$C_6$ alkylaminothiocarbonyl, $C_1$-$C_6$ haloalkylaminothiocarbonyl, phenylcarbonyl, $C_1$-$C_6$

alkylsulfonyl, $C_1$-$C_6$ haloalkylsulfonyl, $C_1$-$C_6$ alkylaminosulfonyl or di($C_1$-$C_6$) alkylaminosulfonyl.

[152] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [151], wherein

$R^{90g}$ is $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkylcarbonyl, $C_1$-$C_8$ alkoxycarbonyl or phenylcarbonyl.

[153] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [151], wherein

$R^{90g}$ is $C_1$-$C_6$ alkyl.

[154] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [151], wherein

$R^{90g}$ is $C_1$-$C_6$ haloalkylcarbonyl.

[155] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [151], wherein

$R^{90g}$ is $C_1$-$C_8$ alkoxycarbonyl.

[156] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [151], wherein

$R^{90g}$ is phenylcarbonyl.

[157] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [156], wherein

$R^{90h}$ is $C_1$-$C_6$ alkyl.

[158] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [157], wherein

$T_1$ is a sulfur atom.

[159] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [157], wherein

$T_1$ is $N(T_{1a})$.

[160] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [159], wherein

$T_{1a}$ is a hydrogen atom.

[161] The condensed heterocyclic compound or its salt or an N-oxide thereof according to any one of the above [1] to [159], wherein

$T_{1a}$ is $C_1$-$C_6$ alkyl.

[162] A pesticide containing one or more members selected from the condensed heterocyclic compounds and their salts as defined in the above [1] to [161] as active ingredient(s).

[163] An agricultural chemical containing one or more members selected from the condensed heterocyclic compounds and their salts as defined in the above [1] to [161] as active ingredient(s).

[164] A parasiticide against internal or external parasites in or on a mammal or bird, containing one or more members selected from the condensed heterocyclic compounds and their salts as defined in the above [1] to [161] as activie ingredient(s).

[165] The parasiticide according to the above [164], wherein the external parasites are Siphonaptera or ticks.

[166] An insecticide or acaricide containing one or more members selected from the condensed heterocyclic compounds and their salts as defined in the above [1] to [161] as active ingredient(s).

[167] A seed treatment agent containing one or more members selected from the condensed heterocyclic compounds and their salts as defined in the above [1] to [161] as active ingredient(s).

[168] The seed treatment agent according to the above [167], which is used to treat seeds by dipping.

[169] A soil treatement agent containing one or more members selected from the condensed hetercyclic compounds as defined in the above [1] to [161] as active ingredient(s).

[170] The soil treatment agent according to the above [169], which is used to treat soil by irrigation.

## ADVANTAGEOUS EFFECTS OF INVENTION

The compounds of the present invention have excellent insecticidal and acaricidal activities on many agricultural pest insects, spider mites, internal or external parasites in or on a mammal or bird and have sufficient controlling effect on pest insects which have acquired resistance to conventional insecticides. The compounds of the present invention have little harmful effect on mammals, fish and beneficial insects, show low

persistence and are environmentally friendly. Thus, the present invention can provide useful novel pesticides.

## DESCRIPTION OF EMBODIMENTS

The compounds of the present invention can have geometrical isomers such as E-isomers and Z-isomers, depending on the types of substituents in them, and the present invention covers both E-isomers and Z-isomers and mixtures containing them in any ratios.

The compounds of the present invention can have optically active isomers due to the presence of one or more asymmetric carbon atoms or asymmetric sulfur atoms, and the present invention covers any optically active isomers and any racemates.

Further, the compounds of the present invention can have tautomers depending on the type of substituents in them, and the present invention covers all tautomers and mixtures containing them in any ratios.

Some of the compounds of the present invention can be converted, by ordinary methods, to salts with hydrogen halides such as hydrofluoric acid, hydrochloric acid, hydrobromic acid and hydroiodic acid, with inorganic acids such as nitric acid, sulfuric acid, phosphoric acid, chloric acid and perchloric acid, with sulfonic acids such as methanesulfonic acid, ethanesulfonic acid, trifluoromethanesulfonic acid, benzenesulfonic acid and p-toluenesulfonic acid, with carboxylic acids such as formic acid, acetic acid, propionic acid, trifluoroacetic acid, fumaric acid, tartaric acid, oxalic acid, maleic acid, malic acid, succinic acid, benzoic acid, mandelic acid, ascorbic acid, lactic acid, gluconic acid and citric acid, with amino acids such as glutamic acid and aspartic acid, with alkali metals such as lithium, sodium and potassium, with alkaline earth metals such as calcium, barium and magnesium, with aluminum, and with quaternary ammonium such as tetramethylammonium, tetrabutylammonium and benzyltrimethylammonium.

In the present invention, the N-oxide is a compound having a nitrogen atom constituting the ring in the heterocyclic group oxidized. A heterocyclic group which may constitute an N-oxide may, for example, be a condensed ring containing a pyridine ring, a condensed ring containing a pyrazine ring, a condensed ring containing a pyridazine ring or a condensed ring containing a pyrimidine ring.

Next, specific examples of each substituent used herein will be given below. n- denotes normal, i- iso, s- secondary, and tert- tertiary.

As a "halogen atom" in the compounds of the present invention, a fluorine atom, a chlorine atom, a bromine atom or an iodine atom may be mentioned. Herein, the expression "halo" also means such a halogen atom.

The expression "$C_a$-$C_b$ alkyl" herein means a linear or branched hydrocarbon group containing from a to b carbon atoms such as methyl, ethyl, n-propyl, i-propyl, n-butyl, i-butyl, s-butyl, tert-butyl, n-pentyl, 1,1-dimethylpropyl or n-hexyl, and those within the designated carbon number range are selected.

The expression "$C_a$-$C_b$ haloalkyl" herein means a linear or branched hydrocarbon group containing from a to b carbon atoms in which hydrogen atom(s) on carbon atom(s) are optionally substituted with halogen atom(s) which may be identical with or different from one another if two or more halogen atoms are present, such as fluoromethyl, chloromethyl, bromomethyl, iodomethyl, difluoromethyl, dichloromethyl, trifluoromethyl, chlorodifluoromethyl, trichloromethyl, bromodifluoromethyl, 1-fluoroethyl, 2-fluoroethyl, 2-chloroethyl, 2-bromoethyl, 2,2-difluoroethyl, 2,2,2-trifluoroethyl, 2-chloro-2,2-difluoroethyl, 2,2,2-trichloroethyl, 2-bromo-2,2-difluoroethyl, 1,1,2,2-tetrafluoroethyl, 2-chloro-1,1,2-trifluoroethyl, 2-chloro-1,1,2,2-tetrafluoroethyl, pentafluoroethyl, 2,2-difluoropropyl, 3,3,3-trifluoropropyl, 3-bromo-3,3-difluoropropyl, 2,2,3,3-tetrafluoropropyl, 2,2,3,3,3-pentafluoropropyl, 1,1,2,3,3,3-hexafluoropropyl, heptafluoropropyl, 2,2,2-trifluoro-1-(methyl)ethyl, 2,2,2-trifluoro-1-(trifluoromethyl)ethyl, 1,2,2,2-tetrafluoro-1-(trifluoromethyl)ethyl, 2,2,3,4,4,4-hexafluorobutyl, 2,2,3,3,4,4,4-heptafluorobutyl and nonafluorobutyl, and those within the designated carbon number range are selected.

The expression "$C_a$-$C_b$ alkenyl" herein means a linear or branched unsaturated hydrocarbon group containing from a to b carbon atoms and having one or more double bonds in the molecule, such as vinyl, 1-propenyl, 2-propenyl, 1-methylethenyl, 2-butenyl, 2-methyl-2-propenyl, 3-methyl-2-butenyl or 1,1-dimethyl-2-propenyl, and those within the designated carbon number range are selected.

The expression "$C_a$-$C_b$ haloalkenyl" herein means a linear or branched unsaturated hydrocarbon group containing from a to b carbon atoms and having one or more double bonds in the molecule, in which hydrogen atom(s) on carbon atom(s) are optionally substituted with halogen atom(s) which may be identical with or different from

one another if two or more halogen atoms are present, such as 2,2-dichlorovinyl, 2-fluoro-2-propenyl, 2-chloro-2-propenyl, 3-chloro-2-propenyl, 2-bromo-2-propenyl, 3,3-difluoro-2-propenyl, 2,3-dichloro-2-propenyl, 3,3-dichloro-2-propenyl, 2,3,3-trifluoro-2-propenyl, 2,3,3-trichloro-2-propenyl, 1-(trifluoromethyl)ethenyl, 4,4-difluoro-3-butenyl, 3,4,4-trifluoro-3-butenyl or 3-chloro-4,4,4-trifluoro-2-butenyl, and those within the designated carbon number range are selected.

The expression "$C_a$-$C_b$ alkynyl" herein means a linear or branched unsaturated hydrocarbon group containing from a to b carbon atoms and having one or more triple bonds in the molecule, such as ethynyl, propargyl, 2-butynyl, 3-butynyl, 1-pentynyl, 1-hexynyl or 4,4,4-trifluoro-2-butynyl, and those within the designated carbon number range are selected.

The expression "$C_a$-$C_b$ haloalkynyl" herein means a linear or branched unsaturated hydrocarbon group containing from a to b carbon atoms and having one or more triple bonds in the molecule, in which hydrogen atom(s) on carbon atom(s) are optionally substituted with halogen atom(s) which may be identical with or different from one another if two or more halogen atoms are present, such as 2-chloroethynyl, 2-bromoethynyl, 2-iodoethynyl, 3-chloro-2-propynyl, 3-bromo-2-propynyl or 3-iodo-2-propynyl, and those within the designated carbon number range are selected.

The expression "$C_a$-$C_b$ cycloalkyl" herein means a cyclic hydrocarbon group containing from a to b carbon atoms in the form of a 3- to 6-membered monocyclic or polycyclic ring which may optionally be substituted with an alkyl group as long as the number of carbon atoms does not exceed the designated carbon number range, such as cyclopropyl, 1-methylcyclopropyl, 2-methylcyclopropyl, 2,2-dimethylcyclopropyl, cyclobutyl, cyclopentyl or cyclohexyl, and those within the designated carbon number range are selected.

The expression "$C_a$-$C_b$ halocycloalkyl" herein means a cyclic hydrocarbon group containing from a to b carbon atoms in the form of a 3- to 6-membered monocyclic or polycyclic ring which may optionally be substituted with an alkyl group as long as the number of carbon atoms does not exceed the designated carbon number range, in which hydrogen atom(s) on carbon atom(s) in a ring moiety and/or in a side chain are optionally substituted with halogen atom(s) which may be identical with or different from one another if two or more halogen atoms are present, such as 2,2-difluorocyclopropyl,

2,2-dichlorocyclopropyl, 2,2-dibromocyclopropyl, 2,2-difluoro-1-methylcyclopropyl, 2,2-dichloro-1-methylcyclopropyl, 2,2-dibromo-1-methylcyclopropyl or 2,2,3,3-tetrafluorocyclobutyl, and those within the designated carbon number range are selected.

The expression "$C_a$-$C_b$ alkoxy" herein means an alkyl-O- group in which the alkyl is a previously mentioned alkyl group containing from a to b carbon atoms, such as methoxy, ethoxy, n-propyloxy, i-propyloxy, n-butyloxy, i-butyloxy, s-butyloxy, tert-butyloxy or 2-ethylhexyloxy, and those within the designated carbon number range are selected.

The expression "$C_a$-$C_b$ haloalkoxy" herein means a haloalkyl-O- group in which the haloalkyl is a previously mentioned haloalkyl group containing from a to b carbon atoms, such as difluoromethoxy, trifluoromethoxy, chlorodifluoromethoxy, bromodifluoromethoxy, 2-fluoroethoxy, 2-chloroethoxy, 2,2,2-trifluoroethoxy, 1,1,2,2,-tetrafluoroethoxy, 2-chloro-1,1,2-trifluoroethoxy or 1,1,2,3,3,3-hexafluoropropyloxy, and those within the designated carbon number range are selected.

The expression "$C_a$-$C_b$ alkenyloxy" herein means an alkenyl-O- group in which the alkenyl is a previously mentioned alkenyl group containing from a to b carbon atoms, such as 2-propenyloxy, 2-butenyloxy, 2-methyl-2-propenyloxy or 3-methyl-2-butenyloxy, and those within the designated carbon number range are selected.

The expression "$C_a$-$C_b$ haloalkenyloxy" herein means a haloalkenyl-O- group in which the haloalkenyl is a previously mentioned haloalkenyl group containing from a to b carbon atoms, such as 3,3-difluoroallyloxy or 3,3-dichloroallyloxy, and those within the designated carbon number range are selected.

The expression "$C_a$-$C_b$ alkynyloxy" herein means an alkynyl-O- group in which the alkynyl is a previously mentioned alkynyl group containing from a to b carbon atoms, such as ethynyloxy, propargyloxy, 2-butynyloxy, 1-pentynyloxy or 1-hexynyloxy, and those within the designated carbon number range are selected.

The expression "$C_a$-$C_b$ haloalkynyloxy" herein means a haloalkynyl-O- group in which the haloalkynyl is a previously mentioned haloalkynyl group containing from a to b carbon atoms, such as 3-chloro-2-propynyloxy, 3-bromo-2-propynyloxy or 3-iodo-2-propynyloxy, and those within the designated carbon number range are selected.

The expression "$C_a$-$C_b$ alkylthio" herein means an alkyl-S- group in which the alkyl is a previously mentioned alkyl group containing from a to b carbon atoms, such as

methylthio, ethylthio, n-propylthio, i-propylthio, n-butylthio, i-butylthio, s-butylthio or tert-butylthio, and those within the designated carbon number range are selected.

The expression "$C_a$-$C_b$ haloalkylthio" herein means a haloalkyl-S- group in which the haloalkyl is a previously mentioned haloalkyl group containing from a to b carbon atoms, such as difluoromethylthio, trifluoromethylthio, chlorodifluoromethylthio, bromodifluoromethylthio, 2,2,2-trifluoroethylthio, 1,1,2,2-tetrafluoroethylthio, 2-chloro-1,1,2-trifluoroethylthio, pentafluoroethylthio, 1,1,2,3,3,3-hexafluoropropylthio, heptafluoropropylthio, 1,2,2,2-tetrafluoro-1-(trifluoromethyl)ethylthio or nonafluorobutylthio, and those within the designated carbon number range are selected.

The expression "$C_a$-$C_b$ alkenylthio" herein means an alkenyl-S- group in which the alkenyl is a previously mentioned alkenyl group containing from a to b carbon atoms, such as 2-propenylthio, 2-butenylthio, 2-methyl-2-propenylthio or 3-methyl-2-butenylthio, and those within the designated carbon number range are selected.

The expression "$C_a$-$C_b$ haloalkenylthio" herein means a haloalkenyl-S- group in which the haloalkenyl is a previously mentioned haloalkenyl group containing from a to b carbon atoms, such as 2-fluoro-2-propenylthio, 2-chloro-2-propenylthio, 3,3-difluoro-2-propenylthio, 3,3-dichloro-2-propenylthio, 2,3,3-trifluoro-2-propenylthio, 4,4-difluoro-3-butenylthio or 3,4,4-trifluoro-3-butenylthio, and those within the designated carbon number range are selected.

The expression "$C_a$-$C_b$ alkynylthio" herein means an alkynyl-S- group in which the alkynyl is a previously mentioned alkynyl group containing from a to b carbon atoms, such as propynylthio, butynylthio, pentynylthio or hexynylthio, and those within the designated carbon number range are selected.

The expression "$C_a$-$C_b$ haloalkynylthio" herein means a haloalkynyl-S- group in which the haloalkynyl is a previously mentioned haloalkynyl group containing from a to b carbon atoms, such as 3-chloro-2-propynylthio, 3-bromo-2-propynylthio or 3-iodo-2-propynylthio, and those within the designated carbon number range are selected.

The expression "$C_a$-$C_b$ alkylsulfinyl" herein means an alkyl-S(O)- group in which the alkyl is a previously mentioned alkyl group containing from a to b carbon atoms, such as methylsulfinyl, ethylsulfinyl, n-propylsulfinyl, i-propylsulfinyl, n-butylsulfinyl, i-butylsulfinyl, s-butylsulfinyl or tert-butylsulfinyl, and those within the designated carbon number range are selected.

The expression "$C_a$-$C_b$ haloalkylsulfinyl" herein means a haloalkyl-S(O)- group in which the haloalkyl is a previously mentioned haloalkyl group containing from a to b carbon atoms, such as difluoromethylsulfinyl, trifluoromethylsulfinyl, chlorodifluoromethylsulfinyl, bromodifluoromethylsulfinyl, 2,2,2-trifluoroethylsulfinyl, 1,2,2,2-tetrafluoro-1-(trifluoromethyl)ethylsulfinyl or nonafluorobutylsulfinyl, and those within the designated carbon number range are selected.

The expression "$C_a$-$C_b$ alkenylsulfinyl" herein means an alkenyl-S(O)- group in which the alkenyl is a previously mentioned alkenyl group containing from a to b carbon atoms, such as 2-propenylsulfinyl, 2-butenylsulfinyl, 2-methyl-2-propenylsulfinyl or 3-methyl-2-butenylsulfinyl, and those within the designated carbon number range are selected.

The expression "$C_a$-$C_b$ haloalkenylsulfinyl" herein means a haloalkenyl-S(O)- group in which the haloalkenyl is a previously mentioned haloalkenyl group containing from a to b carbon atoms, such as 2-fluoro-2-propenylsulfinyl, 2-chloro-2-propenylsulfinyl, 3,3-difluoro-2-propenylsulfinyl, 3,3-dichloro-2-propenylsulfinyl, 4,4-difluoro-3-butenylsulfinyl or 3,4,4-trifluoro-3-butenylsulfinyl, and those within the designated carbon number range are selected.

The expression "$C_a$-$C_b$ alkynylsulfinyl" herein means an alkynyl-S(O)- group in which the alkynyl is a previously mentioned alkynyl group containing from a to b carbon atoms, such as 2-propynylsulfinyl or 2-butynylsulfinyl, and those within the designated carbon number range are selected.

The expression "$C_a$-$C_b$ haloalkynylsulfinyl" herein means a haloalkynyl-S(O)- group in which the haloalkynyl is a previously mentioned haloalkynyl group containing from a to b carbon atoms, such as 3-chloro-2-propynylsulfinyl, 3-bromo-2-propynylsulfinyl or 3-iodo-2-propynylsulfinyl, and those within the designated carbon number range are selected.

The expression "$C_a$-$C_b$ alkylsulfonyl" herein means an alkyl-$SO_2$- group in which the alkyl is a previously mentioned alkyl group containing from a to b carbon atoms, such as methylsulfonyl, ethylsulfonyl, n-propylsulfonyl, i-propylsulfonyl, n-butylsulfonyl, i-butylsulfonyl, s-butylsulfonyl or tert-butylsulfonyl, and those within the designated carbon number range are selected.

The expression "$C_a$-$C_b$ haloalkylsulfonyl" herein means a haloalkyl-$SO_2$- group in

which the haloalkyl is a previously mentioned haloalkyl group containing from a to b carbon atoms, such as difluoromethylsulfonyl, trifluoromethylsulfonyl, chlorodifluoromethylsulfonyl, bromodifluoromethylsulfonyl, 2,2,2-trifluoroethylsulfonyl, 1,1,2,2-tetrafluoroethylsulfonyl or 2-chloro-1,1,2-trifluoroethylsulfonyl, and those within the designated carbon number range are selected.

The expression "$C_a$-$C_b$ alkenylsulfonyl" herein means an alkenyl-$SO_2$- group in which the alkenyl is a previously mentioned alkenyl group containing from a to b carbon atoms, such as 2-propenylsulfonyl, 2-butenylsulfonyl, 2-methyl-2-propenylsulfonyl or 3-methyl-2-butenylsulfonyl, and those within the designated carbon number range are selected.

The expression "$C_a$-$C_b$ haloalkenylsulfonyl" herein means a haloalkenyl-$SO_2$- group in which the haloalkenyl is a previously mentioned haloalkenyl group containing from a to b carbon atoms, such as 2-fluoro-2-propenylsulfonyl, 2-chloro-2-propenylsulfonyl, 3,3-difluoro-2-propenylsulfonyl, 3,3-dichloro-2-propenylsulfonyl, 4,4-difluoro-3-butenylsulfonyl or 3,4,4-trifluoro-3-butenylsulfonyl, and those within the designated carbon number range are selected.

The expression "$C_a$-$C_b$ alkynylsulfonyl" herein means an alkynyl-$SO_2$- group in which the alkynyl is a previously mentioned alkynyl group containing from a to b carbon atoms, such as 2-propynylsulfonyl or 2-butynylsulfonyl, and those within the designated carbon number range are selected.

The expression "$C_a$-$C_b$ haloalkynylsulfonyl" herein means a haloalkynyl-$SO_2$- group in which the haloalkynyl is a previously mentioned haloalkynyl group containing from a to b carbon atoms, such as 3-chloro-2-propynylsulfonyl, 3-bromo-2-propynylsulfonyl or 3-iodo-2-propynylsulfonyl, and those within the designated carbon number range are selected.

The expression "$C_a$-$C_b$ alkylamino" herein means an amino group in which either hydrogen atom is replaced with a previously mentioned alkyl group containing from a to b carbon atoms, such as methylamino, ethylamino, n-propylamino, i-propylamino, n-butylamino, i-butylamino or tert-butylamino, and those within the designated carbon number range are selected.

The expression "$C_a$-$C_b$ haloalkylamino" herein means an amino group in which either hydrogen atom is replaced with a previously mentioned haloalkyl group

containing from a to b carbon atoms, such as 2,2,2-trifluoroethylamino, 2-chloro-2,2-difluoroethylamino or 3,3,3-trifluoropropylamino, and those within the designated carbon number range are selected.

The expression "di($C_a$-$C_b$) alkylamino" herein means an amino group in which both hydrogen atoms are replaced with previously mentioned alkyl groups containing from a to b carbon atoms which may be identical with or different from each other, such as dimethylamino, ethyl(methyl)amino, diethylamino, n-propyl(methyl)amino, i-propyl(methyl)amino, di(n-propyl)amino or di(n-butyl)amino, and those within the designated carbon number range are selected.

The expression "di($C_a$-$C_b$) haloalkylamino" herein means an amino group in which both hydrogen atoms are replaced with previously mentioned haloalkyl groups containing from a to b carbon atoms which may be identical with or different from each other, such as bis(2,2,2-trifluoroethyl)amino, and those within the designated carbon number range are selected.

The expression "$C_a$-$C_b$ alkylcarbonyl" herein means an alkyl-C(O)- group in which the alkyl means a previously mentioned alkyl group containing from a to b carbon atoms, such as acetyl, propionyl, butyryl, isobutyryl, valeryl, isovaleryl, 2-methylbutanoyl, pivaloyl, hexanoyl or heptanoyl, and those within the designated carbon number range are selected.

The expression "$C_a$-$C_b$ haloalkylcarbonyl" herein means a haloalkyl-C(O)- group in which the haloalkyl means a previously mentioned haloalkyl group containing from a to b carbon atoms, such as fluoroacetyl, chloroacetyl, difluoroacetyl, dichloroacetyl, trifluoroacetyl, chlorodifluoroacetyl, bromodifluoroacetyl, trichloroacetyl, pentafluoropropionyl, heptafluorobutanoyl or 3-chloro-2,2-dimethylpropanoyl, and those within the designated carbon number range are selected.

The expression "$C_a$-$C_b$ alkoxycarbonyl" herein means an alkyl-O-C(O)- group in which the alkyl means a previously mentioned alkyl group containing from a to b carbon atoms, such as methoxycarbonyl, ethoxycarbonyl, n-propyloxycarbonyl, i-propyloxycarbonyl, n-butoxycarbonyl, i-butoxycarbonyl, s-butoxycarbonyl, tert-butoxycarbonyl or 2-ethylhexyloxycarbonyl, and those within the designated carbon number range are selected.

The expression "$C_a$-$C_b$ haloalkoxycarbonyl" herein means a haloalkyl-O-C(O)-

group in which the haloalkyl means a previously mentioned haloalkyl group containing from a to b carbon atoms, such as chloromethoxycarbonyl, 2-chloroethoxycarbonyl, 2,2-difluoroethoxycarbonyl, 2,2,2-trifluoroethoxycarbonyl or 2,2,2-trichloroethoxycarbonyl, and those within the designated carbon number range are selected.

The expression "$C_a$-$C_b$ alkylaminocarbonyl" herein means a carbamoyl group in which either hydrogen atom is replaced with a previously mentioned alkyl group containing from a to b carbon atoms, such as methylcarbamoyl, ethylcarbamoyl, n-propylcarbamoyl, i-propylcarbamoyl, n-butylcarbamoyl, i-butylcarbamoyl, s-butylcarbamoyl or tert-butylcarbamoyl, and those within the designated carbon number range are selected.

The expression "$C_a$-$C_b$ haloalkylaminocarbonyl" herein means a carbamoyl group in which either hydrogen atom is replaced with a previously mentioned haloalkyl group containing from a to b carbon atoms, such as 2-fluoroethylcarbamonyl, 2-chloroethylcarbamoyl, 2,2-difluoroethylcarbamoyl or 2-trifluoroethylcarbamoyl, and those within the designated carbon number range are selected.

The expression "$C_a$-$C_b$ alkylaminothiocarbonyl" herein means an amino-C(=S)-group in which either hydrogen atom is replaced with a previously mentioned alkyl group containing from a to b carbon atoms, such as methylthiocarbamoyl, ethylthiocarbamoyl, n-propylthiocarbamoyl, i-propylthiocarbamoyl, n-butylthiocarbamoyl, i-butylthiocarbamoyl, s-butylthiocarbamoyl or tert-butylthiocarbamoyl, and those within the designated carbon number range are selected.

The expression "$C_a$-$C_b$ haloalkylaminothiocarbonyl" herein means an amino-C(=S)- group in which either hydrogen atom is replaced with a previously mentioned haloalkyl group containing from a to b carbon atoms, such as 2-fluoroethylthiocarbamoyl, 2-chloroethylthiocarbamoyl, 2,2-difluoroethylthiocarbamoyl or 2-trifluoroethylthiocarbamoyl, and those within the designated carbon number range are selected.

The expression "$C_a$-$C_b$ alkylaminosulfonyl" herein means a sulfamoyl group in which either hydrogen atom is replaced with a previously mentioned alkyl group containing from a to b carbon atoms, such as methylsulfamoyl, ethylsulfamoyl, n-propylsulfamoyl, i-propylsulfamoyl, n-butylsulfamoyl, i-butylsulfamoyl, s-butylsulfamoyl or tert-butylsulfamoyl, and those within the designated carbon number range are

selected.

The expression "di($C_a$-$C_b$) alkylaminosulfonyl" herein means a sulfamoyl group in which both hydrogen atoms are replaced with previously mentioned alkyl groups containing from a to b carbon atoms which may be identical with or different from each other, such as N,N-dimethylsulfamoyl, N-ethyl-N-methylsulfamoyl, N,N-diethylsulfamoyl, N,N-di(n-propyl)sulfamoyl or N,N-di(n-butyl)sulfamoyl, and those within the designated carbon number range are selected.

The expression "heterocyclyl" herein may, for example, be specifically thiophen-2-yl, thiophen-3-yl, furan-2-yl, furan-3-yl, pyrrol-1-yl, pyrrol-2-yl, pyrrol-3-yl, oxazol-2-yl, oxazol-4-yl, oxazol-5-yl, isoxazol-3-yl, isoxazol-4-yl, isoxazol-5-yl, isoxazolin-3-yl, isoxazolin-4-yl, isoxazolin-5-yl, thiazol-2-yl, thiazol-4-yl, thiazol-5-yl, isothiazol-3-yl, isothiazol-4-yl, isothiazol-5-yl, pyrazol-1-yl, pyrazol-3-yl, pyrazol-4-yl, pyrazol-5-yl, imidazol-1-yl, imidazol-2-yl, imidazol-4-yl, 1,3,4-oxadiazol-2-yl, 1,2,4-oxadiazol-3-yl, 1,2,4-oxadiazol-5-yl, 1,3,4-thiadiazol-2-yl, 1,2,4-thiadiazol-3-yl, 1,2,4-thiadiazol-5-yl, 1,2,4-triazol-1-yl, 1,2,4-triazol-3-yl, 1,2,4-triazol-5-yl, 1,2,3-thiadiazol-4-yl, 1,2,3-thiadiazol-5-yl, 1,2,3-triazol-1-yl, 1,2,3-triazol-2-yl, 1,2,3-triazol-4-yl, 1,2,3,4-tetrazol-1-yl, 1,2,3,4-tetrazol-2-yl, 1,2,3,4-tetrazol-5-yl, pyridin-2-yl, pyridin-3-yl, pyridin-4-yl, pyrimidin-2-yl, pyrimidin-4-yl, pyrimidin-5-yl, pyrazin-2-yl, pyridazin-3-yl, pyridazin-4-yl, 1,3,5-triazin-2-yl, 1,2,4-triazin-3-yl, 1,2,4-triazin-5-yl, 1,2,4-triazin-6-yl, benzothiophen-2-yl, benzothiophen-3-yl, benzothiophen-4-yl, benzothiophen-5-yl, benzothiophen-6-yl, benzothiophen-7-yl, benzofuran-2-yl, benzofuran-3-yl, benzofuran-4-yl, benzofuran-5-yl, benzofuran-6-yl, benzofuran-7-yl, indol-1-yl, indol-2-yl, indol-3-yl, indol-4-yl, indol-5-yl, indol-6-yl, indol-7-yl, benzothiazol-2-yl, benzothiazol-4-yl, benzothiazol-5-yl, benzothiazol-6-yl, benzothiazol-7-yl, benzimidazol-1-yl, benzimidazol-2-yl, benzimidazol-4-yl, benzimidazol-5-yl, benzimidazol-6-yl, benzimidazol-7-yl, benzisoxazol-3-yl, benzisoxazol-4-yl, benzisoxazol-5-yl, benzisoxazol-6-yl, benzisoxazol-7-yl, benzisothiazol-3-yl, benzisothiazol-4-yl, benzisothiazol-5-yl, benzisothiazol-6-yl, benzisothiazol-7-yl, indazol-1-yl, indazol-3-yl, indazol-4-yl, indazol-5-yl, indazol-6-yl, indazol-7-yl, benzoxazol-2-yl, benzoxazol-4-yl, benzoxazol-5-yl, benzoxazol-6-yl, benzoxazol-7-yl, quinolin-2-yl, quinolin-3-yl, quinolin-4-yl, quinolin-5-yl, quinolin-6-yl, quinolin-7-yl, quinolin-8-yl, isoquinolin-1-yl, isoquinolin-3-yl, isoquinolin-4-yl, isoquinolin-5-yl, isoquinolin-6-yl, isoquinolin-7-yl, isoquinolin-8-yl, quinoxalin-2-yl,

quinoxalin-3-yl, quinoxalin-5-yl, quinoxalin-6-yl, quinoxalin-7-yl, quinoxalin-8-yl, phthalazin-1-yl, phthalazin-4-yl, phthalazin-5-yl, phthalazin-6-yl, phthalazin-7-yl, phthalazin-8-yl, cinnolin-3-yl, cinnolin-4-yl, cinnolin-5-yl, cinnolin-6-yl, cinnolin-7-yl, cinnolin-8-yl, quinazolin-2-yl, quinazolin-4-yl, quinazolin-5-yl, quinazolin-6-yl, quinazolin-7-yl or quinazolin-8-yl.

The expression such as "$C_a$-$C_b$ cycloalkyl ($C_d$-$C_e$) alkyl", "$C_a$-$C_b$ halocycloalkyl ($C_d$-$C_e$) alkyl" or "hydroxy ($C_d$-$C_e$) alkyl" herein means a previously mentioned alkyl group containing from d to e carbon atoms in which hydrogen atom(s) on carbon atom(s) are optionally substituted with an optional previously mentioned $C_a$-$C_b$ cycloalkyl, $C_a$-$C_b$ halocycloalkyl or hydroxy, and those within the designated carbon number range are selected.

The expression such as "($C_a$-$C_b$) alkyl optionally substituted with $R^{1a}$", "($C_1$-$C_6$) alkyl optionally substituted with $A^{1a-a}$" or "($C_1$-$C_6$) alkyl optionally substituted with $Y^a$" herein means a previously mentioned alkyl group having from a to b carbon atoms in which hydrogen atom(s) on carbon(s) are optionally substituted with optional $R^{1a}$, $A^{1a-a}$ or $Y^a$, and those within the designated carbon number range are selected. When there are two or more $R^{1a}$'s, $A^{1a-a}$'s or $Y^a$'s on ($C_a$-$C_b$) alkyl, each $R^{1a}$, $A^{1a-a}$ or $Y^a$ may be identical with or different from one another.

The expression such as "($C_a$-$C_b$) haloalkyl optionally substituted with $A^{1a-a}$" or "($C_a$-$C_b$) haloalkyl optionally substituted with $Y^a$" herein means a previously mentioned haloalkyl group having from a to b carbon atoms in which hydrogen atom(s) or halogen atom(s) on carbon atom(s) are optionally substituted with optional $A^{1a-a}$ or $Y^a$, and those within the designated carbon number range are selected. When there are two or more $A^{1a-a}$'s or $Y^a$'s on ($C_a$-$C_b$) haloalkyl, each $A^{1a-a}$ or $Y^a$ may be identical with or different from one another.

The expression such as "($C_a$-$C_b$) alkenyl optionally substituted with $Y^a$" herein means a previously mentioned alkenyl group having from a to b carbon atoms in which hydrogen atom(s) on carbon atom(s) are optionally substituted with optional $Y^a$, and those within the designated carbon number range are selected. When there are two or more $Y^a$'s on ($C_a$-$C_b$) alkenyl, each $Y^a$ may be identical with or different from one another.

The expression such as "($C_a$-$C_b$) alkynyl optionally substituted with $Y^b$" herein

means a previously mentioned alkynyl group having from a to b carbon atoms in which hydrogen atom(s) on carbon atom(s) are optionally substituted with optional $Y^b$, and those within the designated carbon number range are selected. When there are two or more $Y^b$'s on ($C_a$-$C_b$) alkynyl, each $Y^b$ may be identical with or different from one another.

The expression such as "($C_a$-$C_b$) alkoxy optionally substituted with $Y^a$" herein means a previously mentioned alkoxy group having from a to b carbon atoms in which hydrogen atom(s) on carbon atom(s) are optionally substituted with optional $Y^a$, and those within the designated carbon number range are selected. When there are two or more $Y^a$'s on ($C_a$-$C_b$) alkoxy, each $Y^a$ may be identical with or different from one another.

The expression such as "($C_a$-$C_b$) alkenyloxy optionally substituted with $Y^a$" herein means a previously mentioned alkenyloxy group having from a to b carbon atoms in which hydrogen atom(s) on carbon atom(s) are optionally substituted with optional $Y^a$, and those within the designated carbon number range are selected. When there are two or more $Y^a$'s on ($C_a$-$C_b$) alkenyloxy, each $Y^a$ may be identical with or different from one another.

The expression such as "($C_a$-$C_b$) alkynyloxy optionally substituted with $Y^a$" herein means a previously mentioned alkynyloxy group having from a to b carbon atoms in which hydrogen atom(s) on carbon atom(s) are optionally substituted with optional $Y^a$, and those within the designated carbon number range are selected. When there are two or more $Y^a$'s on ($C_a$-$C_b$) alkynyloxy, each $Y^a$ may be identical with or different from one another.

The expression "($C_a$-$C_b$) alkylthio optionally substituted with $R^{3a}$", "($C_a$-$C_b$) alkylthio optionally substituted with $R^{4a}$" or "($C_a$-$C_b$) alkylthio optionally substituted with $Y^a$" herein means a previously mentioned alkylthio group having from a to b carbon atoms in which hydrogen atom(s) on carbon atom(s) are optionally substituted with optional $R^{3a}$, $R^{4a}$ or $Y^a$, and those within the designated carbon number range are selected. When there are two or more $R^{3a}$'s, $R^{4a}$'s or $Y^a$'s on ($C_a$-$C_b$) alkylthio, each $R^{3a}$, $R^{4a}$ or $Y^a$ may be identical with or different from one another.

The expression such as "($C_a$-$C_b$) alkylsulfinyl optionally substituted with $Y^a$" herein means a previously mentioned alkylsulfinyl group having from a to b carbon atoms in which hydrogen atom(s) on carbon atom(s) are optionally substituted with optional $Y^a$, and those within the designated carbon number range are selected. When there are

two or more $Y^a$'s on ($C_a$-$C_b$) alkylsulfinyl, each $Y^a$ may be identical with or different from one another.

The expression such as "($C_a$-$C_b$) alkylsulfonyl optionally substituted with $Y^a$" herein means a previously mentioned alkylsulfonyl group having from a to b carbon atoms in which hydrogen atom(s) on carbon atom(s) are optionally substituted with optional $Y^a$, and those within the designated carbon number range are selected. When there are two or more $Y^a$'s on ($C_a$-$C_b$) alkylsulfonyl, each $Y^a$ may be identical with or different from one another.

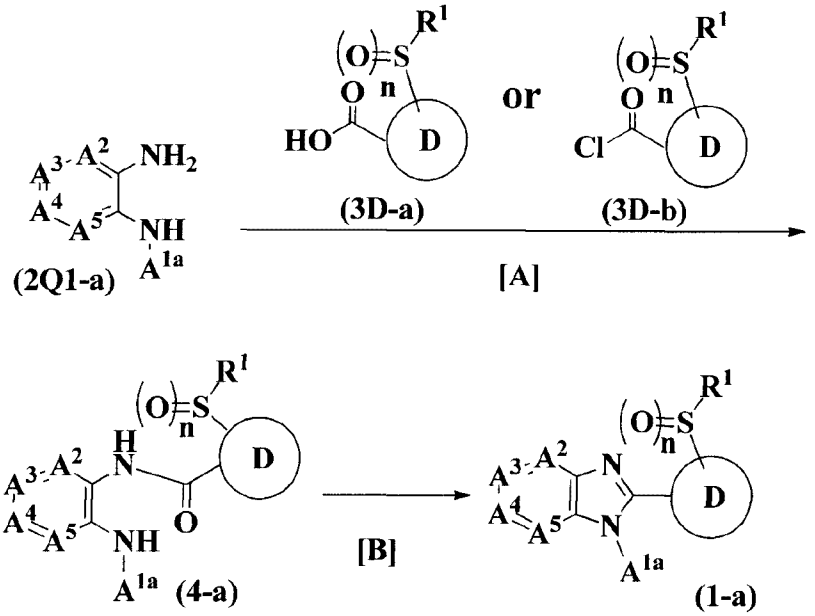
The expression "phenyl optionally substituted with $R^{3b}$", "phenyl optionally substituted with $R^{4b}$" or "phenyl optionally substituted with $Y^c$" herein means a previously mentioned phenyl in which hydrogen atom(s) on carbon atom(s) are optionally substituted with optional $R^{3b}$, $R^{4b}$ or $Y^c$. When there are two or more $R^{3b}$'s, $R^{4b}$'s or $Y^c$'s on phenyl, each $R^{3b}$, $R^{4b}$ or $Y^c$ may be identical with or different from one another.

The expression such as "heterocyclyl optionally substituted with $R^{3b}$", "heterocyclyl optionally substituted with $R^{4b}$" or "heterocyclyl optionally substituted with $Y^c$" herein means a heterocyclic group in which hydrogen atom(s) on carbon atom(s) or nitrogen atom(s) are optionally substituted with optional $R^{3b}$, $R^{4b}$ or $Y^c$. When there are two or more $R^{3b}$'s, $R^{4b}$'s or $Y^c$'s, each $R^{3b}$, $R^{4b}$ or $Y^c$ may be identical with or different from one another.

Now, a process for producing the compound of the present invention represented by the above formula (1) will be described below.

The compounds of the present invention may be produced, for example, by the following Processes 1 to 17.

Process 1




A compound represented by the formula (2Q1-a) (wherein $A^{1a}$, $A^2$, $A^3$, $A^4$ and $A^5$ are the same as defined above) and a compound represented by the formula (3D-a) (wherein $R^1$, D and n are the same as defined above) are reacted in a solvent or without solvent, as the case requires, in the presence of a dehydration condensation agent, and as the case requires, in the presence of a catalyst to produce a compound represented by the formula (4-a) (wherein $R^1$, $A^{1a}$, $A^2$, $A^3$, $A^4$, $A^5$, D and n are the same as defined above). In a case where a solvent is used, the solvent used may be any solvent which is inert to the reaction, and for example, water, a lower alcohol such as methanol or ethanol, an ether such as diethyl ether, tetrahydrofuran, 1,4-dioxane or 1,2-dimethoxyethane, an aromatic hydrocarbon such as benzene, chlorobenzene, bromobenzene, xylene or toluene, an aliphatic hydrocarbon such as pentane, hexane or cyclohexane, a halogenated hydrocarbon such as dichloromethane, chloroform or 1,2-dichloroethane, a nitrile such as acetonitrile or propionitrile, an amide such as N,N-dimethylformamide, N,N-dimethylacetamide, N-methylpyrrolidone or N,N'-dimethylimidazolidinone, a sulfoxide such as dimethyl sulfoxide, a nitrogen-containing aromatic compound such as pyridine or quinoline, or a mixture thereof may be mentioned.

The reaction may be carried out in the presence of a dehydration condensation agent. The dehydration condensation agent to be used may, for example, be 1H-benzotriazol-1-yloxytris(dimethylamino)phosphonium hexafluorophosphate, N,N'-

dicyclohexylcarbodiimide, 1-ethyl-3-(3-dimethylaminopropyl)carbodiimide hydrochloride or 2-chloro-1-methylpyridinium iodide. The equivalent amount of the hehydration condensation agent used is from 0.1 to 100 equivalent amount, preferably from 1 to 20 equivalent amount based on the compound represented by the formula (2Q1-a).

The reaction may be carried out in the presence of a catalyst. The catalyst to be used may, for example, be 1-hydroxybenzotriazole or 4-(dimethylamino)pyridine. The equivalent amount of the catalyst used is from 0.005 to 20 quivalent amount, preferably from 0.1 to 5 equivalent amount based on the compound represented by the formula (2Q1-a).

The reaction temperature may be set at an optional temperature of from -80°C to the refluxing temperature of the reaction mixture, and is preferably within a range of from 0°C to the refluxing temperature of the reaction mixture.

The reaction time varies depending upon the concentration of the reaction substrate and the reaction temperature, and is optionally set usually within a range of from 5 minutes to 100 hours, and is preferably from 1 to 48 hours.

With respect to the equivalent amount of the reaction substrate, the compound (3D-a) may be used in an amount of from 0.5 to 50 equivlant amount, preferably from 1 to 20 equivalent amount based on the compound (2Q1-a).

Further, the compound represented by the formula (4-a) may be produced by reacting the compound represented by the formula (2Q1-a) and a compound represented by the formula (3D-b) (wherein $R^1$, D and n are the same as defined above) in a solvent or without solvent, and as the case requires, in the presence of a base. In a case where a solvent is used, the solvent used may be any solvent which is inert to the reaction, and for example, water, a lower alcohol such as methanol or ethanol, an ether such as diethyl ether, tetrahydrofuran, 1,4-dioxane or 1,2-dimethoxyethane, an aromatic hydrocarbon such as benzene, chlorobenzene, bromobenzene, xylene or toluene, an aliphatic hydrocarbon such as pentane, hexane or cyclohexane, a halogenated hydrocarbon such as dichloromethane, chloroform or 1,2-dichloroethane, a nitrile such as acetonitrile or propionitrile, an amide such as N,N-dimethylformamide, N,N-dimethylacetamide, N-methylpyrrolidone or N,N'-dimethylimidazolidinone, a sulfoxide such as dimethyl sulfoxide, a nitrogen-containing aromatic compound such as pyridine or quinoline, or a mixture thereof may be mentioned.

The reaction may be carried out in the presence of a base. The base to be used may, for example, be an organic base such as pyridine, 2,6-lutidine, 4-dimethylaminopyridine, triethylamine, diisopropylethylamine, tributylamine, 4-(dimethylamino)pyridine, 1,4-diazabicyclo[2.2.2]octane (DABCO), 1,8-diazabicyclo[5.4.0]-7-undecene (DBU) or 1,5-diazabicyclo[4.3.0]-5-nonene (DBN), or an inorganic base such as sodium hydroxide, potassium hydroxide, sodium hydride, sodium hydrogen carbonate, potassium carbonate or cesium carbonate. The equivalent amount of the base used is from 0.1 to 100 equivalent amount, preferably from 1 to 20 equivalent amount based on the compound represented by the formula (2Q1-a).

The reaction temperature may be set at an optional temperature of from -80°C to the refluxing temperature of the reaction mixture, and is preferably within a range of from 0°C to the refluxing temperature of the reaction mixture.

The reaction time varies depending upon the concentration of the reaction substrate and the reaction temperature, and is optionally set usually within a range of from 5 minutes to 100 hours, and is preferably from 1 to 48 hours.

With respect to the equivalent amount of the reaction substrate, the compound (3D-b) may be used in an amount of from 0.5 to 50 equivalent amount, preferably from 1 to 20 equivalent amount based on the compound (2Q1-a).

Then, the compound represented by the formula (4-a) is subjected to dehydration condensation in a solvent or without solvent, as the case requires, in the presence of an acid, and as the case requires, in the presence of a dehydration agent to produce a compound represented by the formula (1-a) (wherein $R^1$, $A^{1a}$, $A^2$, $A^3$, $A^4$, $A^5$, D and n are the same as defined above). In a case where a solvent is used, the solvent used may be any solvent which is inert to the reaction, and for example, water, a lower alcohol such as methanol or ethanol, an ether such as diethyl ether, tetrahydrofuran, 1,4-dioxane or 1,2-dimethoxyethane, an aromatic hydrocarbon such as benzene, chlorobenzene, bromobenzene, xylene or toluene, an aliphatic hydrocarbon such as pentane, hexane or cyclohexane, a halogenated hydrocarbon such as dichloromethane, chloroform or 1,2-dichloroethane, a nitrile such as acetonitrile or propionitrile, an amide such as N,N-dimethylformamide, N,N-dimethylacetamide, N-methylpyrrolidone or N,N'-dimethylimidazolidinone, a sulfoxide such as dimethyl sulfoxide, a nitrogen-containing

aromatic compound such as pyridine or quinoline, or a mixture thereof may be mentioned.

The reaction may be carried out in the presence of an acid. The acid to be used may, for example, be p-toluenesulfonic acid, polyphosphoric acid, acetic acid or propionic acid. The equivalent amount of the acid used is from 0.1 to 1,000 equivelent amount, preferably from 1 to 500 equivalent amount based on the compound represented by the formula (4-a).

The reaction may be carried out in the presence of a dehydration agent. The dehydration agent to be used may, for example, be phosphorus oxychloride or acetic anhydride. The equivalent amount of the dehydration agent used is from 0.5 to 50 equivalent amount, preferably from 1 to 20 equivalent amount based on the compound represented by the formula (4-a).

The reaction temperature may be set at an optional temperature of from -80°C to the refluxing temperature of the reaction mixture, and is preferably within a range of from 0°C to the refluxing temperature of the reaction mixture.

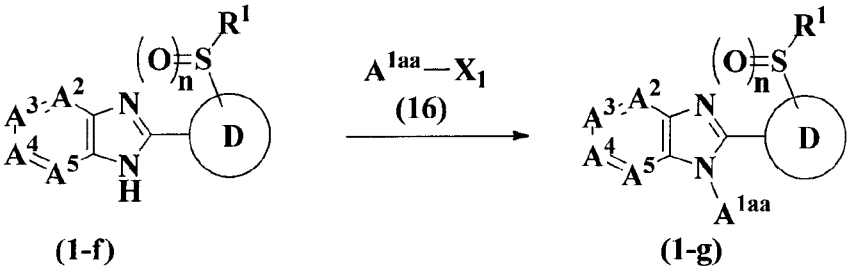
The reaction time varies depending upon the concentration of the reaction substrate and the reaction temperature, and is optionally set usually within a range of from 5 minutes to 100 hours, and is preferably from 1 to 48 hours.

Some of compounds represented by the formula (2Q1-a) are known compounds, and some of them are commercially available. The rest of them may be prepared, for example, in accordance with the after-mentioned Reaction Scheme 4.

The compound represented by the formula (3D-a) may be prepared, for example, in accordance with the after-mentioned Reaction Scheme 1 or Reaction Scheme 2.

The compound represented by the formula (3D-b) may be prepared, for example, in accordance with the after-mentioned Reaction Scheme 1.

Process 2




(1-f) (1-g)

A compound represented by the formula (1-f) (wherein $R^1$, $A^2$, $A^3$, $A^4$, $A^5$, D and n are the same as defined above) and a compound represented by the formula (16) (wherein $A^{1aa}$ is $C_1$-$C_6$ alkyl, and $X_1$ is a leaving group such as a halogen atom, $C_1$-$C_4$ alkylsulfonate (such as methanesulfonyloxy), $C_1$-$C_4$ haloalkylsulfonate (such as trifluoromethanesulfonyloxy) or arylsulfonate (such as benzenesulfonyloxy or p-toluenesulfonyloxy)) are reacted in a solvent or without solvent, and as the case requires, in the presence of a base, to produce a compound represented by the formula (1-g) (wherein $R^1$, $A^{1aa}$, $A^2$, $A^3$, $A^4$, $A^5$, D and n are the same as defined above). In a case where a solvent is used, the solvent used may be any solvent which is inert to the reaction, and for example, water, a lower alcohol such as methanol or ethanol, an ether such as diethyl ether, tetrahydrofuran, 1,4-dioxane or 1,2-dimethoxyethane, an aromatic hydrocarbon such as benzene, chlorobenzene, bromobenzene, xylene or toluene, an aliphatic hydrocarbon such as pentane, hexane or cyclohexane, a halogenated hydrocarbon such as dichloromethane, chloroform or 1,2-dichloroethane, a nitrile such as acetonitrile or propionitrile, an amide such as N,N-dimethylformamide, N,N-dimethylacetamide, N-methylpyrrolidone or N,N'-dimethylimidazolidinone, a sulfoxide such as dimethyl sulfoxide, a nitrogen-containing aromatic compound such as pyridine or quinoline, or a mixture thereof may be mentioned.

The reaction may be carried out in the presence of a base. The base to be used may, for example, be an organic base such as pyridine, 2,6-lutidine, 4-dimethylaminopyridine, triethylamine, diisopropylethylamine, tributylamine, 4-(dimethylamino)pyridine, 1,4-diazabicyclo[2.2.2]octane (DABCO), 1,8-diazabicyclo[5.4.0]-7-undecene (DBU) or 1,5-diazabicyclo[4.3.0]-5-nonene (DBN), or an inorganic base such as sodium hydroxide, potassium hydroxide, sodium hydride, sodium hydrogen carbonate, potassium carbonate or cesium carbonate. The equivalent amount of the base used is from 0.1 to 100 equivalent amount, preferably from 1 to 20 equivalent amount based on the compound represented by the formula (1-f).

The reaction temperature may be set at an optional temperature of from -80°C to the refluxing temperature of the reaction mixture, and is preferably within a range of from 0°C to the refluxing temperature of the reaction mixture.

The reaction time varies depending upon the concentration of the reaction

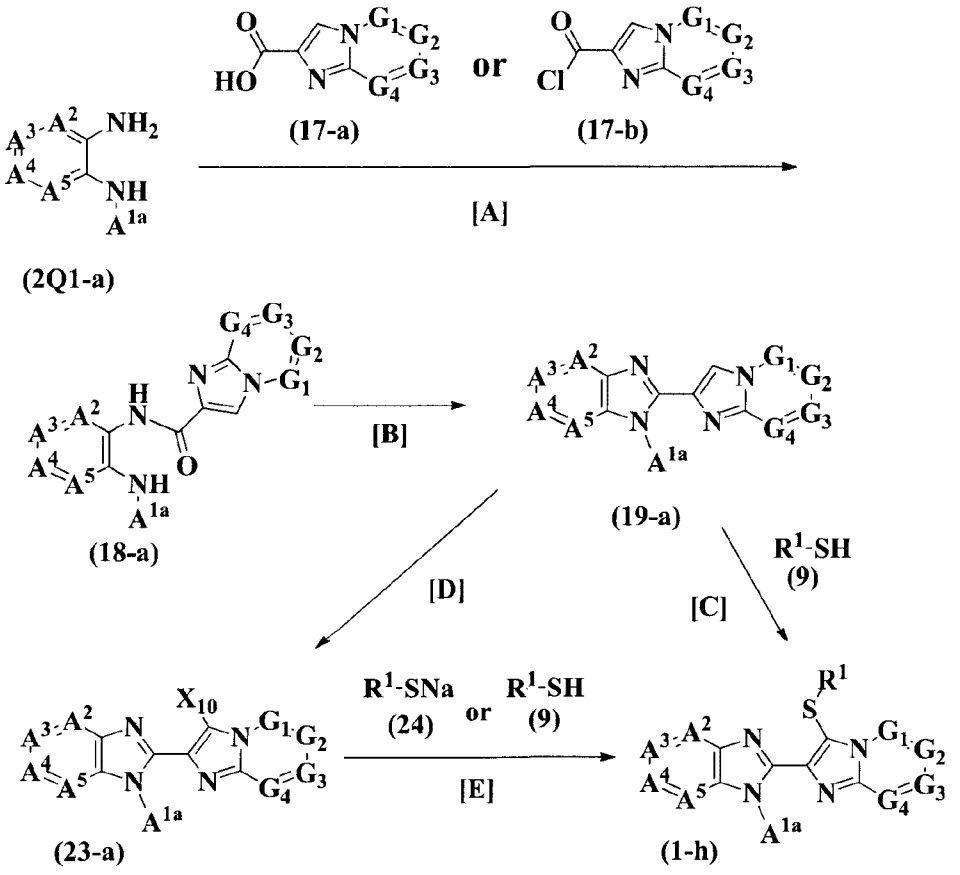
substrate and the reaction temperature, and is optionally set usually within a range of from 5 minutes to 100 hours, and is preferably from 1 to 48 hours.

With respect to the equivalent amount of the reaction substrate, the compound (16) may be used in an amount of from 0.5 to 50 equivalent amount, preferably from 1 to 20 equivalent amount based on the compound (1-f).

The compound represented by the formula (1-f) may be prepared in accordance with Process 1.

Some of the compounds represented by the formula (16) are known compounds, and some of them are commercially available.

Process 3




The compound represented by the formula (2Q1-a) and a compound represented by the formula (17-a) (wherein $G_1$, $G_2$, $G_3$ and $G_4$ are the same as defined above) are reacted in accordance with the method disclosed in step [A] of Process 1 to produce a compound represented by the formula (18-a) (wherein $A^{1a}$, $A^2$, $A^3$, $A^4$, $A^5$, $G_1$, $G_2$, $G_3$ and $G_4$ are the same as defined above).

Further, the compound represented by the formula (18-a) may be produced by reacting the compound represented by the formula (2Q1-a) and a compound represented by the formula (17-b) (wherein $G_1$, $G_2$, $G_3$ and $G_4$ are the same as defined above) in accordance with the method disclosed in step [A] of Process 1.

Then, the compound represented by the formula (18-a) is subjected to dehydration condensation in accordance with the method disclosed in step [B] of Process 1 to produce a compound represented by the formula (19-a) (wherein $A^{1a}$, $A^2$, $A^3$, $A^4$, $A^5$, $G_1$, $G_2$, $G_3$ and $G_4$ are the same as defined above).

Then, the compound represented by the formula (19-a) is reacted with a compound represented by the formula (9) (wherein $R^1$ is the same as defined above) and a halogenating agent in a solvent or without solvent to produce a compound represented by the formula (1-h) (wherein $R^1$, $A^{1a}$, $A^2$, $A^3$, $A^4$, $A^5$, $G_1$, $G_2$, $G_3$ and $G_4$ are the same as defined above). In a case where a solvent is used, the solvent used may be any solvent which is inert to the reaction, and for example, water, a lower alcohol such as methanol or ethanol, an ether such as diethyl ether, tetrahydrofuran, 1,4-dioxane or 1,2-dimethoxyethane, an aromatic hydrocarbon such as benzene, chlorobenzene, bromobenzene, xylene or toluene, an aliphatic hydrocarbon such as pentane, hexane or cyclohexane, a halogenated hydrocarbon such as dichloromethane, chloroform or 1,2-dichloroethane, a nitrile such as acetonitrile or propionitrile, an amide such as N,N-dimethylformamide, N,N-dimethylacetamide, N-methylpyrrolidone or N,N'-dimethylimidazolidinone, a sulfoxide such as dimethyl sulfoxide, a nitrogen-containing aromatic compound such as pyridine or quinoline, or a mixture thereof may be mentioned.

The halogenating agent may, for example, be chlorine, bromine, iodine, N-chlorosuccinimide, N-bromosuccinimide, N-iodosuccinimide, 1,3-dichloro-5,5-dimethylhydantoin, 1,3-dibromo-5,5-dimethylhydantoin or 1,3-diiodo-5,5-dimethylhydantoin. The equivalent amount of the halogenating agent used is from 0.5 to 50 equivalent amount, preferably from 1 to 20 equivalent amount based on the compound represented by the formula (19-a).

The reaction temperature may be set at an optional temperature of from -80°C to the refluxing temperature of the reaction mixture, and is preferably within a range of from 0°C to the refluxing temperature of the reaction mixture.

The reaction time varies depending upon the concentration of the reaction substrate and the reaction temperature, and is optionally set usually within a range of from 5 minutes to 100 hours, and is preferably from 1 to 48 hours.

With respect to the equivalent amount of the reaction substrate, the compound (9) may be used in an amount of from 0.5 to 50 equivalent amount, preferably from 1 to 20 equivalent amount based on the compound (19-a).

Further, the compound represented by the formula (19-a) and a halogenating agent are reacted in a solvent or without solvent to produce a compound represented by the formula (23-a) (wherein $A^{1a}$, $A^2$, $A^3$, $A^4$, $A^5$, $G_1$, $G_2$, $G_3$ and $G_4$ are the same as defined above, and $X_{10}$ is a chlorine atom, a bromine atom or an iodine atom). In a case where a solvent is used, the solvent used may be any solvent which is inert to the reaction, and for example, water, a lower alcohol such as methanol or ethanol, an ether such as diethyl ether, tetrahydrofuran, 1,4-dioxane or 1,2-dimethoxyethane, an aromatic hydrocarbon such as benzene, chlorobenzene, bromobenzene, xylene or toluene, an aliphatic hydrocarbon such as pentane, hexane or cyclohexane, a halogenated hydrocarbon such as dichloromethane, chloroform or 1,2-dichloroethane, a nitrile such as acetonitrile or propionitrile, an amide such as N,N-dimethylformamide, N,N-dimethylacetamide, N-methylpyrrolidone or N,N'-dimethylimidazolidinone, a sulfoxide such as dimethyl sulfoxide, a nitrogen-containing aromatic compound such as pyridine or quinoline, or a mixture thereof may be mentioned.

The halogenating agent may, for example, be chlorine, bromine, iodine, N-chlorosuccinimide, N-bromosuccinimide, N-iodosuccinimide, 1,3-dichloro-5,5-dimethylhydantoin, 1,3-dibromo-5,5-dimethylhydantoin or 1,3-diiodo-5,5-dimethylhydantoin. The equivalent amount of the halogenating agent used is from 0.5 to 50 equivalent amount, preferably from 1 to 20 equivalent amount based on the compound represented by the formula (19-a).

The reaction temperature may be set at an optional temperature of from -80°C to the refluxing temperature of the reaction mixture, and is preferably within a range of from 0°C to the refluxing temperature of the reaction mixture.

The reaction time varies depending upon the concentration of the reaction substrate and the reaction temperature, and is optionally set usually within a range of from 5 minutes to 100 hours, and is preferably from 1 to 48 hours.

Then, the compound represented by the formula (23-a) and a compound represented by the formula (24) (wherein $R^1$ is the same as defined above) are reacted in a solvent or without solvent, and as the case requires, in the presence of a base, to produce a compound represented by the formula (1-h) (wherein $R^1$, $A^{1a}$, $A^2$, $A^3$, $A^4$, $A^5$, $G_1$, $G_2$, $G_3$ and $G_4$ are the same as defined above). In a case where a solvent is used, the solvent used may be any solvent which is inert to the reaction, and for example, water, a lower alcohol such as methanol or ethanol, an ether such as diethyl ether, tetrahydrofuran, 1,4-dioxane or 1,2-dimethoxyethane, an aromatic hydrocarbon such as benzene, chlorobenzene, bromobenzene, xylene or toluene, an aliphatic hydrocarbon such as pentane, hexane or cyclohexane, a halogenated hydrocarbon such as dichloromethane, chloroform or 1,2-dichloroethane, a nitrile such as acetonitrile or propionitrile, an amide such as N,N-dimethylformamide, N,N-dimethylacetamide, N-methylpyrrolidone or N,N'-dimethylimidazolidinone, a sulfoxide such as dimethyl sulfoxide, a nitrogen-containing aromatic compound such as pyridine or quinoline, or a mixture thereof may be mentioned.

The reaction may be carried out in the presence of a base. The base to be used may, for example, be an organic base such as pyridine, 2,6-lutidine, 4-dimethylaminopyridine, triethylamine, diisopropylethylamine, tributylamine, 4-(dimethylamino)pyridine, 1,4-diazabicyclo[2.2.2]octane (DABCO), 1,8-diazabicyclo[5.4.0]-7-undecene (DBU) or 1,5-diazabicyclo[4.3.0]-5-nonene (DBN), or an inorganic base such as sodium hydroxide, potassium hydroxide, sodium hydride, sodium hydrogen carbonate, potassium carbonate or cesium carbonate. The equivalent amount of the base used is from 0.1 to 100 equivalent amount, preferably from 1 to 20 equivalent amount based on the compound represented by the formula (23-a).

The reaction temperature may be set at an optional temperature of from -80°C to the refluxing temperature of the reaction mixture, and is preferably within a range of from 0°C to the refluxing temperature of the reaction mixture.

The reaction time varies depending upon the concentration of the reaction substrate and the reaction temperature, and is optionally set usually within a range of from 5 minutes to 100 hours, and is preferably from 1 to 48 hours.

With respect to the equivalent amount of the reaction substrate, the compound

(24) may be used in an amount of from 0.5 to 50 equivalent amount, preferably from 1 to 20 equivalent amount based on the compound (23-a).

Further, the compound represented by the formula (1-h) may be produced by reacting the compound represented by the formula (23-a) and the compound represented by the formula (9) in a solvent or without solvent, as the case requires, in the presence of a base, as the case requires, in the presence of a palladium catalyst, and as the case requires, in the presence of a ligand. In a case where a solvent is used, the solvent used may be any solvent which is inert to the reaction, and for example, water, a lower alcohol such as methanol or ethanol, an ether such as diethyl ether, tetrahydrofuran, 1,4-dioxane or 1,2-dimethoxyethane, an aromatic hydrocarbon such as benzene, chlorobenzene, bromobenzene, xylene or toluene, an aliphatic hydrocarbon such as pentane, hexane or cyclohexane, a halogenated hydrocarbon such as dichloromethane, chloroform or 1,2-dichloroethane, a nitrile such as acetonitrile or propionitrile, an amide such as N,N-dimethylformamide, N,N-dimethylacetamide, N-methylpyrrolidone or N,N'-dimethylimidazolidinone, a sulfoxide such as dimethyl sulfoxide, a nitrogen-containing aromatic compound such as pyridine or quinoline, or a mixture thereof may be mentioned.

The reaction may be carried out in the presence of a base. The base to be used may, for example, be an organic base such as pyridine, 2,6-lutidine, 4-dimethylaminopyridine, triethylamine, diisopropylethylamine, tributylamine, 4-(dimethylamino)pyridine, 1,4-diazabicyclo[2.2.2]octane (DABCO), 1,8-diazabicyclo[5.4.0]-7-undecene (DBU) or 1,5-diazabicyclo[4.3.0]-5-nonene (DBN), or an inorganic base such as sodium hydroxide, potassium hydroxide, sodium hydride, sodium hydrogen carbonate, potassium carbonate or cesium carbonate. The equivalent amount of the base used is from 0.1 to 100 equivalent amount, preferably from 1 to 20 equivalent amount based on the compound represented by the formula (23-a).

The reaction may be carried out in the presence of a palladium catalyst. The palladium catalyst to be used may, for example, be palladium-carbon, palladium(II) chloride, palladium(II) acetate, bis(triphenylphosphine) palladium(II) dichloride, tetrakis(triphenylphosphine) palladium(0), bis(dibenzylideneacetone) palladium(0) or tris(dibenzylideneacetone) dipalladium(0). The equivalent amount of the palladium

catalyst used may be from 0.005 to 20 equivalent amount, preferably from 0.01 to 5 equivalent amount based on the compouond (23-a).

The reaction may be carried out in the presence of a ligand. The ligand to be used may, for example, be 4,5'-bis(diphenylphosphino)-9,9'-dimethylxanthene or 1,10-phenanthroline. The equivalent amount of the ligand used may be from 0.005 to 20 equivalent amount, preferably from 0.01 to 5 equivalent amount based on the compound (23-a).

The reaction temperature may be set at an optional temperature of from -80°C to the refluxing temperature of the reaction mixture, and is preferably within a range of from 0°C to the refluxing temperature of the reaction mixture.

The reaction time varies depending upon the concentration of the reaction substrate and the reaction temperature, and is optionally set usually within a range of from 5 minutes to 100 hours, and is preferably from 1 to 48 hours.

With respect to the equivalent amount of the reaction substrate, the compound (9) may be used in an amount of from 0.5 to 50 equivalent amount, preferably from 1 to 20 equivalent amount based on the compound (23-a).

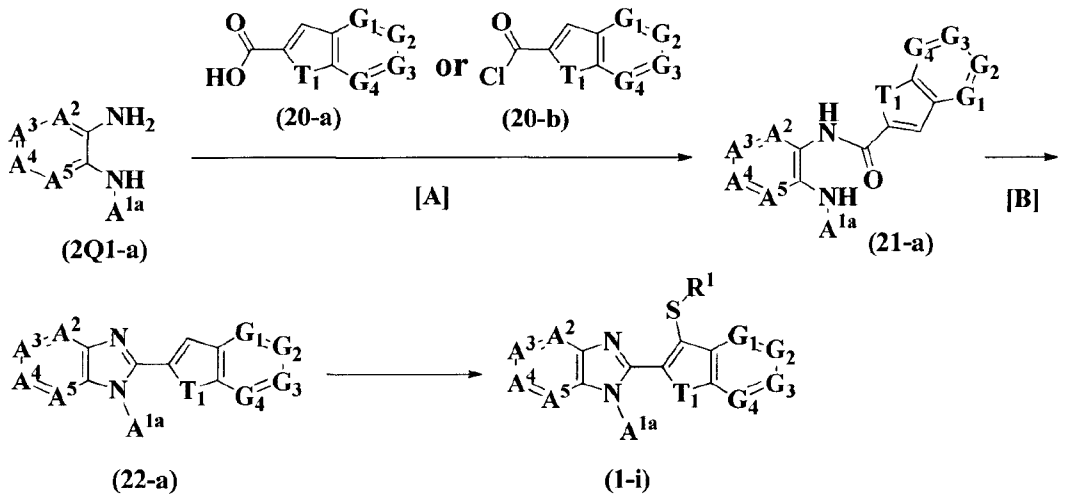
Some of the compounds represented by the formula (17-a) are known compounds, and some of them are commercially available.

Some of the compounds represented by the formula (17-b) are known compounds, and some of them are commercially available.

Some of the compounds represented by the formula (9) are known compounds, and some of them are commercially available.

Some of the compounds represented by the formula (24) are known compounds, and some of them are commercially available.

Process 4




The compound represented by the formula (2Q1-a) is reacted with a compound represented by the formula (20-a) (wherein $T_1$, $G_1$, $G_2$, $G_3$ and $G_4$ are the same as defined above) in accordance with the method disclosed in step [A] of Process 1 to produce a compound represented by the formula (21-a) (wherein $A^{1a}$, $A^2$, $A^3$, $A^4$, $A^5$, $T_1$, $G_1$, $G_2$, $G_3$ and $G_4$ are the same as defined above).

Further, the compound represented by the formula (21-a) may be produced by reacting the compound represented by the formula (2Q1-a) and a compound represented by the formula (20-b) (wherein $T_1$, $G_1$, $G_2$, $G_3$ and $G_4$ are the same as defined above) in accordance with the method disclosed in step [A] of Process 1.

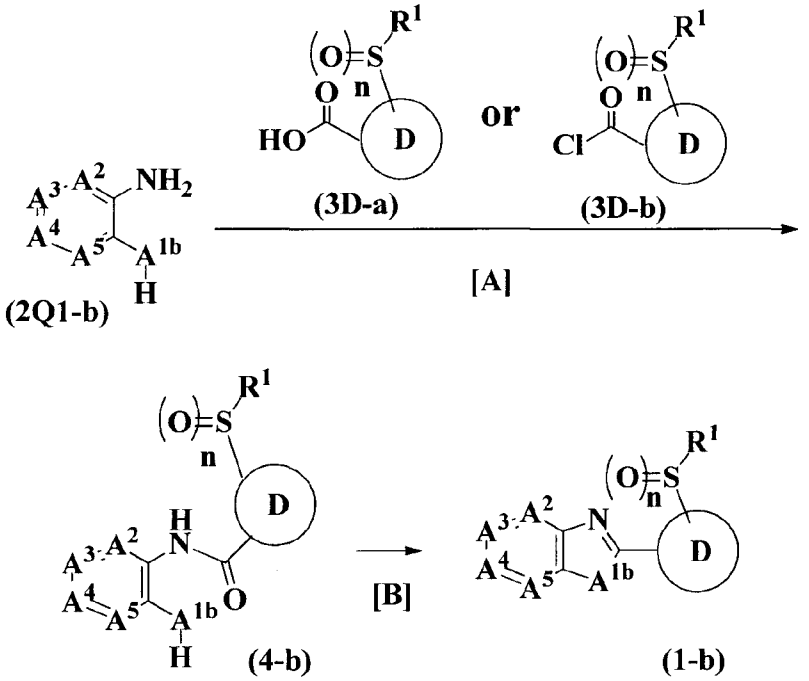
Then, the compound represented by the formula (21-a) is subjected to hydration condensation in accordance with the method disclosed in step [B] of Process 1 to produce a compound represented by the formula (22-a) (wherein $A^{1a}$, $A^2$, $A^3$, $A^4$, $A^5$, $T_1$, $G_1$, $G_2$, $G_3$ and $G_4$ are the same as defined above).

Then, the compound represented by the formula (22-a) is reacted in accordance with the method disclosed in step [C] of Process 3 or the method disclosed in steps [D] and [E] of Process 3 to produce a compound represented by the formula (1-i) (wherein $R^1$, $A^{1a}$, $A^2$, $A^3$, $A^4$, $A^5$, $T_1$, $G_1$, $G_2$, $G_3$ and $G_4$ are the same as defined above).

Some of the compounds represented by the formula (20-a) are known compounds, and some of them are commercially available.

Some of the compounds represented by the formula (20-b) are known compounds, and some of them are commercially available.

Process 5



A compound represented by the formula (2Q1-b) (wherein $A^2$, $A^3$, $A^4$ and $A^5$ are the same as defined above, and $A^{1b}$ is an oxygen atom or a sulfur atom) and a compound represented by the formula (3D-a) are reacted in accordance with the method disclosed in step [A] of Process 1 to produce a compound represented by the formula (4-b) (wherein $A^{1b}$, $R^1$, $A^2$, $A^3$, $A^4$, $A^5$, D and n are the same as defined above).

Further, the compound represented by the formula (4-b) may be produced by reacting the compound represented by the formula (2Q1-b) and the compound represented by the formula (3D-b) in accordance with the method disclosed in step [A] of Process 1.

Then, the compound represented by the formula (4-b) is reacted in a solvent or without solvent, as the case requires, in the presence of an acid, and as the case requires, in the presence of a dehydration condensation agent to produce a compound represented by the formula (1-b) (wherein $A^{1b}$, $R^1$, $A^2$, $A^3$, $A^4$, $A^5$, D and n are the same as defined above). In a case where a solvent is used, the solvent used may be any solvent which is inert to the reaction, and for example, water, a lower alcohol such as methanol or ethanol, an ether such as diethyl ether, tetrahydrofuran, 1,4-dioxane or 1,2-dimethoxyethane, an aromatic hydrocarbon such as benzene, chlorobenzene, bromobenzene, xylene or toluene, an aliphatic hydrocarbon such as pentane, hexane or cyclohexane, a halogenated hydrocarbon such as dichloromethane, chloroform or 1,2-

dichloroethane, a nitrile such as acetonitrile or propionitrile, an amide such as N,N-dimethylformamide, N,N-dimethylacetamide, N-methylpyrrolidone or N,N'-dimethylimidazolidinone, a sulfoxide such as dimethyl sulfoxide, a nitrogen-containing aromatic compound such as pyridine or quinoline, or a mixture thereof may be mentioned.

The reaction may be carried out in the presence of an acid. The acid to be used may, for example, be p-toluenesulfonic acid, polyphosphoric acid, acetic acid or propionic acid. The equivalent amount of the acid used is from 0.1 to 1,000 equivelent amount, preferably from 1 to 500 equivalent amount based on the compound represented by the formula (4-b).

The reaction may be carried out in the presence of a dehydration condensation agent. The dehydration condensation agent to be used may, for example, be a mixture of triphenylphosphine and bis(2-methoxyethyl) azodicarboxylate.

The equivalent amount of triphenylphosphine used is from 0.5 to 50 equivalent amount, preferably from 1 to 20 equivalent amount based on the compound represented by the formula (4-b).

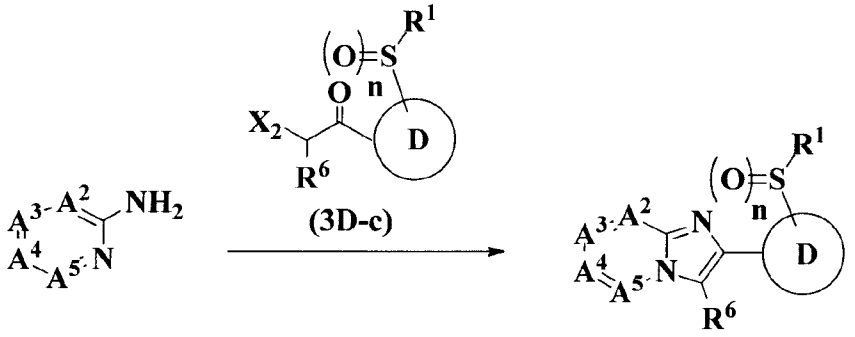
The equivalent amount of bis(2-methoxyethyl) azodicarboxylate used is from 0.5 to 50 equivalent amount, preferably from 1 to 20 equivalent amount based on the compound represented by the formula (4-b).

The reaction temperature may be set at an optional temperature of from -80°C to the refluxing temperature of the reaction mixture, and is preferably within a range of from 0°C to the refluxing temperature of the reaction mixture.

The reaction time varies depending upon the concentration of the reaction substrate and the reaction temperature, and is optionally set usually within a range of from 5 minutes to 100 hours, and is preferably from 1 to 48 hours.

Some of the compounds represented by the formula (2Q1-b) are known compounds, and some of them are commercially available.

Process 6



(2Q2-a) (3D-c) (1-c)

A compound represented by the formula (2Q2-a) (wherein $A^2$, $A^3$, $A^4$ and $A^5$ are the same as defined above) and a compound represented by the formula (3D-c) (wherein $R^1$, $R^6$, D and n are the same as defined above, and $X_2$ is a chlorine atom, a bromine atom or an iodine atom) are reacted in the presence of a solvent or without solvent, and as the case requires, in the presence of a base to produce a compound represented by the formula (1-c) (wherein $R^1$, $R^6$, $A^2$, $A^3$, $A^4$, $A^5$, D and n are the same as defined above). In a case where a solvent is used, the solvent used may be any solvent which is inert to the reaction, and for example, water, a lower alcohol such as methanol or ethanol, an ether such as diethyl ether, tetrahydrofuran, 1,4-dioxane or 1,2-dimethoxyethane, an aromatic hydrocarbon such as benzene, chlorobenzene, bromobenzene, xylene or toluene, an aliphatic hydrocarbon such as pentane, hexane or cyclohexane, a halogenated hydrocarbon such as dichloromethane, chloroform or 1,2-dichloroethane, a nitrile such as acetonitrile or propionitrile, an amide such as N,N-dimethylformamide, N,N-dimethylacetamide, N-methylpyrrolidone or N,N'-dimethylimidazolidinone, a sulfoxide such as dimethyl sulfoxide, a nitrogen-containing aromatic compound such as pyridine or quinoline, or a mixture thereof may be mentioned.

The reaction may be carried out in the presence of a base. The base to be used may, for example, be an organic base such as pyridine, 2,6-lutidine, 4-dimethylaminopyridine, triethylamine, diisopropylethylamine, tributylamine, 4-(dimethylamino)pyridine, 1,4-diazabicyclo[2.2.2]octane (DABCO), 1,8-diazabicyclo[5.4.0]-7-undecene (DBU) or 1,5-diazabicyclo[4.3.0]-5-nonene (DBN), or an inorganic base such as sodium hydroxide, potassium hydroxide, sodium hydride, sodium hydrogen carbonate, potassium carbonate or cesium carbonate. The

equivalent amount of the base used is from 0.1 to 100 equivalent amount, preferably from 1 to 20 equivalent amount based on the compound represented by the formula (2Q2-a).

The reaction temperature may be set at an optional temperature of from -80°C to the refluxing temperature of the reaction mixture, and is preferably within a range of from 0°C to the refluxing temperature of the reaction mixture.

The reaction time varies depending upon the concentration of the reaction substrate and the reaction temperature, and is optionally set usually within a range of from 5 minutes to 100 hours, and is preferably from 1 to 48 hours.

Some of the compounds represented by the formula (2Q2-a) are known compounds, and some of them are commercially available. The rest of them may be prepared, for example, in accordance with the after-mentioned Reaction Scheme 5.

The compound represented by the formula (3D-c) may be prepared, for example, in accordance with the after-mentioned Reaction Scheme 1.

Process 7

(1-j) (1-k)

A compound represented by the formula (1-j) (wherein $R^1$, $A^2$, $A^3$, $A^4$, $A^5$, D and n are the same as defined above) and a halogenating agent are reacted in a solvent or without solvent to produce a compound represented by the formula (1-k) (wherein $R^1$, $A^2$, $A^3$, $A^4$, $A^5$, D and n are the same as defined above, and $X_4$ is a chlorine atom, a bromine atom or an iodine atom). In a case where a solvent is used, the solvent used may be any solvent which is inert to the reaction, and for example, water, a lower alcohol such as methanol or ethanol, an ether such as diethyl ether, tetrahydrofuran, 1,4-dioxane or 1,2-dimethoxyethane, an aromatic hydrocarbon such as benzene, chlorobenzene, bromobenzene, xylene or toluene, an aliphatic hydrocarbon such as pentane, hexane or cyclohexane, a halogenated hydrocarbon such as dichloromethane, chloroform or 1,2-dichloroethane, a nitrile such as acetonitrile or propionitrile, an amide

such as N,N-dimethylformamide, N,N-dimethylacetamide, N-methylpyrrolidone or N,N'-dimethylimidazolidinone, a sulfoxide such as dimethyl sulfoxide, a nitrogen-containing aromatic compound such as pyridine or quinoline, or a mixture thereof may be mentioned.

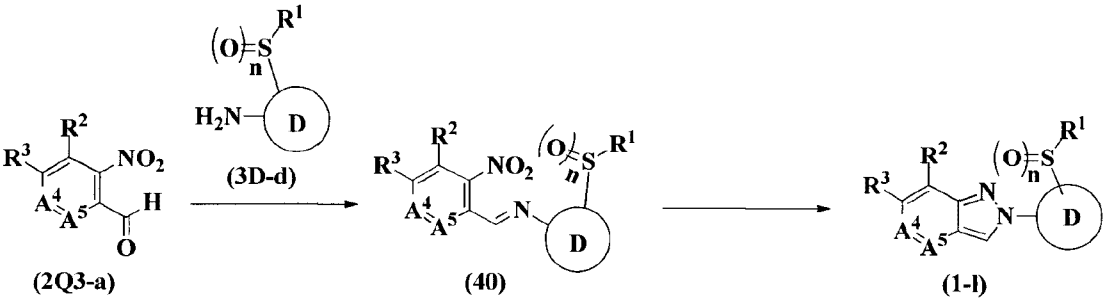
The halogenating agent may, for example, be chlorine, bromine, iodine, N-chlorosuccinimide, N-bromosuccinimide, N-iodosuccinimide, 1,3-dichloro-5,5-dimethylhydantoin, 1,3-dibromo-5,5-dimethylhydantoin or 1,3-diiodo-5,5-dimethylhydantoin. The equivalent amount of the halogenating agent used is from 0.5 to 50 equivalent amount, preferably from 1 to 20 equivalent amount based on the compound represented by the formula (1-j).

The reaction temperature may be set at an optional temperature of from -80°C to the refluxing temperature of the reaction mixture, and is preferably within a range of from 0°C to the refluxing temperature of the reaction mixture.

The reaction time varies depending upon the concentration of the reaction substrate and the reaction temperature, and is optionally set usually within a range of from 5 minutes to 100 hours, and is preferably from 1 to 48 hours.

The compound represented by the formula (1-j) may be prepared in accordance with the method disclosed in Process 6.

Process 8




A compound represented by the formula (2Q3-a) (wherein $R^2$, $R^3$, $A^4$ and $A^5$ are the same as defined above) and a compound represented by the formula (3D-d) (wherein $R^1$, D and n are the same as defined above) are reacted in a solvent or without solvent, and as the case requires, in the presence of an acid to produce a compound represented by the formula (40) (wherein $R^1$, $R^2$, $R^3$, $A^4$, $A^5$, D and n are the same as defined above). In a case where a solvent is used, the solvent used may be any solvent which is inert to the reaction, and for example, water, a lower alcohol such as

methanol or ethanol, an ether such as diethyl ether, tetrahydrofuran, 1,4-dioxane or 1,2-dimethoxyethane, an aromatic hydrocarbon such as benzene, chlorobenzene, bromobenzene, xylene or toluene, an aliphatic hydrocarbon such as pentane, hexane or cyclohexane, a halogenated hydrocarbon such as dichloromethane, chloroform or 1,2-dichloroethane, a nitrile such as acetonitrile or propionitrile, an amide such as N,N-dimethylformamide, N,N-dimethylacetamide, N-methylpyrrolidone or N,N'-dimethylimidazolidinone, a sulfoxide such as dimethyl sulfoxide, a nitrogen-containing aromatic compound such as pyridine or quinoline, or a mixture thereof may be mentioned.

The reaction may be carried out in the presence of an acid. The acid to be used may, for example, be acetic acid, formic acid or p-toluenesulfonic acid. The equivalent amount of the acid used is from 0.1 to 100 equivalent amount, preferably from 1 to 20 equivalent amount based on the compound represented by the formula (2Q3-a).

The reaction temperature may be set at an optional temperature of from -80°C to the refluxing temperature of the reaction mixture, and is preferably within a range of from 0°C to the refluxing temperature of the reaction mixture.

The reaction time varies depending upon the concentration of the reaction substrate and the reaction temperature, and is optionally set usually within a range of from 5 minutes to 100 hours, and is preferably from 1 to 48 hours.

With respect to the equivalent amount of the reaction substrate, the compound (3D-d) may be used in an amount of from 0.5 to 50 equivalent amount, preferably from 1 to 20 equivalent amount based on the compound (2Q3-a).

Then, the compound represented by the formula (40) and a phosphite are reacted in a solvent or without solvent to produce a compound represented by the formula (1-l) (wherein $R^1$, $R^2$, $R^3$, $A^4$, $A^5$, D and n are the same as defined above). In a case where a solvent is used, the solvent used may be any solvent which is inert to the reaction, and for example, water, a lower alcohol such as methanol or ethanol, an ether such as diethyl ether, tetrahydrofuran, 1,4-dioxane or 1,2-dimethoxyethane, an aromatic hydrocarbon such as benzene, chlorobenzene, bromobenzene, xylene or toluene, an aliphatic hydrocarbon such as pentane, hexane or cyclohexane, a halogenated hydrocarbon such as dichloromethane, chloroform or 1,2-dichloroethane, a nitrile such as acetonitrile or propionitrile, an amide such as N,N-dimethylformamide, N,N-

dimethylacetamide, N-methylpyrrolidone or N,N'-dimethylimidazolidinone, a sulfoxide such as dimethyl sulfoxide, a nitrogen-containing aromatic compound such as pyridine or quinoline, or a mixture thereof may be mentioned.

The phosphite may, for example, be trimethyl phosphite or triethyl phosphite. The equivalent amount of the phophite used is from 0.5 to 50 equivalent amount, preferably from 1 to 20 equivalent amount based on the compound represented by the formula (40).

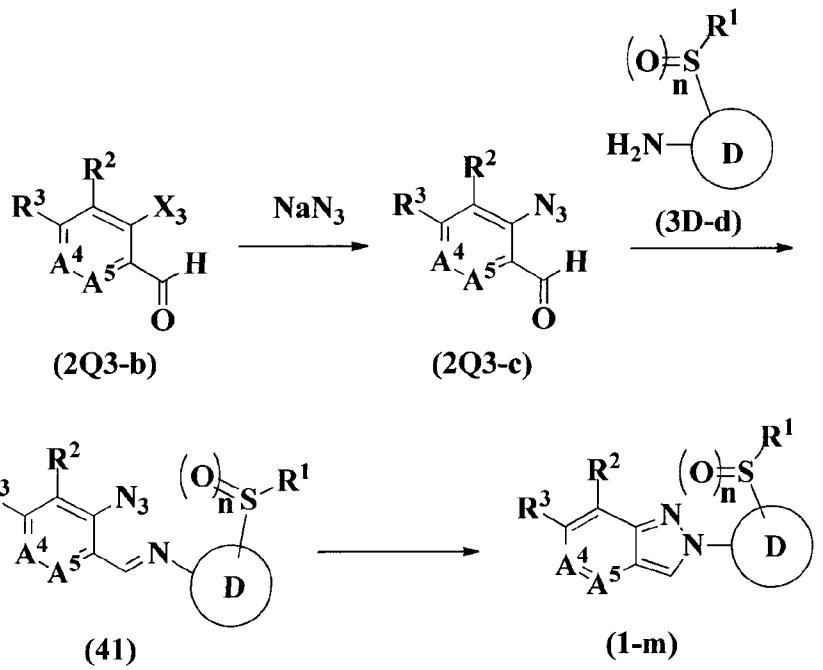
The reaction temperature may be set at an optional temperature of from -80°C to the refluxing temperature of the reaction mixture, and is preferably within a range of from 0°C to the refluxing temperature of the reaction mixture.

The reaction time varies depending upon the concentration of the reaction substrate and the reaction temperature, and is optionally set usually within a range of from 5 minutes to 100 hours, and is preferably from 1 to 48 hours.

Some of the compounds represented by the formula (2Q3-a) are known compounds, and some of them are commercially available. The rest of them may be prepared from known compounds in accordance with conventional methods disclosed in literature, for example, in accordance with the reaction conditions disclosed in Journal of Medicinal Chemistry, 2008, Vol. 50, p. 2468, WO2011/075628 or the like.

Some of the compounds represented by the formula (3D-d) are known compounds, and some of them are commercially available. The rest of them may be prepared, for example, in accordance with the after-mentioned Reaction Scheme 6.

Process 9



(2Q3-b) (2Q3-c) (41) (1-m)

A compound represented by the formula (2Q3-b) (wherein $R^2$, $R^3$, $A^4$ and $A^5$ are the same as defined above, and $X_3$ is a fluorine atom, a chlorine atom, a bromine atom or an iodine atom) and sodium azide are reacted in a solvent or without solvent to produce a compound represented by the formula (2Q3-c) (wherein $R^2$, $R^3$, $A^4$ and $A^5$ are the same as defined above). In a case where a solvent is used, the solvent used may be any solvent which is inert to the reaction, and for example, water, a lower alcohol such as methanol or ethanol, an ether such as diethyl ether, tetrahydrofuran, 1,4-dioxane or 1,2-dimethoxyethane, an aromatic hydrocarbon such as benzene, chlorobenzene, bromobenzene, xylene or toluene, an aliphatic hydrocarbon such as pentane, hexane or cyclohexane, a halogenated hydrocarbon such as dichloromethane, chloroform or 1,2-dichloroethane, a nitrile such as acetonitrile or propionitrile, an amide such as N,N-dimethylformamide, N,N-dimethylacetamide, N-methylpyrrolidone or N,N'-dimethylimidazolidinone, a sulfoxide such as dimethyl sulfoxide, a nitrogen-containing aromatic compound such as pyridine or quinoline, or a mixture thereof may be mentioned.

The reaction temperature may be set at an optional temperature of from -80°C to the refluxing temperature of the reaction mixture, and is preferably within a range of from 0°C to the refluxing temperature of the reaction mixture.

The reaction time varies depending upon the concentration of the reaction

substrate and the reaction temperature, and is optionally set usually within a range of from 5 minutes to 100 hours, and is preferably from 1 to 48 hours.

With respect to the equivalent amount of the reaction substrate, sodium azide may be used in an amount of from 0.5 to 50 equivalent amount, preferably from 1 to 20 equivalent amount based on the compound (2Q3-b).

Then, the compound represented by the formula (2Q3-c) and the compound represented by the formula (3D-d) are reacted in a solvent or without solvent, as the case requires, in the presence of a base, and as the case requires, in the presence of a catalyst to produce a compound represented by the formula (41) (wherein $R^1$, $R^2$, $R^3$, $A^4$, $A^5$, D and n are the same as defined above). In a case where a solvent is used, the solvent used may be any solvent which is inert to the reaction, and for example, water, a lower alcohol such as methanol or ethanol, an ether such as diethyl ether, tetrahydrofuran, 1,4-dioxane or 1,2-dimethoxyethane, an aromatic hydrocarbon such as benzene, chlorobenzene, bromobenzene, xylene or toluene, an aliphatic hydrocarbon such as pentane, hexane or cyclohexane, a halogenated hydrocarbon such as dichloromethane, chloroform or 1,2-dichloroethane, a nitrile such as acetonitrile or propionitrile, an amide such as N,N-dimethylformamide, N,N-dimethylacetamide, N-methylpyrrolidone or N,N'-dimethylimidazolidinone, a sulfoxide such as dimethyl sulfoxide, a nitrogen-containing aromatic compound such as pyridine or quinoline, or a mixture thereof may be mentioned.

The reaction may be carried out in the presence of a base. The base to be used may, for example, be an organic base such as pyridine, 2,6-lutidine, 4-dimethylaminopyridine, triethylamine, diisopropylethylamine, tributylamine, 4-(dimethylamino)pyridine, 1,4-diazabicyclo[2.2.2]octane (DABCO), 1,8-diazabicyclo[5.4.0]-7-undecene (DBU) or 1,5-diazabicyclo[4.3.0]-5-nonene (DBN), or an inorganic base such as sodium hydroxide, potassium hydroxide, sodium hydride, sodium hydrogen carbonate, potassium carbonate or cesium carbonate. The equivalent amount of the base used is from 0.1 to 100 equivalent amount, preferably from 1 to 20 equivalent amount based on the compound represented by the formula (2Q3-c).

The reaction may be carried out in the presence of a catalyst. The catalyst to be used may, for example, be titanium tetrachloride. The equivalent amount of the

catalyst used is from 0.005 to 20 equivalent amount, preferably from 0.1 to 5 equivalent amount based on the compound represented by the formula (2Q3-c).

The reaction temperature may be set at an optional temperature of from -80°C to the refluxing temperature of the reaction mixture, and is preferably within a range of from 0°C to the refluxing temperature of the reaction mixture.

The reaction time varies depending upon the concentration of the reaction substrate and the reaction temperature, and is optionally set usually within a range of from 5 minutes to 100 hours, and is preferably from 1 to 48 hours.

With respect to the equivalent amount of the reaction substrate, the compound (3D-d) may be used in an amount of from 0.5 to 50 equivalent amount, preferably from 1 to 20 equivalent amount based on the compound (2Q3-c).

Then, the compound represented by the formula (41) is cyclized in a solvent or without solvent to produce a compound represented by the formula (1-m) (wherein $R^1$, $R^2$, $R^3$, $A^4$, $A^5$, D and n are the same as defined above).

In a case where a solvent is used, the solvent used may be any solvent which is inert to the reaction, and for example, water, a lower alcohol such as methanol or ethanol, an ether such as diethyl ether, tetrahydrofuran, 1,4-dioxane or 1,2-dimethoxyethane, an aromatic hydrocarbon such as benzene, chlorobenzene, bromobenzene, xylene or toluene, an aliphatic hydrocarbon such as pentane, hexane or cyclohexane, a halogenated hydrocarbon such as dichloromethane, chloroform or 1,2-dichloroethane, a nitrile such as acetonitrile or propionitrile, an amide such as N,N-dimethylformamide, N,N-dimethylacetamide, N-methylpyrrolidone or N,N'-dimethylimidazolidinone, a sulfoxide such as dimethyl sulfoxide, a nitrogen-containing aromatic compound such as pyridine or quinoline, or a mixture thereof may be mentioned.

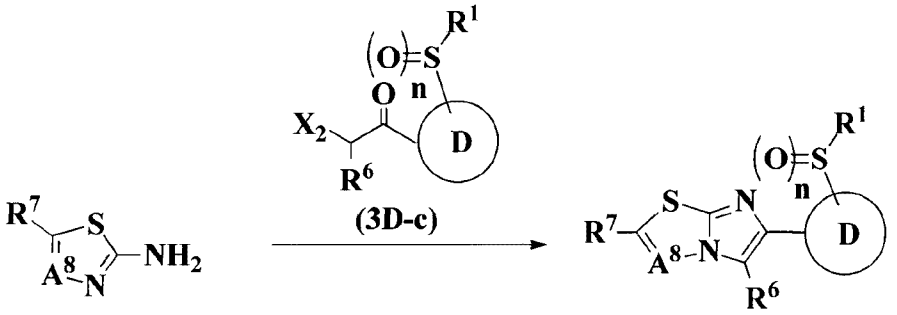
The reaction temperature may be set at an optional temperature of from -80°C to the refluxing temperature of the reaction mixture, and is preferably within a range of from 0°C to the refluxing temperature of the reaction mixture.

The reaction time varies depending upon the concentration of the reaction substrate and the reaction temperature, and is optionally set usually within a range of from 5 minutes to 100 hours, and is preferably from 1 to 48 hours.

Some of the compounds represented by the formula (2Q3-b) are known

compounds, and some of them are commercially available. The rest of them may be prepared, for example, in accordance with the after-mentioned Reaction Scheme 7.

Process 10

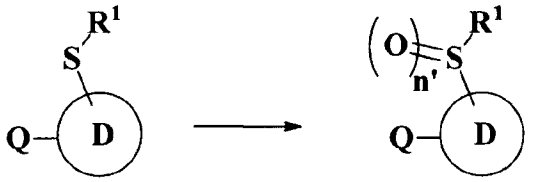


(2Q4-a) (3D-c) (1-n)

A compound represented by the formula (2Q4-a) (wherein $R^7$ and $A^8$ are the same as defined above) is reacted with the compound represented by the formula (3D-c) in accordance with the method disclosed in Process 6 to produce a compound represented by the formula (1-n) (wherein $R^1$, $R^6$, $R^7$, $A^8$, D and n are the same as defined above).

Some of the compounds represented by the formula (2Q4-a) are known compounds, and some of them are commercially available. The rest of them may be prepared from known compounds in accordance with conventional methods disclosed in literature, for example, in accordance with the reaction conditions disclosed in Journal of Fluorine Chemistry, 2012, Vol. 133, p. 115, CN101768135, CN101885708 or the like.

Process 11



(1-d) (1-e)

A compound represented by the formula (1-d) (wherein $R^1$, Q and D are the same as defined above) and an oxidizing agent are reacted in a solvent or without solvent, and as the case requires, in the presence of a catalyst to produce a compound represented by the formula (1-e) (wherein $R^1$, Q and D are the same as defined above, and n' is an integer of 1 or 2). In a case where a solvent is used, the solvent used may

be any solvent which is inert to the reaction, and for example, water, a lower alcohol such as methanol or ethanol, an ether such as diethyl ether, tetrahydrofuran, 1,4-dioxane or 1,2-dimethoxyethane, an aromatic hydrocarbon such as benzene, chlorobenzene, bromobenzene, xylene or toluene, an aliphatic hydrocarbon such as pentane, hexane or cyclohexane, a halogenated hydrocarbon such as dichloromethane, chloroform or 1,2-dichloroethane, a nitrile such as acetonitrile or propionitrile, an amide such as N,N-dimethylformamide, N,N-dimethylacetamide, N-methylpyrrolidone or N,N'-dimethylimidazolidinone, a sulfoxide such as dimethyl sulfoxide, a nitrogen-containing aromatic compound such as pyridine or quinoline, acetic acid, or a mixture thereof may be mentioned.

The oxidizing agent may, for example, be a peracid such as m-chloroperbenzoic acid or peracetic acid, hydrogen peroxide or OXONE (registered trademark by E. I. duPont, potassium peroxymonosulfate). The equivalent amount of the oxidizing agent used is from 0.1 to 100 equivalent amount, preferably from 1 to 20 equivalent amount based on the compound represented by the formula (1-d).

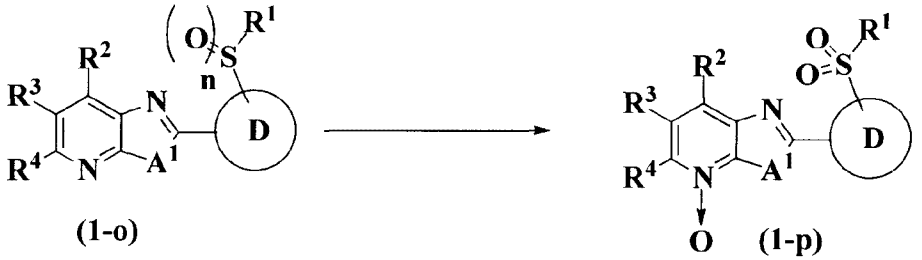
The reaction may be carried out in the presence of a catalyst. The catalyst used may, for example, be sodium tungstate. The equivalent amount of the catalyst used is from 0.005 to 20 equivalent amount, preferably from 0.1 to 5 equivalent amount based on the compound represented by the formula (1-d).

The reaction temperature may be set at an optional temperature of from -80°C to the refluxing temperature of the reaction mixture, and is preferably within a range of from 0°C to the refluxing temperature of the reaction mixture.

The reaction time varies depending upon the concentration of the reaction substrate and the reaction temperature, and is optionally set usually within a range of from 5 minutes to 100 hours, and is preferably from 1 to 48 hours.

The compound represented by the formula (1-d) may be prepared in accordance with the methods in Processes 1 to 10 or the following Processes 14 to 17.

Process 12

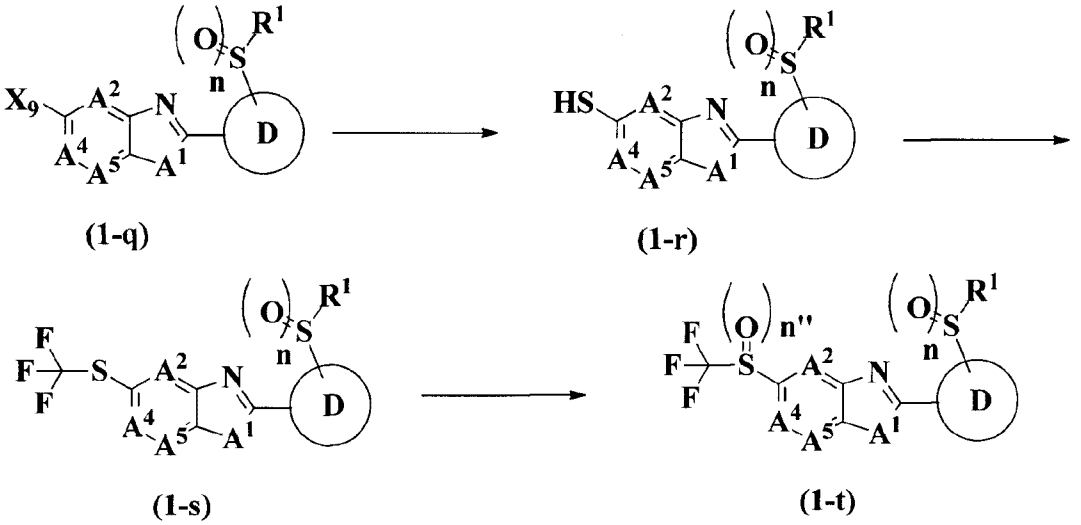


(1-o) (1-p)

A compound represented by the formula (1-o) (wherein $R^1$, $R^2$, $R^3$, $R^4$, $A^1$, D and n are the same as defined above) is reacted with an oxidizing agent in accordance with the method disclosed in Process 11 to produce a compound represented by the formula (1-p) (wherein $R^1$, $R^2$, $R^3$, $R^4$, $A^1$ and D are the same as defined above).

The compound represented by the formula (1-o) may be prepared in accordance with the method disclosed in Processes 1 to 5.

Process 13



(1-q) (1-r)

(1-s) (1-t)

A compound represented by the formula (1-q) (wherein $R^1$, $A^1$, $A^2$, $A^4$, $A^5$, D and n are the same as defined above, and $X_9$ is a chlorine atom, a bromine atom or an iodine atom) is reacted with a thiolating agent such as 2-ethylhexyl 3-mercaptopropionate, sodium hydrogen sulfide or sodium sulfide, for example, in accordance with the method disclosed in Organic Lett. 2007, Vol. 9, p. 3687, Tetrahedron 1998, Vol. 44, p. 1187, WO2011/159839 or the like to produce a compound represented by the formula (1-r) (wherein $R^1$, $A^1$, $A^2$, $A^4$, $A^5$, D and n are the same as defined above).

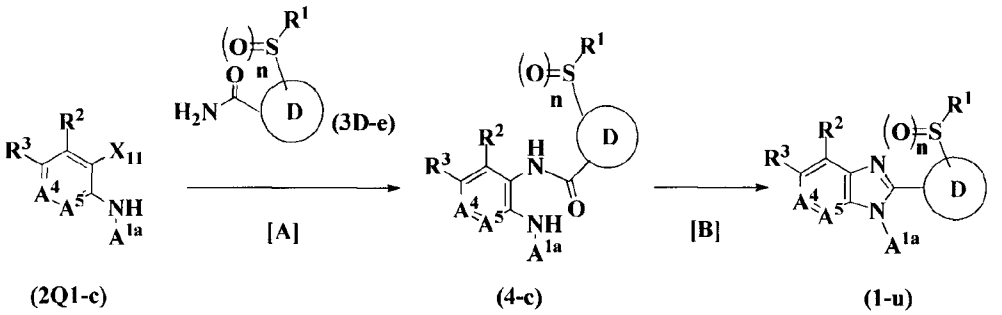
Then, the compound represented by the formula (1-r) is reacted with a trifluoromethylating agent such as Umemoto reagent (5-

(trifluoromethyl)dibenzothiophenium trifluoromethanesulfonate) or Togni reagent (1-trifluoromethyl-3,3-dimethyl-1,2-benziodoxole), for example, in accordance with the method disclosed in WO2013/043962, WO2013/040863, WO2012/082566 or the like, to produce a compound represented by the formula (1-s) (wherein $R^1$, $A^1$, $A^2$, $A^4$, $A^5$, D and n are the same as defined above).

Then, the compound represented by the formula (1-s) is reacted with an oxidizing agent in accordance with the method disclosed in Process 11 to produce a compound represented by the formula (1-t) (wherein $R^1$, $A^1$, $A^2$, $A^4$, $A^5$, D and n are the same as defined above, and n" is an integer of 1 or 2).

The compound represented by the formula (1-q) may be prepared in accordance with the method disclosed in Processes 1 to 5.

Process 14




A compound represented by the formula (2Q1-c) (wherein $A^{1a}$, $A^4$, $A^5$, $R^2$ and $R^3$ are the same as defined above, and $X_{11}$ is a chlorine atom, a bromine atom or an iodine atom) and a compound represented by the formula (3D-e) (wherein $R^1$, D and n are the same as defined above) are reacted in a solvent or without solvent, as the case requires, in the presence of a copper catalyst, as the case requires, in the presence of a base, and as the case requires, in the presence of a ligand. In a case where a solvent is used, the solvent used may be any solvent which is inert to the reaction, and for example, water, a lower alcohol such as methanol or ethanol, an ether such as diethyl ether, tetrahydrofuran, 1,4-dioxane or 1,2-dimethoxyethane, an aromatic hydrocarbon such as benzene, chlorobenzene, bromobenzene, xylene or toluene, an aliphatic hydrocarbon such as pentane, hexane or cyclohexane, a halogenated hydrocarbon such as dichloromethane, chloroform or 1,2-dichloroethane, a nitrile such as acetonitrile or propionitrile, an amide such as N,N-dimethylformamide, N,N-dimethylacetamide, N-methylpyrrolidone or N,N'-dimethylimidazolidinone, a sulfoxide such as dimethyl

sulfoxide, a nitrogen-containing aromatic compound such as pyridine or quinoline, or a mixture thereof may be mentioned.

The reaction may be carried out in the presence of a copper catalyst. The copper catalyst to be used may, for example, be copper(I) iodide. The equivalent amount of the copper catalyst used is from 0.005 to 20 equivalent amount, preferably from 0.01 to 5 equivalent amount based on the compound (2Q1-c).

The reaction may be carried out in the presence of a base. The base to be used may, for example, be an organic base such as pyridine, 2,6-lutidine, 4-dimethylaminopyridine, triethylamine, diisopropylethylamine, tributylamine, 4-(dimethylamino)pyridine, 1,4-diazabicyclo[2.2.2]octane (DABCO), 1,8-diazabicyclo[5.4.0]-7-undecene (DBU) or 1,5-diazabicyclo[4.3.0]-5-nonene (DBN), or an inorganic base such as sodium hydroxide, potassium hydroxide, sodium hydride, sodium hydrogen carbonate, potassium carbonate, cesium carbonate or potassium phosphate. The equivalent amount of the base used is from 0.1 to 100 equivalent amount, preferably from 1 to 20 equivalent amount based on the compound represented by the formula (2Q1-c).

The reaction may be carried out in the presence of a ligand. The ligand to be used may, for example, be 1,10-phenanthroline, 1,2-diaminoethane or N,N'-dimethylethylenediamine. The equivalent amount of the ligand used is from 0.005 to 20 equivalent amount, preferably from 0.01 to 5 equivalent amount based on the compound (2Q1-c).

The reaction temperature may be set at an optional temperature of from -80°C to the refluxing temperature of the reaction mixture, and is preferably within a range of from 0°C to the refluxing temperature of the reaction mixture.

The reaction time varies depending upon the concentration of the reaction substrate and the reaction temperature, and is optionally set usually within a range of from 5 minutes to 100 hours, and is preferably from 1 to 48 hours.

With respect to the equivalent amount of the reaction substrate, the compound (3D-e) may be used in an amount of from 0.5 to 50 equivalent amount, preferably from 1 to 20 equivalent amount based on the compound (2Q1-c).

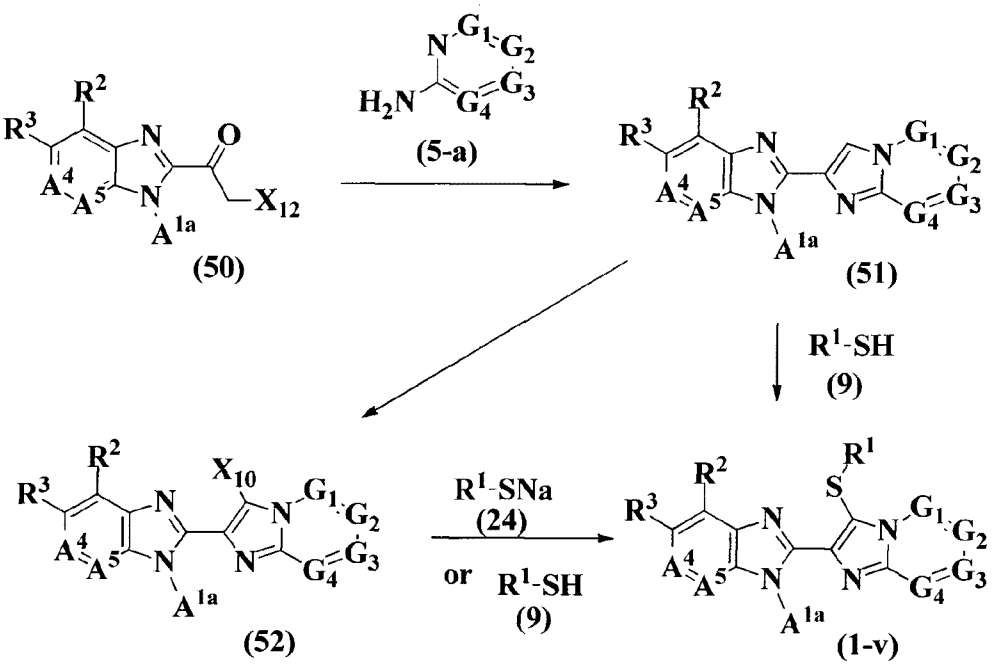
Then, the compound represented by the formula (4-c) is subjected to dehydration condensation in accordance with the method disclosed in step [B] of Process 1 to

produce a compound represented by the formula (1-u) (wherein $A^{1a}$, $A^4$, $A^5$, $R^1$, $R^2$, $R^3$, D and n are the same as defined above).

Some of the compounds represented by the formula (2Q1-c) are known compounds, and some of them are commercially available. The rest of them may be prepared, for example, in accordance with the after-mentioned Reaction Scheme 4.

The compound represented by the formula (3D-e) may be prepared, for example, in accordance with the after-mentioned Reaction Scheme 8.

Process 15




A compound represented by the formula (50) (wherein $R^2$, $R^3$, $A^{1a}$, $A^4$ and $A^5$ are the same as defined above, and $X_{12}$ is a chlorine atom, a bromine atom or an iodine atom) and a compound represented by the formula (5-a) (wherein $G_1$, $G_2$, $G_3$ and $G_4$ are the same as defined above) are reacted in accordance with the method disclosed in Process 6 to produce a compound represented by the formula (51) (wherein $R^2$, $R^3$, $A^{1a}$, $A^4$, $A^5$, $G_1$, $G_2$, $G_3$ and $G_4$ are the same as defined above).

Then, the compound represented by the formula (51) and the compound represented by the formula (9) are reacted in accordance with the method disclosed in step [C] of Process 3 to produce a compound represented by the formula (1-v) (wherein $R^1$, $R^2$, $R^3$, $A^{1a}$, $A^4$, $A^5$, $G_1$, $G_2$, $G_3$ and $G_4$ are the same as defined above).

Further, the compound represented by the formula (51) and a halogenating agent

are reacted in accordance with the method disclosed in step [D] of Process 3 to produce a compound represented by the formula (52) (wherein $R^2$, $R^3$, $A^{1a}$, $A^4$, $A^5$, $G_1$, $G_2$, $G_3$, $G_4$ and $X_{10}$ are the same as defined above).

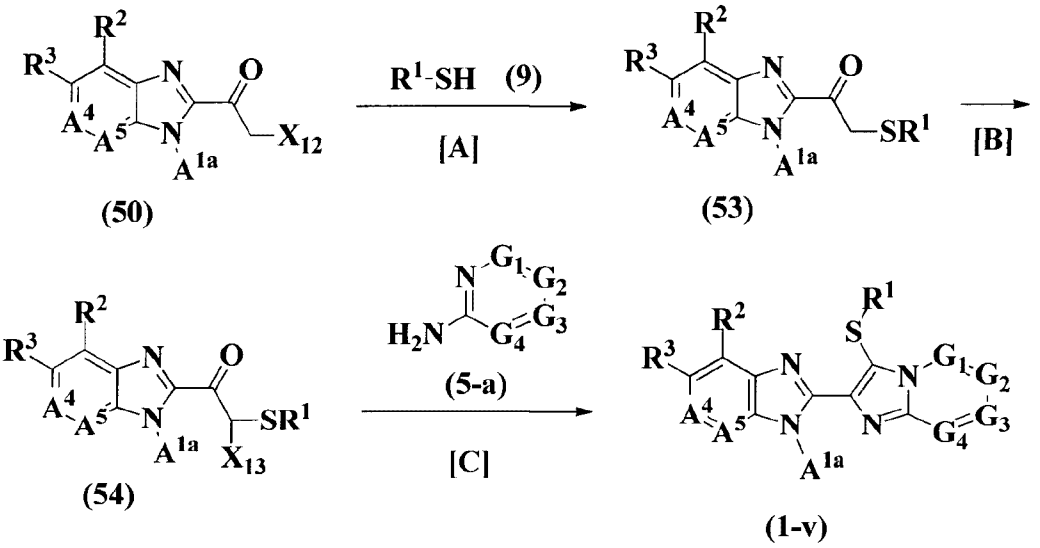
Then, the compound represented by the formula (52) and a compound represented by the formula (24) are reacted in accordance with the method disclosed in step [E] of Process 3 to produce a compound represented by the formula (1-v).

Further, the compound represented by the formula (1-v) may be produced by reacting the compound represented by the formula (52) and the compound represented by the formula (9) in accordance with the method disclosed in step [E] of Process 3.

The compound represented by the formula (50) may be prepared, for example, in accordance with the after-mentioned Reaction Scheme 9.

Some of the compounds represented by the formula (5-a) are known compounds, and some of them are commercially available.

Process 16




The compound represented by the formula (50) and the compound represented by the formula (9) are reacted in a solvent or without solvent, and as the case requires, in the presence of a base to produce a compound represented by the formula (53) (wherein $R^1$, $R^2$, $R^3$, $A^{1a}$, $A^4$ and $A^5$ are the same as defined above). In a case where a solvent is used, the solvent used may be any solvent which is inert to the reaction, and for example, water, a lower alcohol such as methanol or ethanol, an ether such as diethyl ether, tetrahydrofuran, 1,4-dioxane or 1,2-dimethoxyethane, an aromatic

hydrocarbon such as benzene, chlorobenzene, bromobenzene, xylene or toluene, an aliphatic hydrocarbon such as pentane, hexane or cyclohexane, a halogenated hydrocarbon such as dichloromethane, chloroform or 1,2-dichloroethane, a nitrile such as acetonitrile or propionitrile, an amide such as N,N-dimethylformamide, N,N-dimethylacetamide, N-methylpyrrolidone or N,N'-dimethylimidazolidinone, a sulfoxide such as dimethyl sulfoxide, a nitrogen-containing aromatic compound such as pyridine or quinoline, or a mixture thereof may be mentioned.

The reaction may be carried out in the presence of a base. The base to be used may, for example, be an organic base such as pyridine, 2,6-lutidine, 4-dimethylaminopyridine, triethylamine, diisopropylethylamine, tributylamine, 4-(dimethylamino)pyridine, 1,4-diazabicyclo[2.2.2]octane (DABCO), 1,8-diazabicyclo[5.4.0]-7-undecene (DBU) or 1,5-diazabicyclo[4.3.0]-5-nonene (DBN), or an inorganic base such as sodium hydroxide, potassium hydroxide, sodium hydride, sodium hydrogen carbonate, potassium carbonate or cesium carbonate. The equivalent amount of the base used is from 0.1 to 100 equivalent amount, preferably from 1 to 20 equivalent amount based on the compound represented by the formula (50).

The reaction temperature may be set at an optional temperature of from -80°C to the refluxing temperature of the reaction mixture, and is preferably within a range of from 0°C to the refluxing temperature of the reaction mixture.

The reaction time varies depending upon the concentration of the reaction substrate and the reaction temperature, and is optionally set usually within a range of from 5 minutes to 100 hours, and is preferably from 1 to 48 hours.

With respect to the equivalent amount of the reaction substrate, the compound (9) may be used in an amount of from 0.5 to 50 equivalent amount, preferably from 1 to 20 equivalent amount based on the compound (50).

Then, the compound represented by the formula (53) and a halogenating agent are reacted in a solvent or without solvent, as the case requires, in the presence of a silylating agent, as the case requires, in the presence of a base, as the case requires, in the presence of an acid to produce a compound represented by the formula (54) (wherein $R^1$, $R^2$, $R^3$, $A^{1a}$, $A^4$ and $A^5$ are the same as defined above, and $X_{13}$ is a chlorine atom, a bromine atom or an iodine atom). In a case where a solvent is used, the

solvent used may be any solvent which is inert to the reaction, and for example, water, an aliphatic acid such as acetic acid, a lower alcohol such as methanol or ethanol, an ether such as diethyl ether, tetrahydrofuran, 1,4-dioxane or 1,2-dimethoxyethane, an aromatic hydrocarbon such as benzene, chlorobenzene, bromobenzene, xylene or toluene, an aliphatic hydrocarbon such as pentane, hexane or cyclohexane, a halogenated hydrocarbon such as dichloromethane, chloroform or 1,2-dichloroethane, a nitrile such as acetonitrile or propionitrile, an amide such as N,N-dimethylformamide, N,N-dimethylacetamide, N-methylpyrrolidone or N,N'-dimethylimidazolidinone, a sulfoxide such as dimethyl sulfoxide, a nitrogen-containing aromatic compound such as pyridine or quinoline, or a mixture thereof may be mentioned.

The halogenating agent may, for example, be chlorine, bromine, iodine, N-chlorosuccinimide, N-bromosuccinimide, N-iodosuccinimide, 1,3-dichloro-5,5-dimethylhydantoin, 1,3-dibromo-5,5-dimethylhydantoin, 1,3-diiodo-5,5-dimethylhydantoin or trimethylphenylammonium tribromide. The equivalent amount of the halogenating agent used is from 0.5 to 50 equivalent amount, preferably from 1 to 20 equivalent amount based on the compound represented by the formula (53).

The reaction may be carried out in the presence of a silylating agent. The silylating agent to be used may, for example, be trimethylsilyl trifluoromethanesulfonate. The equivalent amount of the silylating agent used is from 0.005 to 20 equivalent amount, preferably from 0.01 to 5 equivalent amount based on the compound represented by the formula (53).

The reaction may be carried out in the presence of a base. The base to be used may, for example, be an organic base such as pyridine, 2,6-lutidine, 4-dimethylaminopyridine, triethylamine, diisopropylethylamine, tributylamine, 4-(dimethylamino)pyridine, 1,4-diazabicyclo[2.2.2]octane (DABCO), 1,8-diazabicyclo[5.4.0]-7-undecene (DBU) or 1,5-diazabicyclo[4.3.0]-5-nonene (DBN), or an inorganic base such as sodium hydroxide, potassium hydroxide, sodium hydride, sodium hydrogen carbonate, potassium carbonate, cesium carbonate or potassium phosphate. The equivalent amount of the base used is from 0.1 to 100 equivalent amount, preferably from 1 to 20 equivalent amount based on the compound represented by the formula (53).

The reaction may be carried out in the presence of an acid. The acid to be used

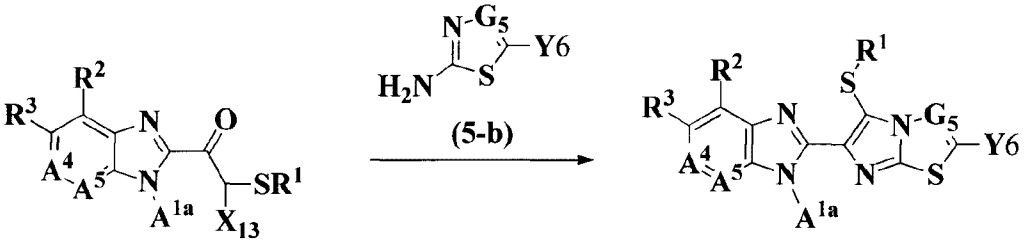
may, for example, be hydrobromic acid or an acetic acid solution of hydrogen bromide. The equivalent amount of the acid used is from 0.1 to 100 equivalent amount, preferably from 1 to 20 equivalent amount based on the compound represented by the formula (53).

The reaction temperature may be set at an optional temperature of from -80°C to the refluxing temperature of the reaction mixture, and is preferably within a range of from 0°C to the refluxing temperature of the reaction mixture.

The reaction time varies depending upon the concentration of the reaction substrate and the reaction temperature, and is optionally set usually within a range of from 5 minutes to 100 hours, and is preferably from 1 to 48 hours.

Then, the compound represented by the formula (54) and the compound represented by the formula (5-a) are reacted in accordance with the method disclosed in Process 6 to produce a compound represented by the formula (1-v).

Process 17




(54) (1-w)

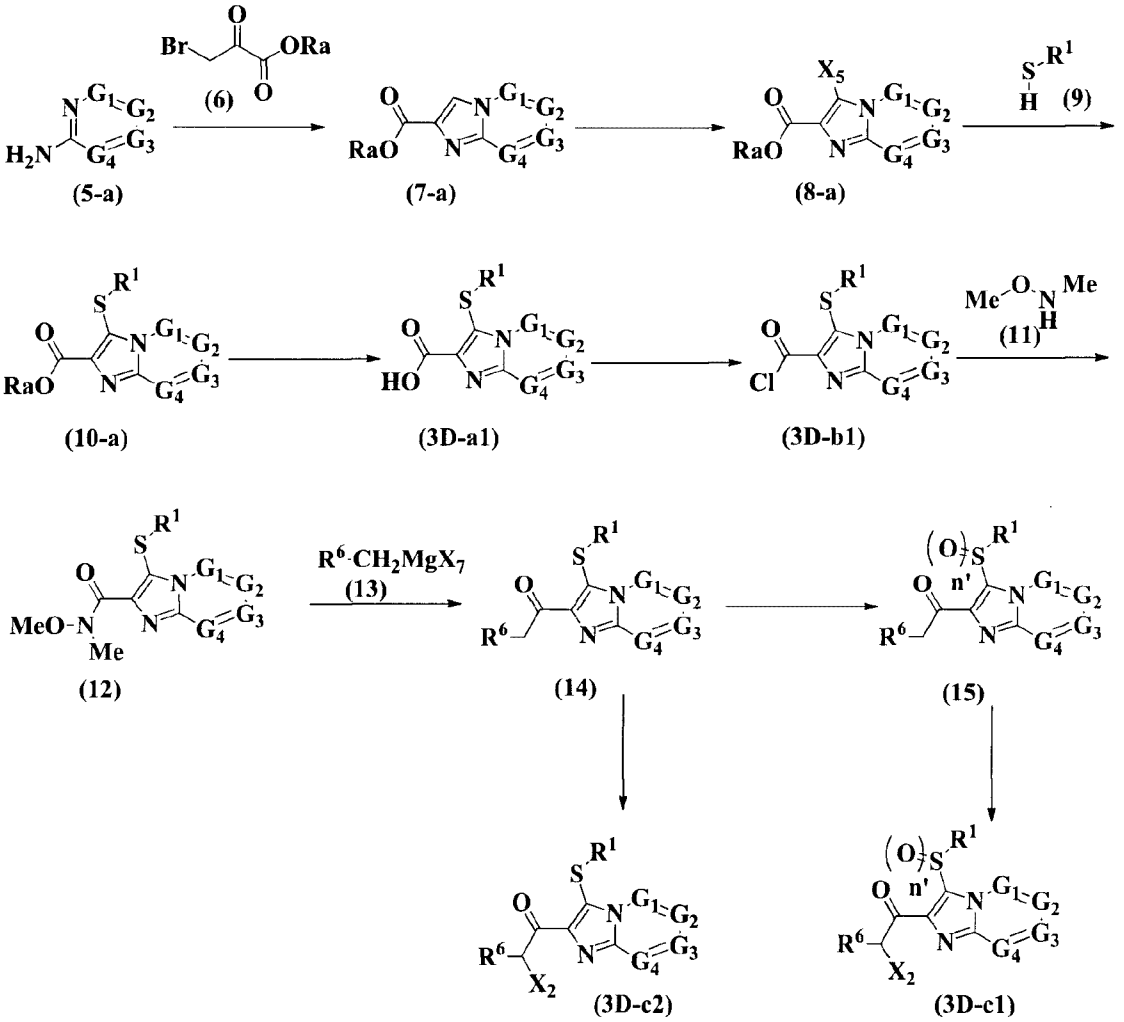
The compound represented by the formula (54) and a compound represented by the formula (5-b) (wherein $G_5$ and Y6 are the same as defined above) are reacted in accordance with the method disclosed in Process 6 to produce a compound represented by the formula (1-w) (wherein $R^1$, $R^2$, $R^3$, $A^{1a}$, $A^4$, $A^5$, $G_5$ and Y6 are the same as defined above).

In Processes 1 to 17, the reaction mixture after the reaction can be worked up by an ordinary procedure such as direct concentration, concentration of a solution in an organic solvent after washing with water, pouring into ice-water or extraction with an organic solvent followed by concentration to obtain the desired compound of the present invention. Further, if necessary, the desired product may be isolated or purified by an optional purification method such as recrystallization, column chromatography, thin layer chromatography or liquid chromatography. Otherwise, the compound of the present

invention may be subjected to the next step without isolation and purification. In some cases, the dehydration condensation reaction as the subsequent step proceeds in step [A] of Process 1, in step [A] of Process 3, in step [A] of Process 4, in step [A] of Process 5 and in step [A] of Process 14, and thus step [B] may be omitted.

Among the compounds represented by the formulae (3D-a) and (3D-b) used in Processes 1 and 5, compounds represented by the formulae (3D-a1) and (3D-b1) wherein n is an integer of 0, and among the compounds represented by the formula (3D-c) used in Processes 6 and 10, a compound represented by the formula (3D-c1) wherein n is an integer of 1 or 2 and a compound represented by the formula (3D-c2) wherein n is an integer of 0, may be produced, for example, in accordance with the following Reaction Scheme 1.

Reaction Scheme 1



The compound represented by the formula (5-a) is reacted with a compound represented by the formula (6) (wherein Ra is $C_1$-$C_6$ alkyl) in accordance with the method disclosed in Process 6 to produce a compound represented by the formula (7-a) (wherein $G_1$, $G_2$, $G_3$ and $G_4$ are the same as defined above, and Ra is $C_1$-$C_6$ alkyl).

Then, the compound represented by the formula (7-a) is reacted with a halogenating agent in accordance with the method disclosed in Process 7 to produce a compound represented by the formula (8-a) (wherein $G_1$, $G_2$, $G_3$ and $G_4$ are the same as defined above, Ra is $C_1$-$C_6$ alkyl, and $X_5$ is a chlorine atom, a bromine atom or an iodine atom).

Then, the compound represented by the formula (8-a) is reacted with a compound represented by the formula (9) (wherein $R^1$ is the same as defined above) in accordance with the method disclosed in step [E] of Process 3 to produce a compound represented by the formula (10-a) (wherein $G_1$, $G_2$, $G_3$, $G_4$ and $R^1$ are the same as defined above, and Ra is $C_1$-$C_6$ alkyl).

Then, the compound represented by the formula (10-a) is hydrolyzed in accordance with conventional methods disclosed in literature to produce a compound represented by the formula (3D-a1) (wherein $G_1$, $G_2$, $G_3$, $G_4$ and $R^1$ are the same as defined above).

Then, the compound represented by the formula (3D-a1) is reacted with a chlorinating agent in accordance with conventional methods disclosed in literature to produce a compound represented by the formula (3D-b1) (wherein $G_1$, $G_2$, $G_3$, $G_4$ and $R^1$ are the same as defined above).

Then, the compound represented by the formula (3D-b1) and N,O-dimethylhydroxylamine represented by the formula (11) or its hydrochloride are reacted, as the case requires, in the presence of a base to produce a compound represented by the formula (12) (wherein $G_1$, $G_2$, $G_3$, $G_4$ and $R^1$ are the same as defined above).

Then, the compound represented by the formula (12) and a Grignard reagent represented by the formula (13) (wherein $R^6$ is the same as defined above, and $X_7$ is a chlorine atom, a bromine atom or an iodine atom) are reacted in accordance with conventional methods disclosed in literature to produce a compound represented by the formula (14) (wherein $G_1$, $G_2$, $G_3$, $G_4$, $R^1$ and $R^6$ are the same as defined above).

Then, the compound represented by the formula (14) and an oxidizing agent are

reacted in accordance with the method disclosed in Process 11 to produce a compound represented by the formula (15) (wherein $G_1$, $G_2$, $G_3$, $G_4$, $R^1$, $R^6$ and n' are the same as defined above).

Then, the compound represented by the formula (15) is reacted with a halogenating agent in accordance with the method disclosed in step [B] of Process 16 to produce a compound represented by the formula (3D-c1) (wherein $G_1$, $G_2$, $G_3$, $G_4$, $R^1$, $R^6$, $X_2$ and n' are the same as defined above).

Further, the compound represented by the formula (14) is reacted with a halogenating agent in accordance with the method disclosed in step [B] of Process 16 to produce a compound represented by the formula (3D-c2) (wherein $G_1$, $G_2$, $G_3$, $G_4$, $R^1$, $R^6$ and $X_2$ are the same as defined above).

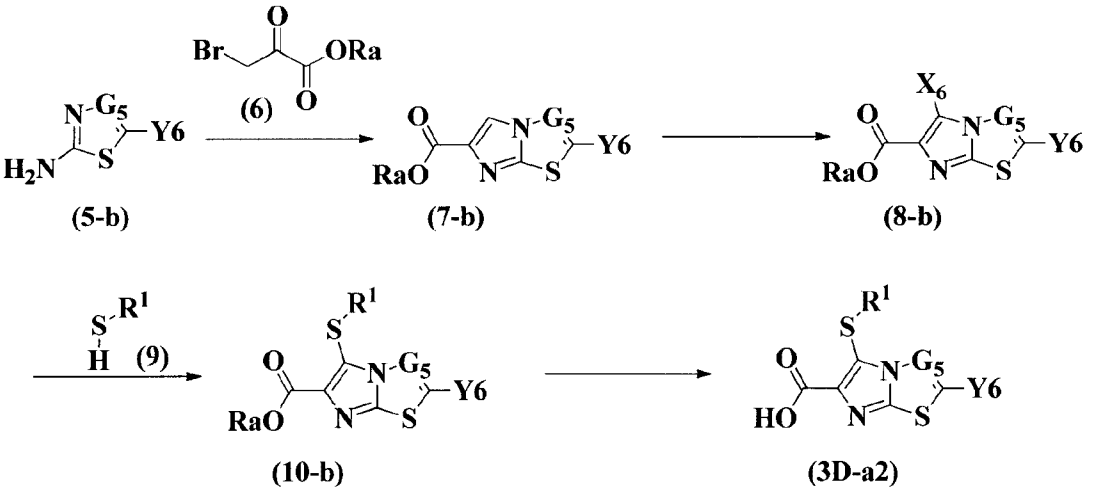
Some of the compounds represented by the formula (5-a) are known compounds, and some of them are commercially available.

Some of the compounds represented by the formula (6) are known compounds, and some of them are commercially available.

Some of the compounds represented by the formula (13) are known compounds, and some of them are commercially available.

Among the compounds represented by the formula (3D-a) used in Process 1, a compound represented by the formula (3D-a2) wherein n is an integer of 0 may be produced, for example, in accordance with the following Reaction Scheme 2.

Reaction Scheme 2




The compound represented by the formula (5-b) is reacted with the compound represented by the formula (6) in accordance with the method disclosed in Process 6 to

produce a compound represented by the formula (7-b) (wherein $G_5$, Y6 and Ra are the same as defined above).

Then, the compound represented by the formula (7-b) is reacted with a halogenating agent in accordance with the method disclosed in Process 7 to produce a compound represented by the formula (8-b) (wherein $G_5$, Y6 and Ra are the same as defined above, and $X_6$ is a chlorine atom, a bromine atom or an iodine atom).

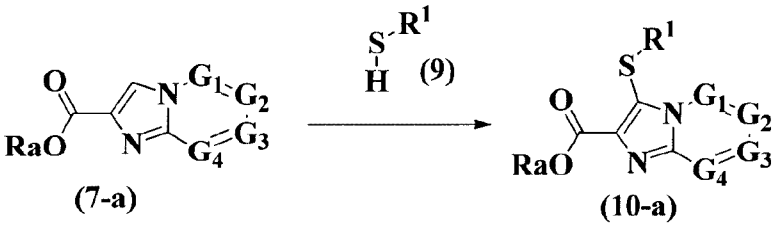
Then, the compound represented by the formula (8-b) is reacted with the compound represented by the formula (9) in accordance with the method disclosed in step [E] of Process 3 to produce a compound represented by the formula (10-b) (wherein $G_5$, Y6, $R^1$ and Ra are the same as defined above).

Then, the compound represented by the formula (10-b) is hydrolyzed in accordance with conventional methods disclosed in literature to produce a compound represented by the formula (3D-a2) (wherein $G_5$, Y6 and $R^1$ are the same as defined above).

Some of the compounds represented by the formula (5-b) are known compounds, and some of them are commercially available.

The compound represented by the formula (10-a) used in Reaction Scheme 1 may be produced, for example, in accordance with the following Reaction Scheme 3.

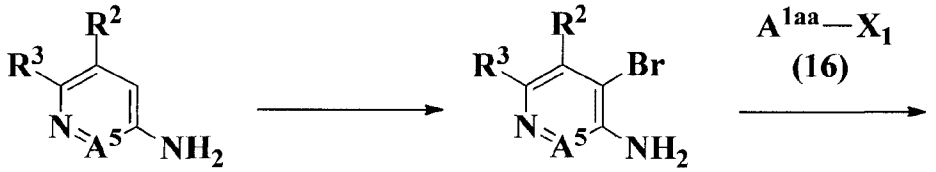
Reaction Scheme 3



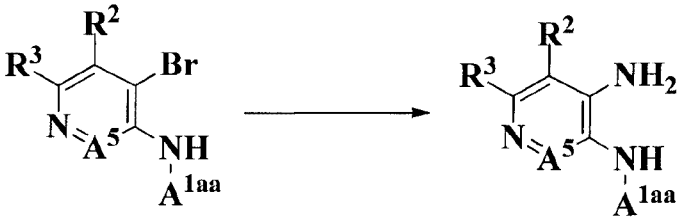

The compound represented by the formula (7-a) is reacted with the compound represented by the formula (9) and a halogenating agent in accordance with the method disclosed in step [C] of Process 3 to produce a compound represented by the formula (10-a).

Among the compounds represented by the formula (2Q1-a) used in Process 1, a compound represented by the formula (2Q1-a-1) may be produced, for example, in accordance with the following Reaction Scheme 4.

Reaction Scheme 4



(25) (26)



(27) (2Q1-a-1)

A compound represented by the formula (25) (wherein $R^2$, $R^3$ and $A^5$ are the same as defined above) is reacted with a brominating agent such as N-bromosuccinimide, for example, in accordance with the method disclosed in WO2007/093901 to produce a compound represented by the formula (26) (wherein $R^2$, $R^3$ and $A^5$ are the same as defined above).

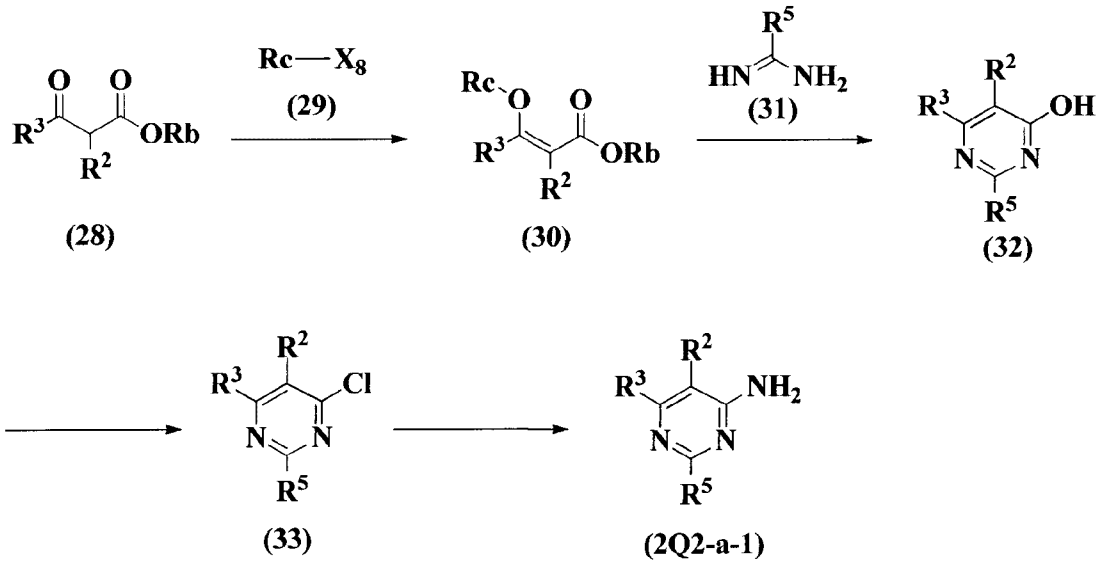
Then, the compound represented by the formula (26) is reacted with the compound represented by the formula (16) in accordance with the method disclosed in Process 2 to produce a compound represented by the formula (27) (wherein $R^2$, $R^3$, $A^{1aa}$ and $A^5$ are the same as defined above).

Then, the compound represented by the formula (27) is reacted with an aminating agent such as ammonia, aqueous ammonia or lithium amide in accordance with the method disclosed in e.g. WO2012/086848 to produce a compound represented by the formula (2Q1-a-1) (wherein $R^2$, $R^3$, $A^{1aa}$ and $A^5$ are the same as defined above).

Some of the compounds represented by the formula (25) are known compounds, and some of them are commercially available.

Among the compounds represented by the formula (2Q2-a) used in Process 6, a compound represented by the formula (2Q2-a-1) may be produced, for example, in accordance with the following Reaction Scheme 5.

Reaction Scheme 5




A compound represented by the formula (28) (wherein $R^2$ and $R^3$ are the same as defined above, and Rb is $C_1$-$C_6$ alkyl) is reacted with a compound represented by the formula (29) (wherein Rc is $C_1$-$C_6$ alkyl, and $X_8$ is a favorable leaving group such as a halogen atom, $C_1$-$C_4$ alkylsulfonate (such as methanesulfonyloxy), $C_1$-$C_4$ haloalkylsulfonate (such as trifluoromethanesulfonyloxy) or arylsulfonate (such as benzenesulfonyloxy or p-toluenesulfonyloxy)) for example in accordance with the method disclosed in e.g. Journal of Fluorine Chemistry, 1989, Vol. 44, p. 361, Journal of Heterocyclic Chemistry, 1993, Vol. 33, p. 49, or Synthesis 2000, p. 1078 to produce a compound represented by the formula (30) (wherein $R^2$, $R^3$, Rb and Rc are the same as defined above).

Then, the compound represented by the formula (30) is reacted with a compound represented by the formula (31) (wherein $R^5$ is the same as defined above) in accordance with e.g. Bioorganic & Medicinal Chemistry Letters, 2011, Vol. 21, p. 1601 to produce a compound represented by the formula (32) (wherein $R^2$, $R^3$ and $R^5$ are the same as defined above).

Then, the compound represented by the formula (32) is reacted with a chlorinating agent such as phosphorus oxychloride, thionyl chloride or oxalyl chloride for example in accordance with e.g. WO2012/061337 or WO2005/033084 to produce a compound represented by the formula (33) (wherein $R^2$, $R^3$ and $R^5$ are the same as defined above).

Then, the compound represented by the formula (33) is reacted with aqueous ammonia for example in accordance with the method disclosed in e.g. WO2012/061337

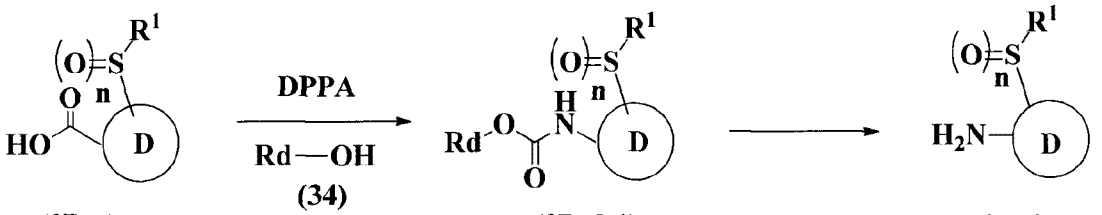
or WO2005/033084 to produce a compound represented by the formula (2Q2-a-1).

Some of the compounds represented by the formula (28) are known compounds, and some of them are commercially available.

Some of the compounds represented by the formula (29) are known compounds, and some of them are commercially available.

Some of the compounds represented by the formula (31) are known compounds, and some of them are commercially available.

The compound represented by the formula (3D-d) used in Process 8 may be produced, for example, in accordance with the following Reaction Scheme 6.



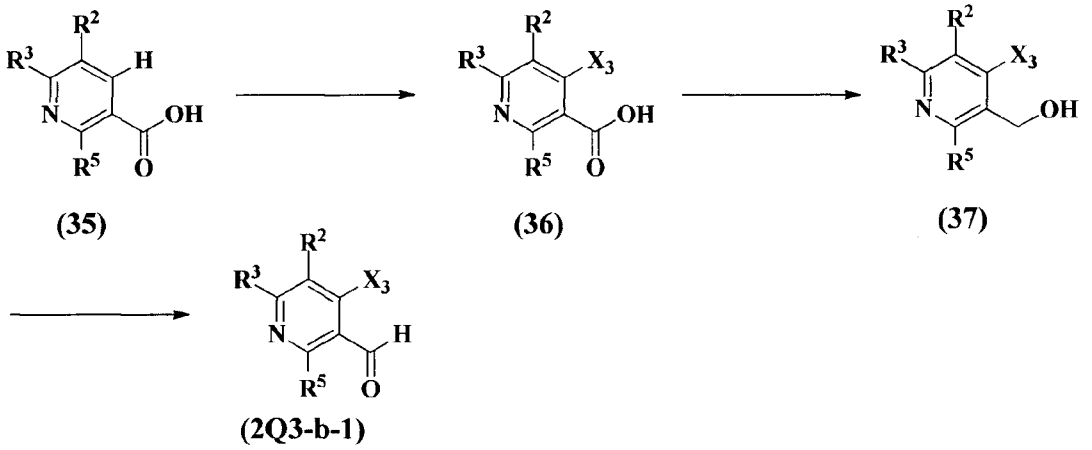

(3D-a) (3D-d-1) (3D-d)

The compound represented by the formula (3D-a) is reacted with diphenylphosphoryl azide (DPPA) and a compound represented by the formula (34) (wherein Rd is $C_1$-$C_6$ alkyl) for example in accordance with the method disclosed in e.g. WO2012/174312 or WO2013/018021 to produce a compound represented by the formula (3D-d-1) (wherein $R^1$, Rd, D and n are the same as defined above).

Then, the compound represented by the formula (3D-d-1) is reacted with an acid for example in accordance with the method disclosed in e.g. WO2012/174312 or WO2003/018021 to produce a compound represented by the formula (3D-d).

Among the compounds represented by the formula (2Q3-b) used in Process 9, a compound represented by the formula (2Q3-b-1) may be produced, for example, in accordance with the following Reaction Scheme 7.

Reaction Scheme 7



(35) (36) (37)

(2Q3-b-1)

A compound represented by the formula (35) (wherein $R^2$, $R^3$ and $R^5$ are the same as defined above) is halogenated by using a halogenating agent for example in accordance with the method disclosed in e.g. WO2013/064460 or WO2013/064461 to produce a compound represented by the formula (36) (wherein $R^2$, $R^3$, $R^5$ and $X_3$ are the same as defined above).

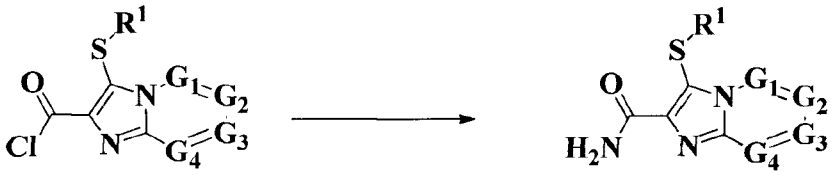
Then, the compound represented by the formula (36) is reduced for example in accordance with the method disclosed in e.g. WO2013/064460 or WO2013/064461 to produce a compound represented by the formula (37) (wherein $R^2$, $R^3$, $R^5$ and $X_3$ are the same as defined above).

Then, the compound represented by the formula (37) is oxidized for example in accordance with the method disclosed in e.g. WO2013/064460 or WO2013/064461 to produce a compound represented by the formula (2Q3-b-1) (wherein $R^2$, $R^3$, $R^5$ and $X_3$ are the same as defined above).

Some of the compounds represented by the formula (35) are known compounds, and some of them are commercially available. The rest of them may be prepared from known compounds in accordance with conventional methods disclosed in literature, for example, in accordance with the reaction conditions disclosed in e.g. WO2000/039094.

Among the compounds represented by the formula (3D-e) used in Process 14, a compound represented by the formula (3D-e1) wherein n is an integer of 0 may be produced, for example, in accordance with the following Reaction Shceme 8.

Reaction Shceme 8

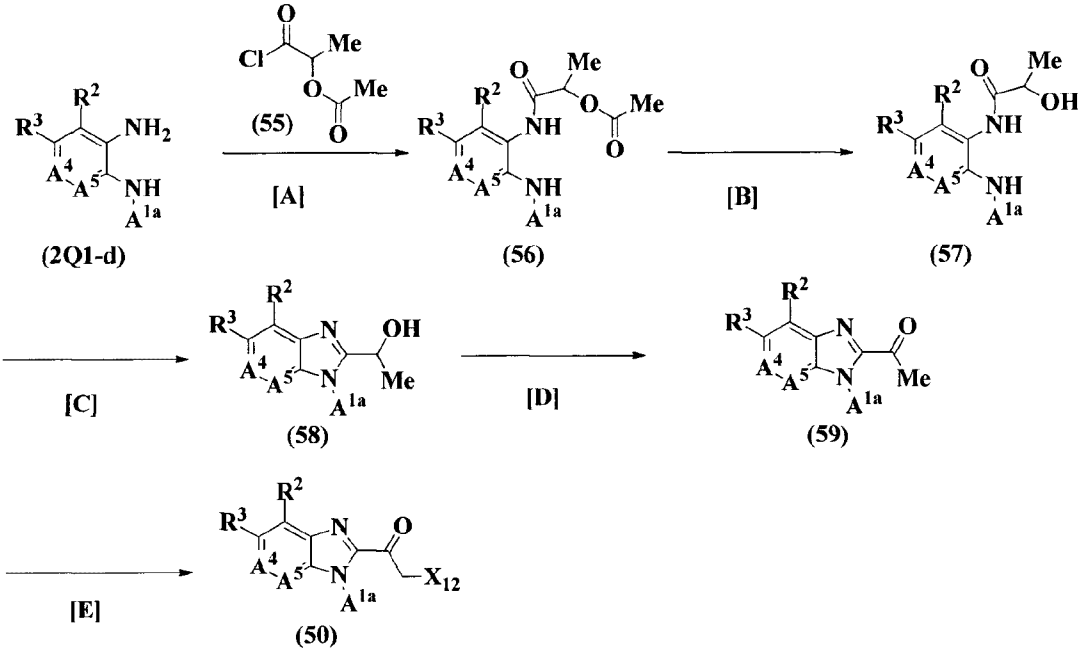


(3D-b1) (3D-e1)

The compound represented by the formula (3D-b1) is reacted with aqueous ammonia for example in accordance with the method disclosed in e.g. JP-A-2009-108046 to produce a compound represented by the formula (3D-e1) (wherein $R^1$, $G_1$, $G_2$, $G_3$ and $G_4$ are the same as defined above).

The compound represented by the formula (50) used in Processes 15 and 16 may be produced, for example, in accordance with the following Reaction Scheme 9.

Reaction Scheme 9



(2Q1-d) (55) [A] (56) [B] (57) [C] (58) [D] (59) [E] (50)

A compound represented by the formula (2Q1-d) is reacted with compound represented by the formula (55) in accordance with the method disclosed in step [A] of Process 1 to produce a compound represented by the formula (56) (wherein $R^2$, $R^3$, $A^{1a}$, $A^4$ and $A^5$ are the same as defined above).

Then, the compound represented by the formula (56) is subjected to deacetylation for example in accordance with the method disclosed in e.g. Synthesis, 1991, p. 465 to produce a compound represented by the formula (57) (wherein $R^2$, $R^3$, $A^{1a}$, $A^4$ and $A^5$

are the same as defined above).

Then, the compound represented by the formula (57) is subjected to dehydration condensation in accordance with the method disclosed in step [B] of Process 1 to produce a compound represented by the formula (58) (wherein $R^2$, $R^3$, $A^{1a}$, $A^4$ and $A^5$ are the same as defined above).

Then, the compound represented by the formula (58) and an oxidizing agent are reacted for example in accordance with the method disclosed in e.g. Journal of Medicinal Chemistry, 1998, Vol. 31, p. 545 to produce a compound represented by the formula (59) (wherein $R^2$, $R^3$, $A^{1a}$, $A^4$ and $A^5$ are the same as defined above).

Then, the compound represented by the formula (59) and a halogenating agent are reacted in accordance with the method disclosed in step [B] of Process 16 or in accordance with the method disclosed in e.g. Journal of Medicinal Chemistry, 1988, Vol. 31, p. 656 or Journal of Medicinal Chemistry, 2005, Vol. 48, p. 7658 to produce a compound represented by the formula (50).

The compound represented by the formula (55) is a known compound and is commercially available. Further, the compound represented by the formula (55) has optically active isomers due to the presence of an asymmetric carbon atom, and the present invention covers any optical isomers and any racemates.

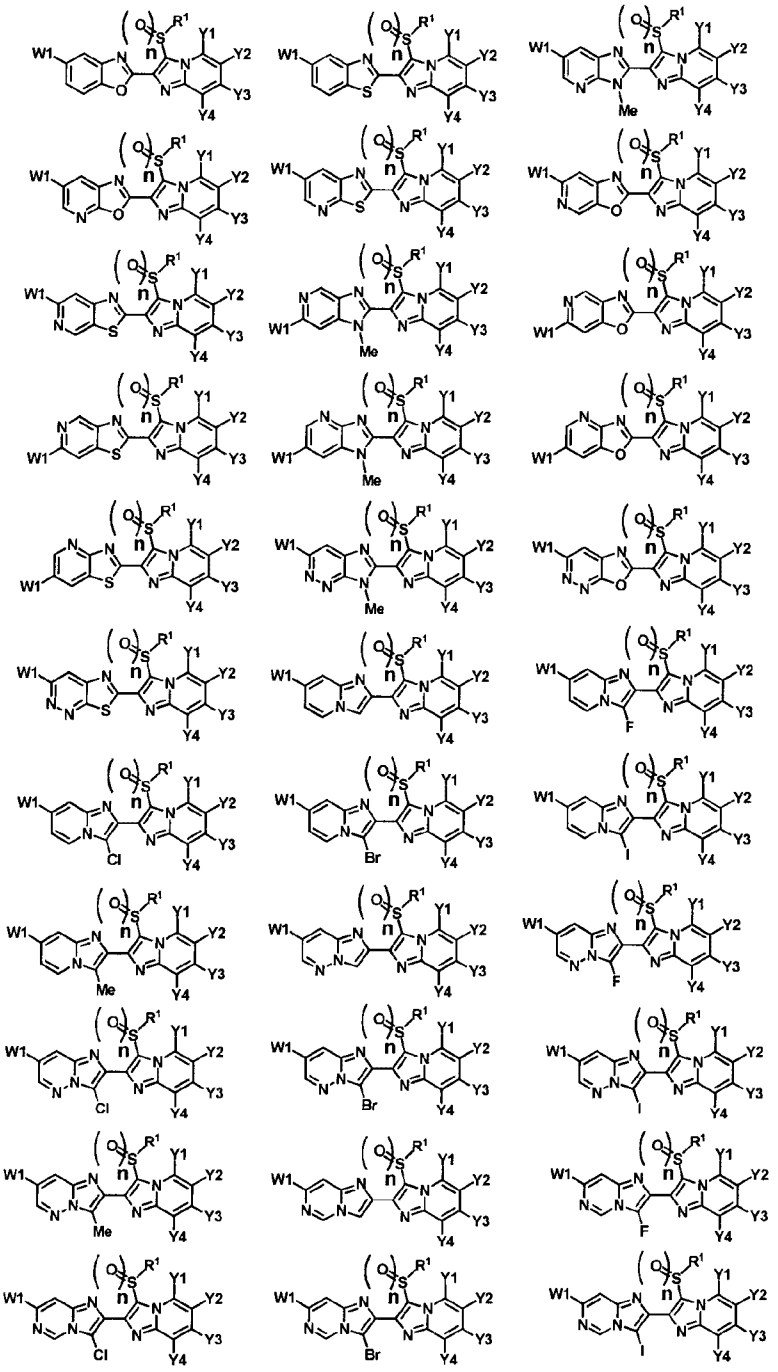
In each reaction, after the reaction, an ordinary post treatment is carried out to obtain respective production intermediates to be raw material compounds in Processes 1 to 17.

Further, each production intermediate produced by the above methods may be used for the reaction in the subsequent step as it is without isolation nor purification. In some cases, the dehydration condensation reaction as the subsequent step proceeds, in step [B] of Reaction Scheme 9, and thus step [C] may be omitted.

As the condensed heterocyclic compounds represented by the formula (1) of the present invention, which can be produced by the above methods, compounds represented by the following Tables 1 to 5 may be mentioned. However, the compounds shown in the following Tables 1 to 5 merely exemplify the present invention, and the present invention is by no means restricted thereto.

In Tables, Me represents methyl, and similarly, Et represents ethyl, $^n$Pr represents normal propyl, and $^i$Pr represents isopropyl.

Table 1



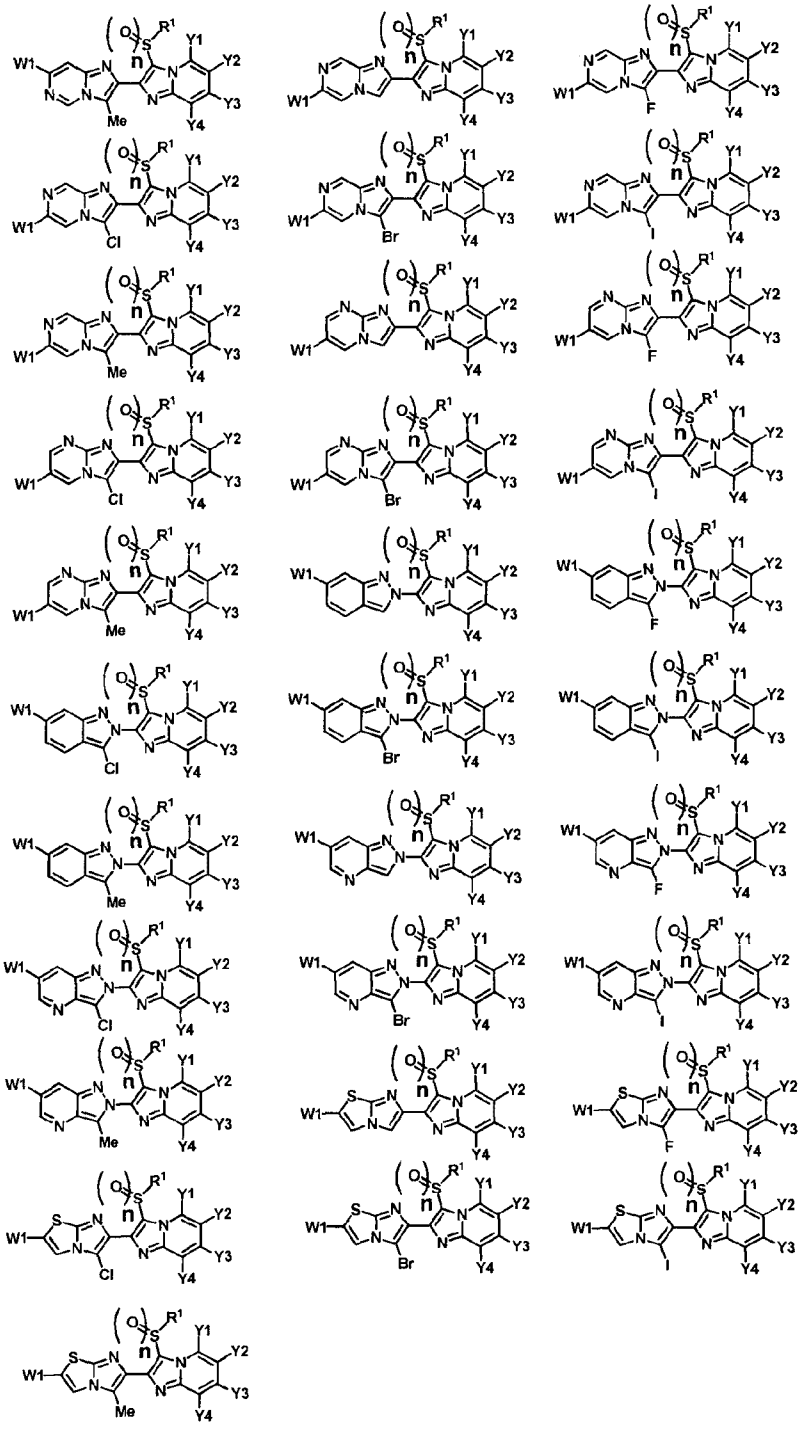


Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_3$ | Me | H | H | H | H | 0 |
| $CF_3$ | Me | H | H | H | H | 1 |
| $CF_3$ | Me | H | H | H | H | 2 |
| $CF_3$ | Me | F | H | H | H | 0 |
| $CF_3$ | Me | F | H | H | H | 1 |
| $CF_3$ | Me | F | H | H | H | 2 |
| $CF_3$ | Me | Cl | H | H | H | 0 |
| $CF_3$ | Me | Cl | H | H | H | 1 |
| $CF_3$ | Me | Cl | H | H | H | 2 |
| $CF_3$ | Me | Br | H | H | H | 0 |
| $CF_3$ | Me | Br | H | H | H | 1 |
| $CF_3$ | Me | Br | H | H | H | 2 |
| $CF_3$ | Me | I | H | H | H | 0 |
| $CF_3$ | Me | I | H | H | H | 1 |
| $CF_3$ | Me | I | H | H | H | 2 |
| $CF_3$ | Me | Me | H | H | H | 0 |
| $CF_3$ | Me | Me | H | H | H | 1 |
| $CF_3$ | Me | Me | H | H | H | 2 |
| $CF_3$ | Me | $CF_3$ | H | H | H | 0 |
| $CF_3$ | Me | $CF_3$ | H | H | H | 1 |
| $CF_3$ | Me | $CF_3$ | H | H | H | 2 |
| $CF_3$ | Me | H | F | H | H | 0 |
| $CF_3$ | Me | H | F | H | H | 1 |
| $CF_3$ | Me | H | F | H | H | 2 |
| $CF_3$ | Me | H | Cl | H | H | 0 |
| $CF_3$ | Me | H | Cl | H | H | 1 |
| $CF_3$ | Me | H | Cl | H | H | 2 |
| $CF_3$ | Me | H | Br | H | H | 0 |
| $CF_3$ | Me | H | Br | H | H | 1 |
| $CF_3$ | Me | H | Br | H | H | 2 |
| $CF_3$ | Me | H | I | H | H | 0 |
| $CF_3$ | Me | H | I | H | H | 1 |
| $CF_3$ | Me | H | I | H | H | 2 |
| $CF_3$ | Me | H | Me | H | H | 0 |
| $CF_3$ | Me | H | Me | H | H | 1 |
| $CF_3$ | Me | H | Me | H | H | 2 |
| $CF_3$ | Me | H | $CF_3$ | H | H | 0 |
| $CF_3$ | Me | H | $CF_3$ | H | H | 1 |
| $CF_3$ | Me | H | $CF_3$ | H | H | 2 |
| $CF_3$ | Me | H | $CF_2CF_3$ | H | H | 0 |
| $CF_3$ | Me | H | $CF_2CF_3$ | H | H | 1 |
| $CF_3$ | Me | H | $CF_2CF_3$ | H | H | 2 |
| $CF_3$ | Me | H | $CF(CF_3)_2$ | H | H | 0 |
| $CF_3$ | Me | H | $CF(CF_3)_2$ | H | H | 1 |
| $CF_3$ | Me | H | $CF(CF_3)_2$ | H | H | 2 |
| $CF_3$ | Me | H | SMe | H | H | 0 |
| $CF_3$ | Me | H | SMe | H | H | 1 |
| $CF_3$ | Me | H | SMe | H | H | 2 |
| $CF_3$ | Me | H | SOMe | H | H | 0 |
| $CF_3$ | Me | H | SOMe | H | H | 1 |
| $CF_3$ | Me | H | SOMe | H | H | 2 |
| $CF_3$ | Me | H | $SO_2Me$ | H | H | 0 |
| $CF_3$ | Me | H | $SO_2Me$ | H | H | 1 |
| $CF_3$ | Me | H | $SO_2Me$ | H | H | 2 |
| $CF_3$ | Me | H | OMe | H | H | 0 |
| $CF_3$ | Me | H | OMe | H | H | 1 |
| $CF_3$ | Me | H | OMe | H | H | 2 |
| $CF_3$ | Me | H | $OCF_3$ | H | H | 0 |
| $CF_3$ | Me | H | $OCF_3$ | H | H | 1 |
| $CF_3$ | Me | H | $OCF_3$ | H | H | 2 |
| $CF_3$ | Me | H | $NO_2$ | H | H | 0 |

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_3$ | Me | H | $NO_2$ | H | H | 1 |
| $CF_3$ | Me | H | $NO_2$ | H | H | 2 |
| $CF_3$ | Me | H | CN | H | H | 0 |
| $CF_3$ | Me | H | CN | H | H | 1 |
| $CF_3$ | Me | H | CN | H | H | 2 |
| $CF_3$ | Me | H | H | F | H | 0 |
| $CF_3$ | Me | H | H | F | H | 1 |
| $CF_3$ | Me | H | H | F | H | 2 |
| $CF_3$ | Me | H | H | Cl | H | 0 |
| $CF_3$ | Me | H | H | Cl | H | 1 |
| $CF_3$ | Me | H | H | Cl | H | 2 |
| $CF_3$ | Me | H | H | Br | H | 0 |
| $CF_3$ | Me | H | H | Br | H | 1 |
| $CF_3$ | Me | H | H | Br | H | 2 |
| $CF_3$ | Me | H | H | I | H | 0 |
| $CF_3$ | Me | H | H | I | H | 1 |
| $CF_3$ | Me | H | H | I | H | 2 |
| $CF_3$ | Me | H | H | Me | H | 0 |
| $CF_3$ | Me | H | H | Me | H | 1 |
| $CF_3$ | Me | H | H | Me | H | 2 |
| $CF_3$ | Me | H | H | $CF_3$ | H | 0 |
| $CF_3$ | Me | H | H | $CF_3$ | H | 1 |
| $CF_3$ | Me | H | H | $CF_3$ | H | 2 |
| $CF_3$ | Me | H | H | $CF_2CF_3$ | H | 0 |
| $CF_3$ | Me | H | H | $CF_2CF_3$ | H | 1 |
| $CF_3$ | Me | H | H | $CF_2CF_3$ | H | 2 |
| $CF_3$ | Me | H | H | $CF(CF_3)_2$ | H | 0 |
| $CF_3$ | Me | H | H | $CF(CF_3)_2$ | H | 1 |
| $CF_3$ | Me | H | H | $CF(CF_3)_2$ | H | 2 |
| $CF_3$ | Me | H | H | SMe | H | 0 |
| $CF_3$ | Me | H | H | SMe | H | 1 |
| $CF_3$ | Me | H | H | SMe | H | 2 |
| $CF_3$ | Me | H | H | SOMe | H | 0 |
| $CF_3$ | Me | H | H | SOMe | H | 1 |
| $CF_3$ | Me | H | H | SOMe | H | 2 |
| $CF_3$ | Me | H | H | $SO_2Me$ | H | 0 |
| $CF_3$ | Me | H | H | $SO_2Me$ | H | 1 |
| $CF_3$ | Me | H | H | $SO_2Me$ | H | 2 |
| $CF_3$ | Me | H | H | OMe | H | 0 |
| $CF_3$ | Me | H | H | OMe | H | 1 |
| $CF_3$ | Me | H | H | OMe | H | 2 |
| $CF_3$ | Me | H | H | $OCF_3$ | H | 0 |
| $CF_3$ | Me | H | H | $OCF_3$ | H | 1 |
| $CF_3$ | Me | H | H | $OCF_3$ | H | 2 |
| $CF_3$ | Me | H | H | $NO_2$ | H | 0 |
| $CF_3$ | Me | H | H | $NO_2$ | H | 1 |
| $CF_3$ | Me | H | H | $NO_2$ | H | 2 |
| $CF_3$ | Me | H | H | CN | H | 0 |
| $CF_3$ | Me | H | H | CN | H | 1 |
| $CF_3$ | Me | H | H | CN | H | 2 |
| $CF_3$ | Me | H | H | H | F | 0 |
| $CF_3$ | Me | H | H | H | F | 1 |
| $CF_3$ | Me | H | H | H | F | 2 |
| $CF_3$ | Me | H | H | H | Cl | 0 |
| $CF_3$ | Me | H | H | H | Cl | 1 |
| $CF_3$ | Me | H | H | H | Cl | 2 |
| $CF_3$ | Me | H | H | H | Br | 0 |
| $CF_3$ | Me | H | H | H | Br | 1 |
| $CF_3$ | Me | H | H | H | Br | 2 |
| $CF_3$ | Me | H | H | H | I | 0 |
| $CF_3$ | Me | H | H | H | I | 1 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_3$ | Me | H | H | H | I | 2 |
| $CF_3$ | Me | H | H | H | Me | 0 |
| $CF_3$ | Me | H | H | H | Me | 1 |
| $CF_3$ | Me | H | H | H | Me | 2 |
| $CF_3$ | Me | H | H | H | $CF_3$ | 0 |
| $CF_3$ | Me | H | H | H | $CF_3$ | 1 |
| $CF_3$ | Me | H | H | H | $CF_3$ | 2 |
| $CF_3$ | Me | H | H | H | $CF_2CF_3$ | 0 |
| $CF_3$ | Me | H | H | H | $CF_2CF_3$ | 1 |
| $CF_3$ | Me | H | H | H | $CF_2CF_3$ | 2 |
| $CF_3$ | Me | H | H | H | $CF(CF_3)_2$ | 0 |
| $CF_3$ | Me | H | H | H | $CF(CF_3)_2$ | 1 |
| $CF_3$ | Me | H | H | H | $CF(CF_3)_2$ | 2 |
| $CF_3$ | Me | H | H | H | SMe | 0 |
| $CF_3$ | Me | H | H | H | SMe | 1 |
| $CF_3$ | Me | H | H | H | SMe | 2 |
| $CF_3$ | Me | H | H | H | SOMe | 0 |
| $CF_3$ | Me | H | H | H | SOMe | 1 |
| $CF_3$ | Me | H | H | H | SOMe | 2 |
| $CF_3$ | Me | H | H | H | $SO_2Me$ | 0 |
| $CF_3$ | Me | H | H | H | $SO_2Me$ | 1 |
| $CF_3$ | Me | H | H | H | $SO_2Me$ | 2 |
| $CF_3$ | Me | H | H | H | OMe | 0 |
| $CF_3$ | Me | H | H | H | OMe | 1 |
| $CF_3$ | Me | H | H | H | OMe | 2 |
| $CF_3$ | Me | H | H | H | $OCF_3$ | 0 |
| $CF_3$ | Me | H | H | H | $OCF_3$ | 1 |
| $CF_3$ | Me | H | H | H | $OCF_3$ | 2 |
| $CF_3$ | Me | H | H | H | $NO_2$ | 0 |
| $CF_3$ | Me | H | H | H | $NO_2$ | 1 |
| $CF_3$ | Me | H | H | H | $NO_2$ | 2 |
| $CF_3$ | Me | H | H | H | CN | 0 |
| $CF_3$ | Me | H | H | H | CN | 1 |
| $CF_3$ | Me | H | H | H | CN | 2 |
| $CF_3$ | Me | H | F | H | F | 0 |
| $CF_3$ | Me | H | F | H | F | 1 |
| $CF_3$ | Me | H | F | H | F | 2 |
| $CF_3$ | Me | H | Cl | H | Cl | 0 |
| $CF_3$ | Me | H | Cl | H | Cl | 1 |
| $CF_3$ | Me | H | Cl | H | Cl | 2 |
| $CF_3$ | Me | H | Br | H | Br | 0 |
| $CF_3$ | Me | H | Br | H | Br | 1 |
| $CF_3$ | Me | H | Br | H | Br | 2 |
| $CF_3$ | Me | H | I | H | I | 0 |
| $CF_3$ | Me | H | I | H | I | 1 |
| $CF_3$ | Me | H | I | H | I | 2 |
| $CF_3$ | Me | H | F | H | Cl | 0 |
| $CF_3$ | Me | H | F | H | Cl | 1 |
| $CF_3$ | Me | H | F | H | Cl | 2 |
| $CF_3$ | Me | H | F | H | Br | 0 |
| $CF_3$ | Me | H | F | H | Br | 1 |
| $CF_3$ | Me | H | F | H | Br | 2 |
| $CF_3$ | Me | H | F | H | I | 0 |
| $CF_3$ | Me | H | F | H | I | 1 |
| $CF_3$ | Me | H | F | H | I | 2 |
| $CF_3$ | Me | H | Cl | H | F | 0 |
| $CF_3$ | Me | H | Cl | H | F | 1 |
| $CF_3$ | Me | H | Cl | H | F | 2 |
| $CF_3$ | Me | H | Cl | H | Br | 0 |
| $CF_3$ | Me | H | Cl | H | Br | 1 |
| $CF_3$ | Me | H | Cl | H | Br | 2 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_3$ | Me | H | Cl | H | I | 0 |
| $CF_3$ | Me | H | Cl | H | I | 1 |
| $CF_3$ | Me | H | Cl | H | I | 2 |
| $CF_3$ | Me | H | Br | H | F | 0 |
| $CF_3$ | Me | H | Br | H | F | 1 |
| $CF_3$ | Me | H | Br | H | F | 2 |
| $CF_3$ | Me | H | Br | H | Cl | 0 |
| $CF_3$ | Me | H | Br | H | Cl | 1 |
| $CF_3$ | Me | H | Br | H | Cl | 2 |
| $CF_3$ | Me | H | Br | H | I | 0 |
| $CF_3$ | Me | H | Br | H | I | 1 |
| $CF_3$ | Me | H | Br | H | I | 2 |
| $CF_3$ | Me | H | I | H | F | 0 |
| $CF_3$ | Me | H | I | H | F | 1 |
| $CF_3$ | Me | H | I | H | F | 2 |
| $CF_3$ | Me | H | I | H | Cl | 0 |
| $CF_3$ | Me | H | I | H | Cl | 1 |
| $CF_3$ | Me | H | I | H | Cl | 2 |
| $CF_3$ | Me | H | I | H | Br | 0 |
| $CF_3$ | Me | H | I | H | Br | 1 |
| $CF_3$ | Me | H | I | H | Br | 2 |
| $CF_3$ | Me | H | F | H | CN | 0 |
| $CF_3$ | Me | H | F | H | CN | 1 |
| $CF_3$ | Me | H | F | H | CN | 2 |
| $CF_3$ | Me | H | Cl | H | CN | 0 |
| $CF_3$ | Me | H | Cl | H | CN | 1 |
| $CF_3$ | Me | H | Cl | H | CN | 2 |
| $CF_3$ | Me | H | Br | H | CN | 0 |
| $CF_3$ | Me | H | Br | H | CN | 1 |
| $CF_3$ | Me | H | Br | H | CN | 2 |
| $CF_3$ | Me | H | I | H | CN | 0 |
| $CF_3$ | Me | H | I | H | CN | 1 |
| $CF_3$ | Me | H | I | H | CN | 2 |
| $CF_3$ | Me | H | $CF_3$ | H | F | 0 |
| $CF_3$ | Me | H | $CF_3$ | H | F | 1 |
| $CF_3$ | Me | H | $CF_3$ | H | F | 2 |
| $CF_3$ | Me | H | $CF_3$ | H | Cl | 0 |
| $CF_3$ | Me | H | $CF_3$ | H | Cl | 1 |
| $CF_3$ | Me | H | $CF_3$ | H | Cl | 2 |
| $CF_3$ | Me | H | $CF_3$ | H | Br | 0 |
| $CF_3$ | Me | H | $CF_3$ | H | Br | 1 |
| $CF_3$ | Me | H | $CF_3$ | H | Br | 2 |
| $CF_3$ | Me | H | $CF_3$ | H | I | 0 |
| $CF_3$ | Me | H | $CF_3$ | H | I | 1 |
| $CF_3$ | Me | H | $CF_3$ | H | I | 2 |
| $CF_3$ | Me | H | $CF_3$ | H | CN | 0 |
| $CF_3$ | Me | H | $CF_3$ | H | CN | 1 |
| $CF_3$ | Me | H | $CF_3$ | H | CN | 2 |
| $CF_3$ | Me | H | F | F | H | 0 |
| $CF_3$ | Me | H | F | F | H | 1 |
| $CF_3$ | Me | H | F | F | H | 2 |
| $CF_3$ | Me | H | Cl | Cl | H | 0 |
| $CF_3$ | Me | H | Cl | Cl | H | 1 |
| $CF_3$ | Me | H | Cl | Cl | H | 2 |
| $CF_3$ | Me | H | Br | Br | H | 0 |
| $CF_3$ | Me | H | Br | Br | H | 1 |
| $CF_3$ | Me | H | Br | Br | H | 2 |
| $CF_3$ | Me | H | I | I | H | 0 |
| $CF_3$ | Me | H | I | I | H | 1 |
| $CF_3$ | Me | H | I | I | H | 2 |
| $CF_3$ | Me | H | F | Cl | H | 0 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_3$ | Me | H | F | Cl | H | 1 |
| $CF_3$ | Me | H | F | Cl | H | 2 |
| $CF_3$ | Me | H | F | Br | H | 0 |
| $CF_3$ | Me | H | F | Br | H | 1 |
| $CF_3$ | Me | H | F | Br | H | 2 |
| $CF_3$ | Me | H | F | I | H | 0 |
| $CF_3$ | Me | H | F | I | H | 1 |
| $CF_3$ | Me | H | F | I | H | 2 |
| $CF_3$ | Me | H | Cl | F | H | 0 |
| $CF_3$ | Me | H | Cl | F | H | 1 |
| $CF_3$ | Me | H | Cl | F | H | 2 |
| $CF_3$ | Me | H | Cl | Br | H | 0 |
| $CF_3$ | Me | H | Cl | Br | H | 1 |
| $CF_3$ | Me | H | Cl | Br | H | 2 |
| $CF_3$ | Me | H | Cl | I | H | 0 |
| $CF_3$ | Me | H | Cl | I | H | 1 |
| $CF_3$ | Me | H | Cl | I | H | 2 |
| $CF_3$ | Me | H | Br | F | H | 0 |
| $CF_3$ | Me | H | Br | F | H | 1 |
| $CF_3$ | Me | H | Br | F | H | 2 |
| $CF_3$ | Me | H | Br | Cl | H | 0 |
| $CF_3$ | Me | H | Br | Cl | H | 1 |
| $CF_3$ | Me | H | Br | Cl | H | 2 |
| $CF_3$ | Me | H | Br | I | H | 0 |
| $CF_3$ | Me | H | Br | I | H | 1 |
| $CF_3$ | Me | H | Br | I | H | 2 |
| $CF_3$ | Me | H | I | F | H | 0 |
| $CF_3$ | Me | H | I | F | H | 1 |
| $CF_3$ | Me | H | I | F | H | 2 |
| $CF_3$ | Me | H | I | Cl | H | 0 |
| $CF_3$ | Me | H | I | Cl | H | 1 |
| $CF_3$ | Me | H | I | Cl | H | 2 |
| $CF_3$ | Me | H | I | Br | H | 0 |
| $CF_3$ | Me | H | I | Br | H | 1 |
| $CF_3$ | Me | H | I | Br | H | 2 |
| $CF_3$ | Me | H | F | CN | H | 0 |
| $CF_3$ | Me | H | F | CN | H | 1 |
| $CF_3$ | Me | H | F | CN | H | 2 |
| $CF_3$ | Me | H | Cl | CN | H | 0 |
| $CF_3$ | Me | H | Cl | CN | H | 1 |
| $CF_3$ | Me | H | Cl | CN | H | 2 |
| $CF_3$ | Me | H | Br | CN | H | 0 |
| $CF_3$ | Me | H | Br | CN | H | 1 |
| $CF_3$ | Me | H | Br | CN | H | 2 |
| $CF_3$ | Me | H | I | CN | H | 0 |
| $CF_3$ | Me | H | I | CN | H | 1 |
| $CF_3$ | Me | H | I | CN | H | 2 |
| $CF_3$ | Me | H | $CF_3$ | F | H | 0 |
| $CF_3$ | Me | H | $CF_3$ | F | H | 1 |
| $CF_3$ | Me | H | $CF_3$ | F | H | 2 |
| $CF_3$ | Me | H | $CF_3$ | Cl | H | 0 |
| $CF_3$ | Me | H | $CF_3$ | Cl | H | 1 |
| $CF_3$ | Me | H | $CF_3$ | Cl | H | 2 |
| $CF_3$ | Me | H | $CF_3$ | Br | H | 0 |
| $CF_3$ | Me | H | $CF_3$ | Br | H | 1 |
| $CF_3$ | Me | H | $CF_3$ | Br | H | 2 |
| $CF_3$ | Me | H | $CF_3$ | I | H | 0 |
| $CF_3$ | Me | H | $CF_3$ | I | H | 1 |
| $CF_3$ | Me | H | $CF_3$ | I | H | 2 |
| $CF_3$ | Me | H | $CF_3$ | CN | H | 0 |
| $CF_3$ | Me | H | $CF_3$ | CN | H | 1 |
| $CF_3$ | Me | H | $CF_3$ | CN | H | 2 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_3$ | Et | H | H | H | H | 0 |
| $CF_3$ | Et | H | H | H | H | 1 |
| $CF_3$ | Et | H | H | H | H | 2 |
| $CF_3$ | Et | F | H | H | H | 0 |
| $CF_3$ | Et | F | H | H | H | 1 |
| $CF_3$ | Et | F | H | H | H | 2 |
| $CF_3$ | Et | Cl | H | H | H | 0 |
| $CF_3$ | Et | Cl | H | H | H | 1 |
| $CF_3$ | Et | Cl | H | H | H | 2 |
| $CF_3$ | Et | Br | H | H | H | 0 |
| $CF_3$ | Et | Br | H | H | H | 1 |
| $CF_3$ | Et | Br | H | H | H | 2 |
| $CF_3$ | Et | I | H | H | H | 0 |
| $CF_3$ | Et | I | H | H | H | 1 |
| $CF_3$ | Et | I | H | H | H | 2 |
| $CF_3$ | Et | Me | H | H | H | 0 |
| $CF_3$ | Et | Me | H | H | H | 1 |
| $CF_3$ | Et | Me | H | H | H | 2 |
| $CF_3$ | Et | $CF_3$ | H | H | H | 0 |
| $CF_3$ | Et | $CF_3$ | H | H | H | 1 |
| $CF_3$ | Et | $CF_3$ | H | H | H | 2 |
| $CF_3$ | Et | H | F | H | H | 0 |
| $CF_3$ | Et | H | F | H | H | 1 |
| $CF_3$ | Et | H | F | H | H | 2 |
| $CF_3$ | Et | H | Cl | H | H | 0 |
| $CF_3$ | Et | H | Cl | H | H | 1 |
| $CF_3$ | Et | H | Cl | H | H | 2 |
| $CF_3$ | Et | H | Br | H | H | 0 |
| $CF_3$ | Et | H | Br | H | H | 1 |
| $CF_3$ | Et | H | Br | H | H | 2 |
| $CF_3$ | Et | H | I | H | H | 0 |
| $CF_3$ | Et | H | I | H | H | 1 |
| $CF_3$ | Et | H | I | H | H | 2 |
| $CF_3$ | Et | H | Me | H | H | 0 |
| $CF_3$ | Et | H | Me | H | H | 1 |
| $CF_3$ | Et | H | Me | H | H | 2 |
| $CF_3$ | Et | H | $CF_3$ | H | H | 0 |
| $CF_3$ | Et | H | $CF_3$ | H | H | 1 |
| $CF_3$ | Et | H | $CF_3$ | H | H | 2 |
| $CF_3$ | Et | H | $CF_2CF_3$ | H | H | 0 |
| $CF_3$ | Et | H | $CF_2CF_3$ | H | H | 1 |
| $CF_3$ | Et | H | $CF_2CF_3$ | H | H | 2 |
| $CF_3$ | Et | H | $CF(CF_3)_2$ | H | H | 0 |
| $CF_3$ | Et | H | $CF(CF_3)_2$ | H | H | 1 |
| $CF_3$ | Et | H | $CF(CF_3)_2$ | H | H | 2 |
| $CF_3$ | Et | H | SMe | H | H | 0 |
| $CF_3$ | Et | H | SMe | H | H | 1 |
| $CF_3$ | Et | H | SMe | H | H | 2 |
| $CF_3$ | Et | H | SOMe | H | H | 0 |
| $CF_3$ | Et | H | SOMe | H | H | 1 |
| $CF_3$ | Et | H | SOMe | H | H | 2 |
| $CF_3$ | Et | H | $SO_2Me$ | H | H | 0 |
| $CF_3$ | Et | H | $SO_2Me$ | H | H | 1 |
| $CF_3$ | Et | H | $SO_2Me$ | H | H | 2 |
| $CF_3$ | Et | H | OMe | H | H | 0 |
| $CF_3$ | Et | H | OMe | H | H | 1 |
| $CF_3$ | Et | H | OMe | H | H | 2 |
| $CF_3$ | Et | H | $OCF_3$ | H | H | 0 |
| $CF_3$ | Et | H | $OCF_3$ | H | H | 1 |
| $CF_3$ | Et | H | $OCF_3$ | H | H | 2 |
| $CF_3$ | Et | H | $NO_2$ | H | H | 0 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_3$ | Et | H | $NO_2$ | H | H | 1 |
| $CF_3$ | Et | H | $NO_2$ | H | H | 2 |
| $CF_3$ | Et | H | CN | H | H | 0 |
| $CF_3$ | Et | H | CN | H | H | 1 |
| $CF_3$ | Et | H | CN | H | H | 2 |
| $CF_3$ | Et | H | H | F | H | 0 |
| $CF_3$ | Et | H | H | F | H | 1 |
| $CF_3$ | Et | H | H | F | H | 2 |
| $CF_3$ | Et | H | H | Cl | H | 0 |
| $CF_3$ | Et | H | H | Cl | H | 1 |
| $CF_3$ | Et | H | H | Cl | H | 2 |
| $CF_3$ | Et | H | H | Br | H | 0 |
| $CF_3$ | Et | H | H | Br | H | 1 |
| $CF_3$ | Et | H | H | Br | H | 2 |
| $CF_3$ | Et | H | H | I | H | 0 |
| $CF_3$ | Et | H | H | I | H | 1 |
| $CF_3$ | Et | H | H | I | H | 2 |
| $CF_3$ | Et | H | H | Me | H | 0 |
| $CF_3$ | Et | H | H | Me | H | 1 |
| $CF_3$ | Et | H | H | Me | H | 2 |
| $CF_3$ | Et | H | H | $CF_3$ | H | 0 |
| $CF_3$ | Et | H | H | $CF_3$ | H | 1 |
| $CF_3$ | Et | H | H | $CF_3$ | H | 2 |
| $CF_3$ | Et | H | H | $CF_2CF_3$ | H | 0 |
| $CF_3$ | Et | H | H | $CF_2CF_3$ | H | 1 |
| $CF_3$ | Et | H | H | $CF_2CF_3$ | H | 2 |
| $CF_3$ | Et | H | H | $CF(CF_3)_2$ | H | 0 |
| $CF_3$ | Et | H | H | $CF(CF_3)_2$ | H | 1 |
| $CF_3$ | Et | H | H | $CF(CF_3)_2$ | H | 2 |
| $CF_3$ | Et | H | H | SMe | H | 0 |
| $CF_3$ | Et | H | H | SMe | H | 1 |
| $CF_3$ | Et | H | H | SMe | H | 2 |
| $CF_3$ | Et | H | H | SOMe | H | 0 |
| $CF_3$ | Et | H | H | SOMe | H | 1 |
| $CF_3$ | Et | H | H | SOMe | H | 2 |
| $CF_3$ | Et | H | H | $SO_2Me$ | H | 0 |
| $CF_3$ | Et | H | H | $SO_2Me$ | H | 1 |
| $CF_3$ | Et | H | H | $SO_2Me$ | H | 2 |
| $CF_3$ | Et | H | H | OMe | H | 0 |
| $CF_3$ | Et | H | H | OMe | H | 1 |
| $CF_3$ | Et | H | H | OMe | H | 2 |
| $CF_3$ | Et | H | H | $OCF_3$ | H | 0 |
| $CF_3$ | Et | H | H | $OCF_3$ | H | 1 |
| $CF_3$ | Et | H | H | $OCF_3$ | H | 2 |
| $CF_3$ | Et | H | H | $NO_2$ | H | 0 |
| $CF_3$ | Et | H | H | $NO_2$ | H | 1 |
| $CF_3$ | Et | H | H | $NO_2$ | H | 2 |
| $CF_3$ | Et | H | H | CN | H | 0 |
| $CF_3$ | Et | H | H | CN | H | 1 |
| $CF_3$ | Et | H | H | CN | H | 2 |
| $CF_3$ | Et | H | H | H | F | 0 |
| $CF_3$ | Et | H | H | H | F | 1 |
| $CF_3$ | Et | H | H | H | F | 2 |
| $CF_3$ | Et | H | H | H | Cl | 0 |
| $CF_3$ | Et | H | H | H | Cl | 1 |
| $CF_3$ | Et | H | H | H | Cl | 2 |
| $CF_3$ | Et | H | H | H | Br | 0 |
| $CF_3$ | Et | H | H | H | Br | 1 |
| $CF_3$ | Et | H | H | H | Br | 2 |
| $CF_3$ | Et | H | H | H | I | 0 |
| $CF_3$ | Et | H | H | H | I | 1 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_3$ | Et | H | H | H | I | 2 |
| $CF_3$ | Et | H | H | H | Me | 0 |
| $CF_3$ | Et | H | H | H | Me | 1 |
| $CF_3$ | Et | H | H | H | Me | 2 |
| $CF_3$ | Et | H | H | H | $CF_3$ | 0 |
| $CF_3$ | Et | H | H | H | $CF_3$ | 1 |
| $CF_3$ | Et | H | H | H | $CF_3$ | 2 |
| $CF_3$ | Et | H | H | H | $CF_2CF_3$ | 0 |
| $CF_3$ | Et | H | H | H | $CF_2CF_3$ | 1 |
| $CF_3$ | Et | H | H | H | $CF_2CF_3$ | 2 |
| $CF_3$ | Et | H | H | H | $CF(CF_3)_2$ | 0 |
| $CF_3$ | Et | H | H | H | $CF(CF_3)_2$ | 1 |
| $CF_3$ | Et | H | H | H | $CF(CF_3)_2$ | 2 |
| $CF_3$ | Et | H | H | H | SMe | 0 |
| $CF_3$ | Et | H | H | H | SMe | 1 |
| $CF_3$ | Et | H | H | H | SMe | 2 |
| $CF_3$ | Et | H | H | H | SOMe | 0 |
| $CF_3$ | Et | H | H | H | SOMe | 1 |
| $CF_3$ | Et | H | H | H | SOMe | 2 |
| $CF_3$ | Et | H | H | H | $SO_2Me$ | 0 |
| $CF_3$ | Et | H | H | H | $SO_2Me$ | 1 |
| $CF_3$ | Et | H | H | H | $SO_2Me$ | 2 |
| $CF_3$ | Et | H | H | H | OMe | 0 |
| $CF_3$ | Et | H | H | H | OMe | 1 |
| $CF_3$ | Et | H | H | H | OMe | 2 |
| $CF_3$ | Et | H | H | H | $OCF_3$ | 0 |
| $CF_3$ | Et | H | H | H | $OCF_3$ | 1 |
| $CF_3$ | Et | H | H | H | $OCF_3$ | 2 |
| $CF_3$ | Et | H | H | H | $NO_2$ | 0 |
| $CF_3$ | Et | H | H | H | $NO_2$ | 1 |
| $CF_3$ | Et | H | H | H | $NO_2$ | 2 |
| $CF_3$ | Et | H | H | H | CN | 0 |
| $CF_3$ | Et | H | H | H | CN | 1 |
| $CF_3$ | Et | H | H | H | CN | 2 |
| $CF_3$ | Et | H | F | H | F | 0 |
| $CF_3$ | Et | H | F | H | F | 1 |
| $CF_3$ | Et | H | F | H | F | 2 |
| $CF_3$ | Et | H | Cl | H | Cl | 0 |
| $CF_3$ | Et | H | Cl | H | Cl | 1 |
| $CF_3$ | Et | H | Cl | H | Cl | 2 |
| $CF_3$ | Et | H | Br | H | Br | 0 |
| $CF_3$ | Et | H | Br | H | Br | 1 |
| $CF_3$ | Et | H | Br | H | Br | 2 |
| $CF_3$ | Et | H | I | H | I | 0 |
| $CF_3$ | Et | H | I | H | I | 1 |
| $CF_3$ | Et | H | I | H | I | 2 |
| $CF_3$ | Et | H | F | H | Cl | 0 |
| $CF_3$ | Et | H | F | H | Cl | 1 |
| $CF_3$ | Et | H | F | H | Cl | 2 |
| $CF_3$ | Et | H | F | H | Br | 0 |
| $CF_3$ | Et | H | F | H | Br | 1 |
| $CF_3$ | Et | H | F | H | Br | 2 |
| $CF_3$ | Et | H | F | H | I | 0 |
| $CF_3$ | Et | H | F | H | I | 1 |
| $CF_3$ | Et | H | F | H | I | 2 |
| $CF_3$ | Et | H | Cl | H | F | 0 |
| $CF_3$ | Et | H | Cl | H | F | 1 |
| $CF_3$ | Et | H | Cl | H | F | 2 |
| $CF_3$ | Et | H | Cl | H | Br | 0 |
| $CF_3$ | Et | H | Cl | H | Br | 1 |
| $CF_3$ | Et | H | Cl | H | Br | 2 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_3$ | Et | H | Cl | H | I | 0 |
| $CF_3$ | Et | H | Cl | H | I | 1 |
| $CF_3$ | Et | H | Cl | H | I | 2 |
| $CF_3$ | Et | H | Br | H | F | 0 |
| $CF_3$ | Et | H | Br | H | F | 1 |
| $CF_3$ | Et | H | Br | H | F | 2 |
| $CF_3$ | Et | H | Br | H | Cl | 0 |
| $CF_3$ | Et | H | Br | H | Cl | 1 |
| $CF_3$ | Et | H | Br | H | Cl | 2 |
| $CF_3$ | Et | H | Br | H | I | 0 |
| $CF_3$ | Et | H | Br | H | I | 1 |
| $CF_3$ | Et | H | Br | H | I | 2 |
| $CF_3$ | Et | H | I | H | F | 0 |
| $CF_3$ | Et | H | I | H | F | 1 |
| $CF_3$ | Et | H | I | H | F | 2 |
| $CF_3$ | Et | H | I | H | Cl | 0 |
| $CF_3$ | Et | H | I | H | Cl | 1 |
| $CF_3$ | Et | H | I | H | Cl | 2 |
| $CF_3$ | Et | H | I | H | Br | 0 |
| $CF_3$ | Et | H | I | H | Br | 1 |
| $CF_3$ | Et | H | I | H | Br | 2 |
| $CF_3$ | Et | H | F | H | CN | 0 |
| $CF_3$ | Et | H | F | H | CN | 1 |
| $CF_3$ | Et | H | F | H | CN | 2 |
| $CF_3$ | Et | H | Cl | H | CN | 0 |
| $CF_3$ | Et | H | Cl | H | CN | 1 |
| $CF_3$ | Et | H | Cl | H | CN | 2 |
| $CF_3$ | Et | H | Br | H | CN | 0 |
| $CF_3$ | Et | H | Br | H | CN | 1 |
| $CF_3$ | Et | H | Br | H | CN | 2 |
| $CF_3$ | Et | H | I | H | CN | 0 |
| $CF_3$ | Et | H | I | H | CN | 1 |
| $CF_3$ | Et | H | I | H | CN | 2 |
| $CF_3$ | Et | H | $CF_3$ | H | F | 0 |
| $CF_3$ | Et | H | $CF_3$ | H | F | 1 |
| $CF_3$ | Et | H | $CF_3$ | H | F | 2 |
| $CF_3$ | Et | H | $CF_3$ | H | Cl | 0 |
| $CF_3$ | Et | H | $CF_3$ | H | Cl | 1 |
| $CF_3$ | Et | H | $CF_3$ | H | Cl | 2 |
| $CF_3$ | Et | H | $CF_3$ | H | Br | 0 |
| $CF_3$ | Et | H | $CF_3$ | H | Br | 1 |
| $CF_3$ | Et | H | $CF_3$ | H | Br | 2 |
| $CF_3$ | Et | H | $CF_3$ | H | I | 0 |
| $CF_3$ | Et | H | $CF_3$ | H | I | 1 |
| $CF_3$ | Et | H | $CF_3$ | H | I | 2 |
| $CF_3$ | Et | H | $CF_3$ | H | CN | 0 |
| $CF_3$ | Et | H | $CF_3$ | H | CN | 1 |
| $CF_3$ | Et | H | $CF_3$ | H | CN | 2 |
| $CF_3$ | Et | H | F | F | H | 0 |
| $CF_3$ | Et | H | F | F | H | 1 |
| $CF_3$ | Et | H | F | F | H | 2 |
| $CF_3$ | Et | H | Cl | Cl | H | 0 |
| $CF_3$ | Et | H | Cl | Cl | H | 1 |
| $CF_3$ | Et | H | Cl | Cl | H | 2 |
| $CF_3$ | Et | H | Br | Br | H | 0 |
| $CF_3$ | Et | H | Br | Br | H | 1 |
| $CF_3$ | Et | H | Br | Br | H | 2 |
| $CF_3$ | Et | H | I | I | H | 0 |
| $CF_3$ | Et | H | I | I | H | 1 |
| $CF_3$ | Et | H | I | I | H | 2 |
| $CF_3$ | Et | H | F | Cl | H | 0 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_3$ | Et | H | F | Cl | H | 1 |
| $CF_3$ | Et | H | F | Cl | H | 2 |
| $CF_3$ | Et | H | F | Br | H | 0 |
| $CF_3$ | Et | H | F | Br | H | 1 |
| $CF_3$ | Et | H | F | Br | H | 2 |
| $CF_3$ | Et | H | F | I | H | 0 |
| $CF_3$ | Et | H | F | I | H | 1 |
| $CF_3$ | Et | H | F | I | H | 2 |
| $CF_3$ | Et | H | Cl | F | H | 0 |
| $CF_3$ | Et | H | Cl | F | H | 1 |
| $CF_3$ | Et | H | Cl | F | H | 2 |
| $CF_3$ | Et | H | Cl | Br | H | 0 |
| $CF_3$ | Et | H | Cl | Br | H | 1 |
| $CF_3$ | Et | H | Cl | Br | H | 2 |
| $CF_3$ | Et | H | Cl | I | H | 0 |
| $CF_3$ | Et | H | Cl | I | H | 1 |
| $CF_3$ | Et | H | Cl | I | H | 2 |
| $CF_3$ | Et | H | Br | F | H | 0 |
| $CF_3$ | Et | H | Br | F | H | 1 |
| $CF_3$ | Et | H | Br | F | H | 2 |
| $CF_3$ | Et | H | Br | Cl | H | 0 |
| $CF_3$ | Et | H | Br | Cl | H | 1 |
| $CF_3$ | Et | H | Br | Cl | H | 2 |
| $CF_3$ | Et | H | Br | I | H | 0 |
| $CF_3$ | Et | H | Br | I | H | 1 |
| $CF_3$ | Et | H | Br | I | H | 2 |
| $CF_3$ | Et | H | I | F | H | 0 |
| $CF_3$ | Et | H | I | F | H | 1 |
| $CF_3$ | Et | H | I | F | H | 2 |
| $CF_3$ | Et | H | I | Cl | H | 0 |
| $CF_3$ | Et | H | I | Cl | H | 1 |
| $CF_3$ | Et | H | I | Cl | H | 2 |
| $CF_3$ | Et | H | I | Br | H | 0 |
| $CF_3$ | Et | H | I | Br | H | 1 |
| $CF_3$ | Et | H | I | Br | H | 2 |
| $CF_3$ | Et | H | F | CN | H | 0 |
| $CF_3$ | Et | H | F | CN | H | 1 |
| $CF_3$ | Et | H | F | CN | H | 2 |
| $CF_3$ | Et | H | Cl | CN | H | 0 |
| $CF_3$ | Et | H | Cl | CN | H | 1 |
| $CF_3$ | Et | H | Cl | CN | H | 2 |
| $CF_3$ | Et | H | Br | CN | H | 0 |
| $CF_3$ | Et | H | Br | CN | H | 1 |
| $CF_3$ | Et | H | Br | CN | H | 2 |
| $CF_3$ | Et | H | I | CN | H | 0 |
| $CF_3$ | Et | H | I | CN | H | 1 |
| $CF_3$ | Et | H | I | CN | H | 2 |
| $CF_3$ | Et | H | $CF_3$ | F | H | 0 |
| $CF_3$ | Et | H | $CF_3$ | F | H | 1 |
| $CF_3$ | Et | H | $CF_3$ | F | H | 2 |
| $CF_3$ | Et | H | $CF_3$ | Cl | H | 0 |
| $CF_3$ | Et | H | $CF_3$ | Cl | H | 1 |
| $CF_3$ | Et | H | $CF_3$ | Cl | H | 2 |
| $CF_3$ | Et | H | $CF_3$ | Br | H | 0 |
| $CF_3$ | Et | H | $CF_3$ | Br | H | 1 |
| $CF_3$ | Et | H | $CF_3$ | Br | H | 2 |
| $CF_3$ | Et | H | $CF_3$ | I | H | 0 |
| $CF_3$ | Et | H | $CF_3$ | I | H | 1 |
| $CF_3$ | Et | H | $CF_3$ | I | H | 2 |
| $CF_3$ | Et | H | $CF_3$ | CN | H | 0 |
| $CF_3$ | Et | H | $CF_3$ | CN | H | 1 |
| $CF_3$ | Et | H | $CF_3$ | CN | H | 2 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_3$ | $^nPr$ | H | H | H | H | 0 |
| $CF_3$ | $^nPr$ | H | H | H | H | 1 |
| $CF_3$ | $^nPr$ | H | H | H | H | 2 |
| $CF_3$ | $^nPr$ | F | H | H | H | 0 |
| $CF_3$ | $^nPr$ | F | H | H | H | 1 |
| $CF_3$ | $^nPr$ | F | H | H | H | 2 |
| $CF_3$ | $^nPr$ | Cl | H | H | H | 0 |
| $CF_3$ | $^nPr$ | Cl | H | H | H | 1 |
| $CF_3$ | $^nPr$ | Cl | H | H | H | 2 |
| $CF_3$ | $^nPr$ | Br | H | H | H | 0 |
| $CF_3$ | $^nPr$ | Br | H | H | H | 1 |
| $CF_3$ | $^nPr$ | Br | H | H | H | 2 |
| $CF_3$ | $^nPr$ | I | H | H | H | 0 |
| $CF_3$ | $^nPr$ | I | H | H | H | 1 |
| $CF_3$ | $^nPr$ | I | H | H | H | 2 |
| $CF_3$ | $^nPr$ | Me | H | H | H | 0 |
| $CF_3$ | $^nPr$ | Me | H | H | H | 1 |
| $CF_3$ | $^nPr$ | Me | H | H | H | 2 |
| $CF_3$ | $^nPr$ | $CF_3$ | H | H | H | 0 |
| $CF_3$ | $^nPr$ | $CF_3$ | H | H | H | 1 |
| $CF_3$ | $^nPr$ | $CF_3$ | H | H | H | 2 |
| $CF_3$ | $^nPr$ | H | F | H | H | 0 |
| $CF_3$ | $^nPr$ | H | F | H | H | 1 |
| $CF_3$ | $^nPr$ | H | F | H | H | 2 |
| $CF_3$ | $^nPr$ | H | Cl | H | H | 0 |
| $CF_3$ | $^nPr$ | H | Cl | H | H | 1 |
| $CF_3$ | $^nPr$ | H | Cl | H | H | 2 |
| $CF_3$ | $^nPr$ | H | Br | H | H | 0 |
| $CF_3$ | $^nPr$ | H | Br | H | H | 1 |
| $CF_3$ | $^nPr$ | H | Br | H | H | 2 |
| $CF_3$ | $^nPr$ | H | I | H | H | 0 |
| $CF_3$ | $^nPr$ | H | I | H | H | 1 |
| $CF_3$ | $^nPr$ | H | I | H | H | 2 |
| $CF_3$ | $^nPr$ | H | Me | H | H | 0 |
| $CF_3$ | $^nPr$ | H | Me | H | H | 1 |
| $CF_3$ | $^nPr$ | H | Me | H | H | 2 |
| $CF_3$ | $^nPr$ | H | $CF_3$ | H | H | 0 |
| $CF_3$ | $^nPr$ | H | $CF_3$ | H | H | 1 |
| $CF_3$ | $^nPr$ | H | $CF_3$ | H | H | 2 |
| $CF_3$ | $^nPr$ | H | $CF_2CF_3$ | H | H | 0 |
| $CF_3$ | $^nPr$ | H | $CF_2CF_3$ | H | H | 1 |
| $CF_3$ | $^nPr$ | H | $CF_2CF_3$ | H | H | 2 |
| $CF_3$ | $^nPr$ | H | $CF(CF_3)_2$ | H | H | 0 |
| $CF_3$ | $^nPr$ | H | $CF(CF_3)_2$ | H | H | 1 |
| $CF_3$ | $^nPr$ | H | $CF(CF_3)_2$ | H | H | 2 |
| $CF_3$ | $^nPr$ | H | SMe | H | H | 0 |
| $CF_3$ | $^nPr$ | H | SMe | H | H | 1 |
| $CF_3$ | $^nPr$ | H | SMe | H | H | 2 |
| $CF_3$ | $^nPr$ | H | SOMe | H | H | 0 |
| $CF_3$ | $^nPr$ | H | SOMe | H | H | 1 |
| $CF_3$ | $^nPr$ | H | SOMe | H | H | 2 |
| $CF_3$ | $^nPr$ | H | $SO_2Me$ | H | H | 0 |
| $CF_3$ | $^nPr$ | H | $SO_2Me$ | H | H | 1 |
| $CF_3$ | $^nPr$ | H | $SO_2Me$ | H | H | 2 |
| $CF_3$ | $^nPr$ | H | OMe | H | H | 0 |
| $CF_3$ | $^nPr$ | H | OMe | H | H | 1 |
| $CF_3$ | $^nPr$ | H | OMe | H | H | 2 |
| $CF_3$ | $^nPr$ | H | $OCF_3$ | H | H | 0 |
| $CF_3$ | $^nPr$ | H | $OCF_3$ | H | H | 1 |
| $CF_3$ | $^nPr$ | H | $OCF_3$ | H | H | 2 |
| $CF_3$ | $^nPr$ | H | $NO_2$ | H | H | 0 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_3$ | $^nPr$ | H | $NO_2$ | H | H | 1 |
| $CF_3$ | $^nPr$ | H | $NO_2$ | H | H | 2 |
| $CF_3$ | $^nPr$ | H | CN | H | H | 0 |
| $CF_3$ | $^nPr$ | H | CN | H | H | 1 |
| $CF_3$ | $^nPr$ | H | CN | H | H | 2 |
| $CF_3$ | $^nPr$ | H | H | F | H | 0 |
| $CF_3$ | $^nPr$ | H | H | F | H | 1 |
| $CF_3$ | $^nPr$ | H | H | F | H | 2 |
| $CF_3$ | $^nPr$ | H | H | Cl | H | 0 |
| $CF_3$ | $^nPr$ | H | H | Cl | H | 1 |
| $CF_3$ | $^nPr$ | H | H | Cl | H | 2 |
| $CF_3$ | $^nPr$ | H | H | Br | H | 0 |
| $CF_3$ | $^nPr$ | H | H | Br | H | 1 |
| $CF_3$ | $^nPr$ | H | H | Br | H | 2 |
| $CF_3$ | $^nPr$ | H | H | I | H | 0 |
| $CF_3$ | $^nPr$ | H | H | I | H | 1 |
| $CF_3$ | $^nPr$ | H | H | I | H | 2 |
| $CF_3$ | $^nPr$ | H | H | Me | H | 0 |
| $CF_3$ | $^nPr$ | H | H | Me | H | 1 |
| $CF_3$ | $^nPr$ | H | H | Me | H | 2 |
| $CF_3$ | $^nPr$ | H | H | $CF_3$ | H | 0 |
| $CF_3$ | $^nPr$ | H | H | $CF_3$ | H | 1 |
| $CF_3$ | $^nPr$ | H | H | $CF_3$ | H | 2 |
| $CF_3$ | $^nPr$ | H | H | $CF_2CF_3$ | H | 0 |
| $CF_3$ | $^nPr$ | H | H | $CF_2CF_3$ | H | 1 |
| $CF_3$ | $^nPr$ | H | H | $CF_2CF_3$ | H | 2 |
| $CF_3$ | $^nPr$ | H | H | $CF(CF_3)_2$ | H | 0 |
| $CF_3$ | $^nPr$ | H | H | $CF(CF_3)_2$ | H | 1 |
| $CF_3$ | $^nPr$ | H | H | $CF(CF_3)_2$ | H | 2 |
| $CF_3$ | $^nPr$ | H | H | SMe | H | 0 |
| $CF_3$ | $^nPr$ | H | H | SMe | H | 1 |
| $CF_3$ | $^nPr$ | H | H | SMe | H | 2 |
| $CF_3$ | $^nPr$ | H | H | SOMe | H | 0 |
| $CF_3$ | $^nPr$ | H | H | SOMe | H | 1 |
| $CF_3$ | $^nPr$ | H | H | SOMe | H | 2 |
| $CF_3$ | $^nPr$ | H | H | $SO_2Me$ | H | 0 |
| $CF_3$ | $^nPr$ | H | H | $SO_2Me$ | H | 1 |
| $CF_3$ | $^nPr$ | H | H | $SO_2Me$ | H | 2 |
| $CF_3$ | $^nPr$ | H | H | OMe | H | 0 |
| $CF_3$ | $^nPr$ | H | H | OMe | H | 1 |
| $CF_3$ | $^nPr$ | H | H | OMe | H | 2 |
| $CF_3$ | $^nPr$ | H | H | $OCF_3$ | H | 0 |
| $CF_3$ | $^nPr$ | H | H | $OCF_3$ | H | 1 |
| $CF_3$ | $^nPr$ | H | H | $OCF_3$ | H | 2 |
| $CF_3$ | $^nPr$ | H | H | $NO_2$ | H | 0 |
| $CF_3$ | $^nPr$ | H | H | $NO_2$ | H | 1 |
| $CF_3$ | $^nPr$ | H | H | $NO_2$ | H | 2 |
| $CF_3$ | $^nPr$ | H | H | CN | H | 0 |
| $CF_3$ | $^nPr$ | H | H | CN | H | 1 |
| $CF_3$ | $^nPr$ | H | H | CN | H | 2 |
| $CF_3$ | $^nPr$ | H | H | H | F | 0 |
| $CF_3$ | $^nPr$ | H | H | H | F | 1 |
| $CF_3$ | $^nPr$ | H | H | H | F | 2 |
| $CF_3$ | $^nPr$ | H | H | H | Cl | 0 |
| $CF_3$ | $^nPr$ | H | H | H | Cl | 1 |
| $CF_3$ | $^nPr$ | H | H | H | Cl | 2 |
| $CF_3$ | $^nPr$ | H | H | H | Br | 0 |
| $CF_3$ | $^nPr$ | H | H | H | Br | 1 |
| $CF_3$ | $^nPr$ | H | H | H | Br | 2 |
| $CF_3$ | $^nPr$ | H | H | H | I | 0 |
| $CF_3$ | $^nPr$ | H | H | H | I | 1 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_3$ | $^nPr$ | H | H | H | I | 2 |
| $CF_3$ | $^nPr$ | H | H | H | Me | 0 |
| $CF_3$ | $^nPr$ | H | H | H | Me | 1 |
| $CF_3$ | $^nPr$ | H | H | H | Me | 2 |
| $CF_3$ | $^nPr$ | H | H | H | $CF_3$ | 0 |
| $CF_3$ | $^nPr$ | H | H | H | $CF_3$ | 1 |
| $CF_3$ | $^nPr$ | H | H | H | $CF_3$ | 2 |
| $CF_3$ | $^nPr$ | H | H | H | $CF_2CF_3$ | 0 |
| $CF_3$ | $^nPr$ | H | H | H | $CF_2CF_3$ | 1 |
| $CF_3$ | $^nPr$ | H | H | H | $CF_2CF_3$ | 2 |
| $CF_3$ | $^nPr$ | H | H | H | $CF(CF_3)_2$ | 0 |
| $CF_3$ | $^nPr$ | H | H | H | $CF(CF_3)_2$ | 1 |
| $CF_3$ | $^nPr$ | H | H | H | $CF(CF_3)_2$ | 2 |
| $CF_3$ | $^nPr$ | H | H | H | SMe | 0 |
| $CF_3$ | $^nPr$ | H | H | H | SMe | 1 |
| $CF_3$ | $^nPr$ | H | H | H | SMe | 2 |
| $CF_3$ | $^nPr$ | H | H | H | SOMe | 0 |
| $CF_3$ | $^nPr$ | H | H | H | SOMe | 1 |
| $CF_3$ | $^nPr$ | H | H | H | SOMe | 2 |
| $CF_3$ | $^nPr$ | H | H | H | $SO_2Me$ | 0 |
| $CF_3$ | $^nPr$ | H | H | H | $SO_2Me$ | 1 |
| $CF_3$ | $^nPr$ | H | H | H | $SO_2Me$ | 2 |
| $CF_3$ | $^nPr$ | H | H | H | OMe | 0 |
| $CF_3$ | $^nPr$ | H | H | H | OMe | 1 |
| $CF_3$ | $^nPr$ | H | H | H | OMe | 2 |
| $CF_3$ | $^nPr$ | H | H | H | $OCF_3$ | 0 |
| $CF_3$ | $^nPr$ | H | H | H | $OCF_3$ | 1 |
| $CF_3$ | $^nPr$ | H | H | H | $OCF_3$ | 2 |
| $CF_3$ | $^nPr$ | H | H | H | $NO_2$ | 0 |
| $CF_3$ | $^nPr$ | H | H | H | $NO_2$ | 1 |
| $CF_3$ | $^nPr$ | H | H | H | $NO_2$ | 2 |
| $CF_3$ | $^nPr$ | H | H | H | CN | 0 |
| $CF_3$ | $^nPr$ | H | H | H | CN | 1 |
| $CF_3$ | $^nPr$ | H | H | H | CN | 2 |
| $CF_3$ | $^nPr$ | H | F | H | F | 0 |
| $CF_3$ | $^nPr$ | H | F | H | F | 1 |
| $CF_3$ | $^nPr$ | H | F | H | F | 2 |
| $CF_3$ | $^nPr$ | H | Cl | H | Cl | 0 |
| $CF_3$ | $^nPr$ | H | Cl | H | Cl | 1 |
| $CF_3$ | $^nPr$ | H | Cl | H | Cl | 2 |
| $CF_3$ | $^nPr$ | H | Br | H | Br | 0 |
| $CF_3$ | $^nPr$ | H | Br | H | Br | 1 |
| $CF_3$ | $^nPr$ | H | Br | H | Br | 2 |
| $CF_3$ | $^nPr$ | H | I | H | I | 0 |
| $CF_3$ | $^nPr$ | H | I | H | I | 1 |
| $CF_3$ | $^nPr$ | H | I | H | I | 2 |
| $CF_3$ | $^nPr$ | H | F | H | Cl | 0 |
| $CF_3$ | $^nPr$ | H | F | H | Cl | 1 |
| $CF_3$ | $^nPr$ | H | F | H | Cl | 2 |
| $CF_3$ | $^nPr$ | H | F | H | Br | 0 |
| $CF_3$ | $^nPr$ | H | F | H | Br | 1 |
| $CF_3$ | $^nPr$ | H | F | H | Br | 2 |
| $CF_3$ | $^nPr$ | H | F | H | I | 0 |
| $CF_3$ | $^nPr$ | H | F | H | I | 1 |
| $CF_3$ | $^nPr$ | H | F | H | I | 2 |
| $CF_3$ | $^nPr$ | H | Cl | H | F | 0 |
| $CF_3$ | $^nPr$ | H | Cl | H | F | 1 |
| $CF_3$ | $^nPr$ | H | Cl | H | F | 2 |
| $CF_3$ | $^nPr$ | H | Cl | H | Br | 0 |
| $CF_3$ | $^nPr$ | H | Cl | H | Br | 1 |
| $CF_3$ | $^nPr$ | H | Cl | H | Br | 2 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_3$ | $^nPr$ | H | Cl | H | I | 0 |
| $CF_3$ | $^nPr$ | H | Cl | H | I | 1 |
| $CF_3$ | $^nPr$ | H | Cl | H | I | 2 |
| $CF_3$ | $^nPr$ | H | Br | H | F | 0 |
| $CF_3$ | $^nPr$ | H | Br | H | F | 1 |
| $CF_3$ | $^nPr$ | H | Br | H | F | 2 |
| $CF_3$ | $^nPr$ | H | Br | H | Cl | 0 |
| $CF_3$ | $^nPr$ | H | Br | H | Cl | 1 |
| $CF_3$ | $^nPr$ | H | Br | H | Cl | 2 |
| $CF_3$ | $^nPr$ | H | Br | H | I | 0 |
| $CF_3$ | $^nPr$ | H | Br | H | I | 1 |
| $CF_3$ | $^nPr$ | H | Br | H | I | 2 |
| $CF_3$ | $^nPr$ | H | I | H | F | 0 |
| $CF_3$ | $^nPr$ | H | I | H | F | 1 |
| $CF_3$ | $^nPr$ | H | I | H | F | 2 |
| $CF_3$ | $^nPr$ | H | I | H | Cl | 0 |
| $CF_3$ | $^nPr$ | H | I | H | Cl | 1 |
| $CF_3$ | $^nPr$ | H | I | H | Cl | 2 |
| $CF_3$ | $^nPr$ | H | I | H | Br | 0 |
| $CF_3$ | $^nPr$ | H | I | H | Br | 1 |
| $CF_3$ | $^nPr$ | H | I | H | Br | 2 |
| $CF_3$ | $^nPr$ | H | F | H | CN | 0 |
| $CF_3$ | $^nPr$ | H | F | H | CN | 1 |
| $CF_3$ | $^nPr$ | H | F | H | CN | 2 |
| $CF_3$ | $^nPr$ | H | Cl | H | CN | 0 |
| $CF_3$ | $^nPr$ | H | Cl | H | CN | 1 |
| $CF_3$ | $^nPr$ | H | Cl | H | CN | 2 |
| $CF_3$ | $^nPr$ | H | Br | H | CN | 0 |
| $CF_3$ | $^nPr$ | H | Br | H | CN | 1 |
| $CF_3$ | $^nPr$ | H | Br | H | CN | 2 |
| $CF_3$ | $^nPr$ | H | I | H | CN | 0 |
| $CF_3$ | $^nPr$ | H | I | H | CN | 1 |
| $CF_3$ | $^nPr$ | H | I | H | CN | 2 |
| $CF_3$ | $^nPr$ | H | $CF_3$ | H | F | 0 |
| $CF_3$ | $^nPr$ | H | $CF_3$ | H | F | 1 |
| $CF_3$ | $^nPr$ | H | $CF_3$ | H | F | 2 |
| $CF_3$ | $^nPr$ | H | $CF_3$ | H | Cl | 0 |
| $CF_3$ | $^nPr$ | H | $CF_3$ | H | Cl | 1 |
| $CF_3$ | $^nPr$ | H | $CF_3$ | H | Cl | 2 |
| $CF_3$ | $^nPr$ | H | $CF_3$ | H | Br | 0 |
| $CF_3$ | $^nPr$ | H | $CF_3$ | H | Br | 1 |
| $CF_3$ | $^nPr$ | H | $CF_3$ | H | Br | 2 |
| $CF_3$ | $^nPr$ | H | $CF_3$ | H | I | 0 |
| $CF_3$ | $^nPr$ | H | $CF_3$ | H | I | 1 |
| $CF_3$ | $^nPr$ | H | $CF_3$ | H | I | 2 |
| $CF_3$ | $^nPr$ | H | $CF_3$ | H | CN | 0 |
| $CF_3$ | $^nPr$ | H | $CF_3$ | H | CN | 1 |
| $CF_3$ | $^nPr$ | H | $CF_3$ | H | CN | 2 |
| $CF_3$ | $^nPr$ | H | F | F | H | 0 |
| $CF_3$ | $^nPr$ | H | F | F | H | 1 |
| $CF_3$ | $^nPr$ | H | F | F | H | 2 |
| $CF_3$ | $^nPr$ | H | Cl | Cl | H | 0 |
| $CF_3$ | $^nPr$ | H | Cl | Cl | H | 1 |
| $CF_3$ | $^nPr$ | H | Cl | Cl | H | 2 |
| $CF_3$ | $^nPr$ | H | Br | Br | H | 0 |
| $CF_3$ | $^nPr$ | H | Br | Br | H | 1 |
| $CF_3$ | $^nPr$ | H | Br | Br | H | 2 |
| $CF_3$ | $^nPr$ | H | I | I | H | 0 |
| $CF_3$ | $^nPr$ | H | I | I | H | 1 |
| $CF_3$ | $^nPr$ | H | I | I | H | 2 |
| $CF_3$ | $^nPr$ | H | F | Cl | H | 0 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_3$ | $^n$Pr | H | F | Cl | H | 1 |
| $CF_3$ | $^n$Pr | H | F | Cl | H | 2 |
| $CF_3$ | $^n$Pr | H | F | Br | H | 0 |
| $CF_3$ | $^n$Pr | H | F | Br | H | 1 |
| $CF_3$ | $^n$Pr | H | F | Br | H | 2 |
| $CF_3$ | $^n$Pr | H | F | I | H | 0 |
| $CF_3$ | $^n$Pr | H | F | I | H | 1 |
| $CF_3$ | $^n$Pr | H | F | I | H | 2 |
| $CF_3$ | $^n$Pr | H | Cl | F | H | 0 |
| $CF_3$ | $^n$Pr | H | Cl | F | H | 1 |
| $CF_3$ | $^n$Pr | H | Cl | F | H | 2 |
| $CF_3$ | $^n$Pr | H | Cl | Br | H | 0 |
| $CF_3$ | $^n$Pr | H | Cl | Br | H | 1 |
| $CF_3$ | $^n$Pr | H | Cl | Br | H | 2 |
| $CF_3$ | $^n$Pr | H | Cl | I | H | 0 |
| $CF_3$ | $^n$Pr | H | Cl | I | H | 1 |
| $CF_3$ | $^n$Pr | H | Cl | I | H | 2 |
| $CF_3$ | $^n$Pr | H | Br | F | H | 0 |
| $CF_3$ | $^n$Pr | H | Br | F | H | 1 |
| $CF_3$ | $^n$Pr | H | Br | F | H | 2 |
| $CF_3$ | $^n$Pr | H | Br | Cl | H | 0 |
| $CF_3$ | $^n$Pr | H | Br | Cl | H | 1 |
| $CF_3$ | $^n$Pr | H | Br | Cl | H | 2 |
| $CF_3$ | $^n$Pr | H | Br | I | H | 0 |
| $CF_3$ | $^n$Pr | H | Br | I | H | 1 |
| $CF_3$ | $^n$Pr | H | Br | I | H | 2 |
| $CF_3$ | $^n$Pr | H | I | F | H | 0 |
| $CF_3$ | $^n$Pr | H | I | F | H | 1 |
| $CF_3$ | $^n$Pr | H | I | F | H | 2 |
| $CF_3$ | $^n$Pr | H | I | Cl | H | 0 |
| $CF_3$ | $^n$Pr | H | I | Cl | H | 1 |
| $CF_3$ | $^n$Pr | H | I | Cl | H | 2 |
| $CF_3$ | $^n$Pr | H | I | Br | H | 0 |
| $CF_3$ | $^n$Pr | H | I | Br | H | 1 |
| $CF_3$ | $^n$Pr | H | I | Br | H | 2 |
| $CF_3$ | $^n$Pr | H | F | CN | H | 0 |
| $CF_3$ | $^n$Pr | H | F | CN | H | 1 |
| $CF_3$ | $^n$Pr | H | F | CN | H | 2 |
| $CF_3$ | $^n$Pr | H | Cl | CN | H | 0 |
| $CF_3$ | $^n$Pr | H | Cl | CN | H | 1 |
| $CF_3$ | $^n$Pr | H | Cl | CN | H | 2 |
| $CF_3$ | $^n$Pr | H | Br | CN | H | 0 |
| $CF_3$ | $^n$Pr | H | Br | CN | H | 1 |
| $CF_3$ | $^n$Pr | H | Br | CN | H | 2 |
| $CF_3$ | $^n$Pr | H | I | CN | H | 0 |
| $CF_3$ | $^n$Pr | H | I | CN | H | 1 |
| $CF_3$ | $^n$Pr | H | I | CN | H | 2 |
| $CF_3$ | $^n$Pr | H | $CF_3$ | F | H | 0 |
| $CF_3$ | $^n$Pr | H | $CF_3$ | F | H | 1 |
| $CF_3$ | $^n$Pr | H | $CF_3$ | F | H | 2 |
| $CF_3$ | $^n$Pr | H | $CF_3$ | Cl | H | 0 |
| $CF_3$ | $^n$Pr | H | $CF_3$ | Cl | H | 1 |
| $CF_3$ | $^n$Pr | H | $CF_3$ | Cl | H | 2 |
| $CF_3$ | $^n$Pr | H | $CF_3$ | Br | H | 0 |
| $CF_3$ | $^n$Pr | H | $CF_3$ | Br | H | 1 |
| $CF_3$ | $^n$Pr | H | $CF_3$ | Br | H | 2 |
| $CF_3$ | $^n$Pr | H | $CF_3$ | I | H | 0 |
| $CF_3$ | $^n$Pr | H | $CF_3$ | I | H | 1 |
| $CF_3$ | $^n$Pr | H | $CF_3$ | I | H | 2 |
| $CF_3$ | $^n$Pr | H | $CF_3$ | CN | H | 0 |
| $CF_3$ | $^n$Pr | H | $CF_3$ | CN | H | 1 |
| $CF_3$ | $^n$Pr | H | $CF_3$ | CN | H | 2 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_3$ | $^i$Pr | H | H | H | H | 0 |
| $CF_3$ | $^i$Pr | H | H | H | H | 1 |
| $CF_3$ | $^i$Pr | H | H | H | H | 2 |
| $CF_3$ | $^i$Pr | F | H | H | H | 0 |
| $CF_3$ | $^i$Pr | F | H | H | H | 1 |
| $CF_3$ | $^i$Pr | F | H | H | H | 2 |
| $CF_3$ | $^i$Pr | Cl | H | H | H | 0 |
| $CF_3$ | $^i$Pr | Cl | H | H | H | 1 |
| $CF_3$ | $^i$Pr | Cl | H | H | H | 2 |
| $CF_3$ | $^i$Pr | Br | H | H | H | 0 |
| $CF_3$ | $^i$Pr | Br | H | H | H | 1 |
| $CF_3$ | $^i$Pr | Br | H | H | H | 2 |
| $CF_3$ | $^i$Pr | I | H | H | H | 0 |
| $CF_3$ | $^i$Pr | I | H | H | H | 1 |
| $CF_3$ | $^i$Pr | I | H | H | H | 2 |
| $CF_3$ | $^i$Pr | Me | H | H | H | 0 |
| $CF_3$ | $^i$Pr | Me | H | H | H | 1 |
| $CF_3$ | $^i$Pr | Me | H | H | H | 2 |
| $CF_3$ | $^i$Pr | $CF_3$ | H | H | H | 0 |
| $CF_3$ | $^i$Pr | $CF_3$ | H | H | H | 1 |
| $CF_3$ | $^i$Pr | $CF_3$ | H | H | H | 2 |
| $CF_3$ | $^i$Pr | H | F | H | H | 0 |
| $CF_3$ | $^i$Pr | H | F | H | H | 1 |
| $CF_3$ | $^i$Pr | H | F | H | H | 2 |
| $CF_3$ | $^i$Pr | H | Cl | H | H | 0 |
| $CF_3$ | $^i$Pr | H | Cl | H | H | 1 |
| $CF_3$ | $^i$Pr | H | Cl | H | H | 2 |
| $CF_3$ | $^i$Pr | H | Br | H | H | 0 |
| $CF_3$ | $^i$Pr | H | Br | H | H | 1 |
| $CF_3$ | $^i$Pr | H | Br | H | H | 2 |
| $CF_3$ | $^i$Pr | H | I | H | H | 0 |
| $CF_3$ | $^i$Pr | H | I | H | H | 1 |
| $CF_3$ | $^i$Pr | H | I | H | H | 2 |
| $CF_3$ | $^i$Pr | H | Me | H | H | 0 |
| $CF_3$ | $^i$Pr | H | Me | H | H | 1 |
| $CF_3$ | $^i$Pr | H | Me | H | H | 2 |
| $CF_3$ | $^i$Pr | H | $CF_3$ | H | H | 0 |
| $CF_3$ | $^i$Pr | H | $CF_3$ | H | H | 1 |
| $CF_3$ | $^i$Pr | H | $CF_3$ | H | H | 2 |
| $CF_3$ | $^i$Pr | H | $CF_2CF_3$ | H | H | 0 |
| $CF_3$ | $^i$Pr | H | $CF_2CF_3$ | H | H | 1 |
| $CF_3$ | $^i$Pr | H | $CF_2CF_3$ | H | H | 2 |
| $CF_3$ | $^i$Pr | H | $CF(CF_3)_2$ | H | H | 0 |
| $CF_3$ | $^i$Pr | H | $CF(CF_3)_2$ | H | H | 1 |
| $CF_3$ | $^i$Pr | H | $CF(CF_3)_2$ | H | H | 2 |
| $CF_3$ | $^i$Pr | H | SMe | H | H | 0 |
| $CF_3$ | $^i$Pr | H | SMe | H | H | 1 |
| $CF_3$ | $^i$Pr | H | SMe | H | H | 2 |
| $CF_3$ | $^i$Pr | H | SOMe | H | H | 0 |
| $CF_3$ | $^i$Pr | H | SOMe | H | H | 1 |
| $CF_3$ | $^i$Pr | H | SOMe | H | H | 2 |
| $CF_3$ | $^i$Pr | H | $SO_2Me$ | H | H | 0 |
| $CF_3$ | $^i$Pr | H | $SO_2Me$ | H | H | 1 |
| $CF_3$ | $^i$Pr | H | $SO_2Me$ | H | H | 2 |
| $CF_3$ | $^i$Pr | H | OMe | H | H | 0 |
| $CF_3$ | $^i$Pr | H | OMe | H | H | 1 |
| $CF_3$ | $^i$Pr | H | OMe | H | H | 2 |
| $CF_3$ | $^i$Pr | H | $OCF_3$ | H | H | 0 |
| $CF_3$ | $^i$Pr | H | $OCF_3$ | H | H | 1 |
| $CF_3$ | $^i$Pr | H | $OCF_3$ | H | H | 2 |
| $CF_3$ | $^i$Pr | H | $NO_2$ | H | H | 0 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_3$ | $^iPr$ | H | $NO_2$ | H | H | 1 |
| $CF_3$ | $^iPr$ | H | $NO_2$ | H | H | 2 |
| $CF_3$ | $^iPr$ | H | CN | H | H | 0 |
| $CF_3$ | $^iPr$ | H | CN | H | H | 1 |
| $CF_3$ | $^iPr$ | H | CN | H | H | 2 |
| $CF_3$ | $^iPr$ | H | H | F | H | 0 |
| $CF_3$ | $^iPr$ | H | H | F | H | 1 |
| $CF_3$ | $^iPr$ | H | H | F | H | 2 |
| $CF_3$ | $^iPr$ | H | H | Cl | H | 0 |
| $CF_3$ | $^iPr$ | H | H | Cl | H | 1 |
| $CF_3$ | $^iPr$ | H | H | Cl | H | 2 |
| $CF_3$ | $^iPr$ | H | H | Br | H | 0 |
| $CF_3$ | $^iPr$ | H | H | Br | H | 1 |
| $CF_3$ | $^iPr$ | H | H | Br | H | 2 |
| $CF_3$ | $^iPr$ | H | H | I | H | 0 |
| $CF_3$ | $^iPr$ | H | H | I | H | 1 |
| $CF_3$ | $^iPr$ | H | H | I | H | 2 |
| $CF_3$ | $^iPr$ | H | H | Me | H | 0 |
| $CF_3$ | $^iPr$ | H | H | Me | H | 1 |
| $CF_3$ | $^iPr$ | H | H | Me | H | 2 |
| $CF_3$ | $^iPr$ | H | H | $CF_3$ | H | 0 |
| $CF_3$ | $^iPr$ | H | H | $CF_3$ | H | 1 |
| $CF_3$ | $^iPr$ | H | H | $CF_3$ | H | 2 |
| $CF_3$ | $^iPr$ | H | H | $CF_2CF_3$ | H | 0 |
| $CF_3$ | $^iPr$ | H | H | $CF_2CF_3$ | H | 1 |
| $CF_3$ | $^iPr$ | H | H | $CF_2CF_3$ | H | 2 |
| $CF_3$ | $^iPr$ | H | H | $CF(CF_3)_2$ | H | 0 |
| $CF_3$ | $^iPr$ | H | H | $CF(CF_3)_2$ | H | 1 |
| $CF_3$ | $^iPr$ | H | H | $CF(CF_3)_2$ | H | 2 |
| $CF_3$ | $^iPr$ | H | H | SMe | H | 0 |
| $CF_3$ | $^iPr$ | H | H | SMe | H | 1 |
| $CF_3$ | $^iPr$ | H | H | SMe | H | 2 |
| $CF_3$ | $^iPr$ | H | H | SOMe | H | 0 |
| $CF_3$ | $^iPr$ | H | H | SOMe | H | 1 |
| $CF_3$ | $^iPr$ | H | H | SOMe | H | 2 |
| $CF_3$ | $^iPr$ | H | H | $SO_2Me$ | H | 0 |
| $CF_3$ | $^iPr$ | H | H | $SO_2Me$ | H | 1 |
| $CF_3$ | $^iPr$ | H | H | $SO_2Me$ | H | 2 |
| $CF_3$ | $^iPr$ | H | H | OMe | H | 0 |
| $CF_3$ | $^iPr$ | H | H | OMe | H | 1 |
| $CF_3$ | $^iPr$ | H | H | OMe | H | 2 |
| $CF_3$ | $^iPr$ | H | H | $OCF_3$ | H | 0 |
| $CF_3$ | $^iPr$ | H | H | $OCF_3$ | H | 1 |
| $CF_3$ | $^iPr$ | H | H | $OCF_3$ | H | 2 |
| $CF_3$ | $^iPr$ | H | H | $NO_2$ | H | 0 |
| $CF_3$ | $^iPr$ | H | H | $NO_2$ | H | 1 |
| $CF_3$ | $^iPr$ | H | H | $NO_2$ | H | 2 |
| $CF_3$ | $^iPr$ | H | H | CN | H | 0 |
| $CF_3$ | $^iPr$ | H | H | CN | H | 1 |
| $CF_3$ | $^iPr$ | H | H | CN | H | 2 |
| $CF_3$ | $^iPr$ | H | H | H | F | 0 |
| $CF_3$ | $^iPr$ | H | H | H | F | 1 |
| $CF_3$ | $^iPr$ | H | H | H | F | 2 |
| $CF_3$ | $^iPr$ | H | H | H | Cl | 0 |
| $CF_3$ | $^iPr$ | H | H | H | Cl | 1 |
| $CF_3$ | $^iPr$ | H | H | H | Cl | 2 |
| $CF_3$ | $^iPr$ | H | H | H | Br | 0 |
| $CF_3$ | $^iPr$ | H | H | H | Br | 1 |
| $CF_3$ | $^iPr$ | H | H | H | Br | 2 |
| $CF_3$ | $^iPr$ | H | H | H | I | 0 |
| $CF_3$ | $^iPr$ | H | H | H | I | 1 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_3$ | $^iPr$ | H | H | H | I | 2 |
| $CF_3$ | $^iPr$ | H | H | H | Me | 0 |
| $CF_3$ | $^iPr$ | H | H | H | Me | 1 |
| $CF_3$ | $^iPr$ | H | H | H | Me | 2 |
| $CF_3$ | $^iPr$ | H | H | H | $CF_3$ | 0 |
| $CF_3$ | $^iPr$ | H | H | H | $CF_3$ | 1 |
| $CF_3$ | $^iPr$ | H | H | H | $CF_3$ | 2 |
| $CF_3$ | $^iPr$ | H | H | H | $CF_2CF_3$ | 0 |
| $CF_3$ | $^iPr$ | H | H | H | $CF_2CF_3$ | 1 |
| $CF_3$ | $^iPr$ | H | H | H | $CF_2CF_3$ | 2 |
| $CF_3$ | $^iPr$ | H | H | H | $CF(CF_3)_2$ | 0 |
| $CF_3$ | $^iPr$ | H | H | H | $CF(CF_3)_2$ | 1 |
| $CF_3$ | $^iPr$ | H | H | H | $CF(CF_3)_2$ | 2 |
| $CF_3$ | $^iPr$ | H | H | H | SMe | 0 |
| $CF_3$ | $^iPr$ | H | H | H | SMe | 1 |
| $CF_3$ | $^iPr$ | H | H | H | SMe | 2 |
| $CF_3$ | $^iPr$ | H | H | H | SOMe | 0 |
| $CF_3$ | $^iPr$ | H | H | H | SOMe | 1 |
| $CF_3$ | $^iPr$ | H | H | H | SOMe | 2 |
| $CF_3$ | $^iPr$ | H | H | H | $SO_2Me$ | 0 |
| $CF_3$ | $^iPr$ | H | H | H | $SO_2Me$ | 1 |
| $CF_3$ | $^iPr$ | H | H | H | $SO_2Me$ | 2 |
| $CF_3$ | $^iPr$ | H | H | H | OMe | 0 |
| $CF_3$ | $^iPr$ | H | H | H | OMe | 1 |
| $CF_3$ | $^iPr$ | H | H | H | OMe | 2 |
| $CF_3$ | $^iPr$ | H | H | H | $OCF_3$ | 0 |
| $CF_3$ | $^iPr$ | H | H | H | $OCF_3$ | 1 |
| $CF_3$ | $^iPr$ | H | H | H | $OCF_3$ | 2 |
| $CF_3$ | $^iPr$ | H | H | H | $NO_2$ | 0 |
| $CF_3$ | $^iPr$ | H | H | H | $NO_2$ | 1 |
| $CF_3$ | $^iPr$ | H | H | H | $NO_2$ | 2 |
| $CF_3$ | $^iPr$ | H | H | H | CN | 0 |
| $CF_3$ | $^iPr$ | H | H | H | CN | 1 |
| $CF_3$ | $^iPr$ | H | H | H | CN | 2 |
| $CF_3$ | $^iPr$ | H | F | H | F | 0 |
| $CF_3$ | $^iPr$ | H | F | H | F | 1 |
| $CF_3$ | $^iPr$ | H | F | H | F | 2 |
| $CF_3$ | $^iPr$ | H | Cl | H | Cl | 0 |
| $CF_3$ | $^iPr$ | H | Cl | H | Cl | 1 |
| $CF_3$ | $^iPr$ | H | Cl | H | Cl | 2 |
| $CF_3$ | $^iPr$ | H | Br | H | Br | 0 |
| $CF_3$ | $^iPr$ | H | Br | H | Br | 1 |
| $CF_3$ | $^iPr$ | H | Br | H | Br | 2 |
| $CF_3$ | $^iPr$ | H | I | H | I | 0 |
| $CF_3$ | $^iPr$ | H | I | H | I | 1 |
| $CF_3$ | $^iPr$ | H | I | H | I | 2 |
| $CF_3$ | $^iPr$ | H | F | H | Cl | 0 |
| $CF_3$ | $^iPr$ | H | F | H | Cl | 1 |
| $CF_3$ | $^iPr$ | H | F | H | Cl | 2 |
| $CF_3$ | $^iPr$ | H | F | H | Br | 0 |
| $CF_3$ | $^iPr$ | H | F | H | Br | 1 |
| $CF_3$ | $^iPr$ | H | F | H | Br | 2 |
| $CF_3$ | $^iPr$ | H | F | H | I | 0 |
| $CF_3$ | $^iPr$ | H | F | H | I | 1 |
| $CF_3$ | $^iPr$ | H | F | H | I | 2 |
| $CF_3$ | $^iPr$ | H | Cl | H | F | 0 |
| $CF_3$ | $^iPr$ | H | Cl | H | F | 1 |
| $CF_3$ | $^iPr$ | H | Cl | H | F | 2 |
| $CF_3$ | $^iPr$ | H | Cl | H | Br | 0 |
| $CF_3$ | $^iPr$ | H | Cl | H | Br | 1 |
| $CF_3$ | $^iPr$ | H | Cl | H | Br | 2 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_3$ | $^iPr$ | H | Cl | H | I | 0 |
| $CF_3$ | $^iPr$ | H | Cl | H | I | 1 |
| $CF_3$ | $^iPr$ | H | Cl | H | I | 2 |
| $CF_3$ | $^iPr$ | H | Br | H | F | 0 |
| $CF_3$ | $^iPr$ | H | Br | H | F | 1 |
| $CF_3$ | $^iPr$ | H | Br | H | F | 2 |
| $CF_3$ | $^iPr$ | H | Br | H | Cl | 0 |
| $CF_3$ | $^iPr$ | H | Br | H | Cl | 1 |
| $CF_3$ | $^iPr$ | H | Br | H | Cl | 2 |
| $CF_3$ | $^iPr$ | H | Br | H | I | 0 |
| $CF_3$ | $^iPr$ | H | Br | H | I | 1 |
| $CF_3$ | $^iPr$ | H | Br | H | I | 2 |
| $CF_3$ | $^iPr$ | H | I | H | F | 0 |
| $CF_3$ | $^iPr$ | H | I | H | F | 1 |
| $CF_3$ | $^iPr$ | H | I | H | F | 2 |
| $CF_3$ | $^iPr$ | H | I | H | Cl | 0 |
| $CF_3$ | $^iPr$ | H | I | H | Cl | 1 |
| $CF_3$ | $^iPr$ | H | I | H | Cl | 2 |
| $CF_3$ | $^iPr$ | H | I | H | Br | 0 |
| $CF_3$ | $^iPr$ | H | I | H | Br | 1 |
| $CF_3$ | $^iPr$ | H | I | H | Br | 2 |
| $CF_3$ | $^iPr$ | H | F | H | CN | 0 |
| $CF_3$ | $^iPr$ | H | F | H | CN | 1 |
| $CF_3$ | $^iPr$ | H | F | H | CN | 2 |
| $CF_3$ | $^iPr$ | H | Cl | H | CN | 0 |
| $CF_3$ | $^iPr$ | H | Cl | H | CN | 1 |
| $CF_3$ | $^iPr$ | H | Cl | H | CN | 2 |
| $CF_3$ | $^iPr$ | H | Br | H | CN | 0 |
| $CF_3$ | $^iPr$ | H | Br | H | CN | 1 |
| $CF_3$ | $^iPr$ | H | Br | H | CN | 2 |
| $CF_3$ | $^iPr$ | H | I | H | CN | 0 |
| $CF_3$ | $^iPr$ | H | I | H | CN | 1 |
| $CF_3$ | $^iPr$ | H | I | H | CN | 2 |
| $CF_3$ | $^iPr$ | H | $CF_3$ | H | F | 0 |
| $CF_3$ | $^iPr$ | H | $CF_3$ | H | F | 1 |
| $CF_3$ | $^iPr$ | H | $CF_3$ | H | F | 2 |
| $CF_3$ | $^iPr$ | H | $CF_3$ | H | Cl | 0 |
| $CF_3$ | $^iPr$ | H | $CF_3$ | H | Cl | 1 |
| $CF_3$ | $^iPr$ | H | $CF_3$ | H | Cl | 2 |
| $CF_3$ | $^iPr$ | H | $CF_3$ | H | Br | 0 |
| $CF_3$ | $^iPr$ | H | $CF_3$ | H | Br | 1 |
| $CF_3$ | $^iPr$ | H | $CF_3$ | H | Br | 2 |
| $CF_3$ | $^iPr$ | H | $CF_3$ | H | I | 0 |
| $CF_3$ | $^iPr$ | H | $CF_3$ | H | I | 1 |
| $CF_3$ | $^iPr$ | H | $CF_3$ | H | I | 2 |
| $CF_3$ | $^iPr$ | H | $CF_3$ | H | CN | 0 |
| $CF_3$ | $^iPr$ | H | $CF_3$ | H | CN | 1 |
| $CF_3$ | $^iPr$ | H | $CF_3$ | H | CN | 2 |
| $CF_3$ | $^iPr$ | H | F | F | H | 0 |
| $CF_3$ | $^iPr$ | H | F | F | H | 1 |
| $CF_3$ | $^iPr$ | H | F | F | H | 2 |
| $CF_3$ | $^iPr$ | H | Cl | Cl | H | 0 |
| $CF_3$ | $^iPr$ | H | Cl | Cl | H | 1 |
| $CF_3$ | $^iPr$ | H | Cl | Cl | H | 2 |
| $CF_3$ | $^iPr$ | H | Br | Br | H | 0 |
| $CF_3$ | $^iPr$ | H | Br | Br | H | 1 |
| $CF_3$ | $^iPr$ | H | Br | Br | H | 2 |
| $CF_3$ | $^iPr$ | H | I | I | H | 0 |
| $CF_3$ | $^iPr$ | H | I | I | H | 1 |
| $CF_3$ | $^iPr$ | H | I | I | H | 2 |
| $CF_3$ | $^iPr$ | H | F | Cl | H | 0 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_3$ | $^iPr$ | H | F | Cl | H | 1 |
| $CF_3$ | $^iPr$ | H | F | Cl | H | 2 |
| $CF_3$ | $^iPr$ | H | F | Br | H | 0 |
| $CF_3$ | $^iPr$ | H | F | Br | H | 1 |
| $CF_3$ | $^iPr$ | H | F | Br | H | 2 |
| $CF_3$ | $^iPr$ | H | F | I | H | 0 |
| $CF_3$ | $^iPr$ | H | F | I | H | 1 |
| $CF_3$ | $^iPr$ | H | F | I | H | 2 |
| $CF_3$ | $^iPr$ | H | Cl | F | H | 0 |
| $CF_3$ | $^iPr$ | H | Cl | F | H | 1 |
| $CF_3$ | $^iPr$ | H | Cl | F | H | 2 |
| $CF_3$ | $^iPr$ | H | Cl | Br | H | 0 |
| $CF_3$ | $^iPr$ | H | Cl | Br | H | 1 |
| $CF_3$ | $^iPr$ | H | Cl | Br | H | 2 |
| $CF_3$ | $^iPr$ | H | Cl | I | H | 0 |
| $CF_3$ | $^iPr$ | H | Cl | I | H | 1 |
| $CF_3$ | $^iPr$ | H | Cl | I | H | 2 |
| $CF_3$ | $^iPr$ | H | Br | F | H | 0 |
| $CF_3$ | $^iPr$ | H | Br | F | H | 1 |
| $CF_3$ | $^iPr$ | H | Br | F | H | 2 |
| $CF_3$ | $^iPr$ | H | Br | Cl | H | 0 |
| $CF_3$ | $^iPr$ | H | Br | Cl | H | 1 |
| $CF_3$ | $^iPr$ | H | Br | Cl | H | 2 |
| $CF_3$ | $^iPr$ | H | Br | I | H | 0 |
| $CF_3$ | $^iPr$ | H | Br | I | H | 1 |
| $CF_3$ | $^iPr$ | H | Br | I | H | 2 |
| $CF_3$ | $^iPr$ | H | I | F | H | 0 |
| $CF_3$ | $^iPr$ | H | I | F | H | 1 |
| $CF_3$ | $^iPr$ | H | I | F | H | 2 |
| $CF_3$ | $^iPr$ | H | I | Cl | H | 0 |
| $CF_3$ | $^iPr$ | H | I | Cl | H | 1 |
| $CF_3$ | $^iPr$ | H | I | Cl | H | 2 |
| $CF_3$ | $^iPr$ | H | I | Br | H | 0 |
| $CF_3$ | $^iPr$ | H | I | Br | H | 1 |
| $CF_3$ | $^iPr$ | H | I | Br | H | 2 |
| $CF_3$ | $^iPr$ | H | F | CN | H | 0 |
| $CF_3$ | $^iPr$ | H | F | CN | H | 1 |
| $CF_3$ | $^iPr$ | H | F | CN | H | 2 |
| $CF_3$ | $^iPr$ | H | Cl | CN | H | 0 |
| $CF_3$ | $^iPr$ | H | Cl | CN | H | 1 |
| $CF_3$ | $^iPr$ | H | Cl | CN | H | 2 |
| $CF_3$ | $^iPr$ | H | Br | CN | H | 0 |
| $CF_3$ | $^iPr$ | H | Br | CN | H | 1 |
| $CF_3$ | $^iPr$ | H | Br | CN | H | 2 |
| $CF_3$ | $^iPr$ | H | I | CN | H | 0 |
| $CF_3$ | $^iPr$ | H | I | CN | H | 1 |
| $CF_3$ | $^iPr$ | H | I | CN | H | 2 |
| $CF_3$ | $^iPr$ | H | $CF_3$ | F | H | 0 |
| $CF_3$ | $^iPr$ | H | $CF_3$ | F | H | 1 |
| $CF_3$ | $^iPr$ | H | $CF_3$ | F | H | 2 |
| $CF_3$ | $^iPr$ | H | $CF_3$ | Cl | H | 0 |
| $CF_3$ | $^iPr$ | H | $CF_3$ | Cl | H | 1 |
| $CF_3$ | $^iPr$ | H | $CF_3$ | Cl | H | 2 |
| $CF_3$ | $^iPr$ | H | $CF_3$ | Br | H | 0 |
| $CF_3$ | $^iPr$ | H | $CF_3$ | Br | H | 1 |
| $CF_3$ | $^iPr$ | H | $CF_3$ | Br | H | 2 |
| $CF_3$ | $^iPr$ | H | $CF_3$ | I | H | 0 |
| $CF_3$ | $^iPr$ | H | $CF_3$ | I | H | 1 |
| $CF_3$ | $^iPr$ | H | $CF_3$ | I | H | 2 |
| $CF_3$ | $^iPr$ | H | $CF_3$ | CN | H | 0 |
| $CF_3$ | $^iPr$ | H | $CF_3$ | CN | H | 1 |
| $CF_3$ | $^iPr$ | H | $CF_3$ | CN | H | 2 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_3$ | $CH_2CF_3$ | H | H | H | H | 0 |
| $CF_3$ | $CH_2CF_3$ | H | H | H | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | H | H | H | 2 |
| $CF_3$ | $CH_2CF_3$ | F | H | H | H | 0 |
| $CF_3$ | $CH_2CF_3$ | F | H | H | H | 1 |
| $CF_3$ | $CH_2CF_3$ | F | H | H | H | 2 |
| $CF_3$ | $CH_2CF_3$ | Cl | H | H | H | 0 |
| $CF_3$ | $CH_2CF_3$ | Cl | H | H | H | 1 |
| $CF_3$ | $CH_2CF_3$ | Cl | H | H | H | 2 |
| $CF_3$ | $CH_2CF_3$ | Br | H | H | H | 0 |
| $CF_3$ | $CH_2CF_3$ | Br | H | H | H | 1 |
| $CF_3$ | $CH_2CF_3$ | Br | H | H | H | 2 |
| $CF_3$ | $CH_2CF_3$ | I | H | H | H | 0 |
| $CF_3$ | $CH_2CF_3$ | I | H | H | H | 1 |
| $CF_3$ | $CH_2CF_3$ | I | H | H | H | 2 |
| $CF_3$ | $CH_2CF_3$ | Me | H | H | H | 0 |
| $CF_3$ | $CH_2CF_3$ | Me | H | H | H | 1 |
| $CF_3$ | $CH_2CF_3$ | Me | H | H | H | 2 |
| $CF_3$ | $CH_2CF_3$ | $CF_3$ | H | H | H | 0 |
| $CF_3$ | $CH_2CF_3$ | $CF_3$ | H | H | H | 1 |
| $CF_3$ | $CH_2CF_3$ | $CF_3$ | H | H | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | F | H | H | 0 |
| $CF_3$ | $CH_2CF_3$ | H | F | H | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | F | H | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | Cl | H | H | 0 |
| $CF_3$ | $CH_2CF_3$ | H | Cl | H | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | Cl | H | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | Br | H | H | 0 |
| $CF_3$ | $CH_2CF_3$ | H | Br | H | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | Br | H | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | I | H | H | 0 |
| $CF_3$ | $CH_2CF_3$ | H | I | H | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | I | H | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | Me | H | H | 0 |
| $CF_3$ | $CH_2CF_3$ | H | Me | H | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | Me | H | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | H | 0 |
| $CF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | $CF_2CF_3$ | H | H | 0 |
| $CF_3$ | $CH_2CF_3$ | H | $CF_2CF_3$ | H | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | $CF_2CF_3$ | H | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | $CF(CF_3)_2$ | H | H | 0 |
| $CF_3$ | $CH_2CF_3$ | H | $CF(CF_3)_2$ | H | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | $CF(CF_3)_2$ | H | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | SMe | H | H | 0 |
| $CF_3$ | $CH_2CF_3$ | H | SMe | H | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | SMe | H | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | SOMe | H | H | 0 |
| $CF_3$ | $CH_2CF_3$ | H | SOMe | H | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | SOMe | H | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | $SO_2Me$ | H | H | 0 |
| $CF_3$ | $CH_2CF_3$ | H | $SO_2Me$ | H | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | $SO_2Me$ | H | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | OMe | H | H | 0 |
| $CF_3$ | $CH_2CF_3$ | H | OMe | H | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | OMe | H | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | $OCF_3$ | H | H | 0 |
| $CF_3$ | $CH_2CF_3$ | H | $OCF_3$ | H | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | $OCF_3$ | H | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | $NO_2$ | H | H | 0 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_3$ | $CH_2CF_3$ | H | $NO_2$ | H | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | $NO_2$ | H | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | CN | H | H | 0 |
| $CF_3$ | $CH_2CF_3$ | H | CN | H | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | CN | H | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | H | F | H | 0 |
| $CF_3$ | $CH_2CF_3$ | H | H | F | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | H | F | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | H | Cl | H | 0 |
| $CF_3$ | $CH_2CF_3$ | H | H | Cl | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | H | Cl | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | H | Br | H | 0 |
| $CF_3$ | $CH_2CF_3$ | H | H | Br | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | H | Br | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | H | I | H | 0 |
| $CF_3$ | $CH_2CF_3$ | H | H | I | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | H | I | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | H | Me | H | 0 |
| $CF_3$ | $CH_2CF_3$ | H | H | Me | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | H | Me | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | H | $CF_3$ | H | 0 |
| $CF_3$ | $CH_2CF_3$ | H | H | $CF_3$ | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | H | $CF_3$ | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | H | $CF_2CF_3$ | H | 0 |
| $CF_3$ | $CH_2CF_3$ | H | H | $CF_2CF_3$ | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | H | $CF_2CF_3$ | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | H | $CF(CF_3)_2$ | H | 0 |
| $CF_3$ | $CH_2CF_3$ | H | H | $CF(CF_3)_2$ | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | H | $CF(CF_3)_2$ | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | H | SMe | H | 0 |
| $CF_3$ | $CH_2CF_3$ | H | H | SMe | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | H | SMe | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | H | SOMe | H | 0 |
| $CF_3$ | $CH_2CF_3$ | H | H | SOMe | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | H | SOMe | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | H | $SO_2Me$ | H | 0 |
| $CF_3$ | $CH_2CF_3$ | H | H | $SO_2Me$ | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | H | $SO_2Me$ | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | H | OMe | H | 0 |
| $CF_3$ | $CH_2CF_3$ | H | H | OMe | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | H | OMe | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | H | $OCF_3$ | H | 0 |
| $CF_3$ | $CH_2CF_3$ | H | H | $OCF_3$ | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | H | $OCF_3$ | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | H | $NO_2$ | H | 0 |
| $CF_3$ | $CH_2CF_3$ | H | H | $NO_2$ | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | H | $NO_2$ | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | H | CN | H | 0 |
| $CF_3$ | $CH_2CF_3$ | H | H | CN | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | H | CN | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | H | H | F | 0 |
| $CF_3$ | $CH_2CF_3$ | H | H | H | F | 1 |
| $CF_3$ | $CH_2CF_3$ | H | H | H | F | 2 |
| $CF_3$ | $CH_2CF_3$ | H | H | H | Cl | 0 |
| $CF_3$ | $CH_2CF_3$ | H | H | H | Cl | 1 |
| $CF_3$ | $CH_2CF_3$ | H | H | H | Cl | 2 |
| $CF_3$ | $CH_2CF_3$ | H | H | H | Br | 0 |
| $CF_3$ | $CH_2CF_3$ | H | H | H | Br | 1 |
| $CF_3$ | $CH_2CF_3$ | H | H | H | Br | 2 |
| $CF_3$ | $CH_2CF_3$ | H | H | H | I | 0 |
| $CF_3$ | $CH_2CF_3$ | H | H | H | I | 1 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_3$ | $CH_2CF_3$ | H | H | H | I | 2 |
| $CF_3$ | $CH_2CF_3$ | H | H | H | Me | 0 |
| $CF_3$ | $CH_2CF_3$ | H | H | H | Me | 1 |
| $CF_3$ | $CH_2CF_3$ | H | H | H | Me | 2 |
| $CF_3$ | $CH_2CF_3$ | H | H | H | $CF_3$ | 0 |
| $CF_3$ | $CH_2CF_3$ | H | H | H | $CF_3$ | 1 |
| $CF_3$ | $CH_2CF_3$ | H | H | H | $CF_3$ | 2 |
| $CF_3$ | $CH_2CF_3$ | H | H | H | $CF_2CF_3$ | 0 |
| $CF_3$ | $CH_2CF_3$ | H | H | H | $CF_2CF_3$ | 1 |
| $CF_3$ | $CH_2CF_3$ | H | H | H | $CF_2CF_3$ | 2 |
| $CF_3$ | $CH_2CF_3$ | H | H | H | $CF(CF_3)_2$ | 0 |
| $CF_3$ | $CH_2CF_3$ | H | H | H | $CF(CF_3)_2$ | 1 |
| $CF_3$ | $CH_2CF_3$ | H | H | H | $CF(CF_3)_2$ | 2 |
| $CF_3$ | $CH_2CF_3$ | H | H | H | SMe | 0 |
| $CF_3$ | $CH_2CF_3$ | H | H | H | SMe | 1 |
| $CF_3$ | $CH_2CF_3$ | H | H | H | SMe | 2 |
| $CF_3$ | $CH_2CF_3$ | H | H | H | SOMe | 0 |
| $CF_3$ | $CH_2CF_3$ | H | H | H | SOMe | 1 |
| $CF_3$ | $CH_2CF_3$ | H | H | H | SOMe | 2 |
| $CF_3$ | $CH_2CF_3$ | H | H | H | $SO_2Me$ | 0 |
| $CF_3$ | $CH_2CF_3$ | H | H | H | $SO_2Me$ | 1 |
| $CF_3$ | $CH_2CF_3$ | H | H | H | $SO_2Me$ | 2 |
| $CF_3$ | $CH_2CF_3$ | H | H | H | OMe | 0 |
| $CF_3$ | $CH_2CF_3$ | H | H | H | OMe | 1 |
| $CF_3$ | $CH_2CF_3$ | H | H | H | OMe | 2 |
| $CF_3$ | $CH_2CF_3$ | H | H | H | $OCF_3$ | 0 |
| $CF_3$ | $CH_2CF_3$ | H | H | H | $OCF_3$ | 1 |
| $CF_3$ | $CH_2CF_3$ | H | H | H | $OCF_3$ | 2 |
| $CF_3$ | $CH_2CF_3$ | H | H | H | $NO_2$ | 0 |
| $CF_3$ | $CH_2CF_3$ | H | H | H | $NO_2$ | 1 |
| $CF_3$ | $CH_2CF_3$ | H | H | H | $NO_2$ | 2 |
| $CF_3$ | $CH_2CF_3$ | H | H | H | CN | 0 |
| $CF_3$ | $CH_2CF_3$ | H | H | H | CN | 1 |
| $CF_3$ | $CH_2CF_3$ | H | H | H | CN | 2 |
| $CF_3$ | $CH_2CF_3$ | H | F | H | F | 0 |
| $CF_3$ | $CH_2CF_3$ | H | F | H | F | 1 |
| $CF_3$ | $CH_2CF_3$ | H | F | H | F | 2 |
| $CF_3$ | $CH_2CF_3$ | H | Cl | H | Cl | 0 |
| $CF_3$ | $CH_2CF_3$ | H | Cl | H | Cl | 1 |
| $CF_3$ | $CH_2CF_3$ | H | Cl | H | Cl | 2 |
| $CF_3$ | $CH_2CF_3$ | H | Br | H | Br | 0 |
| $CF_3$ | $CH_2CF_3$ | H | Br | H | Br | 1 |
| $CF_3$ | $CH_2CF_3$ | H | Br | H | Br | 2 |
| $CF_3$ | $CH_2CF_3$ | H | I | H | I | 0 |
| $CF_3$ | $CH_2CF_3$ | H | I | H | I | 1 |
| $CF_3$ | $CH_2CF_3$ | H | I | H | I | 2 |
| $CF_3$ | $CH_2CF_3$ | H | F | H | Cl | 0 |
| $CF_3$ | $CH_2CF_3$ | H | F | H | Cl | 1 |
| $CF_3$ | $CH_2CF_3$ | H | F | H | Cl | 2 |
| $CF_3$ | $CH_2CF_3$ | H | F | H | Br | 0 |
| $CF_3$ | $CH_2CF_3$ | H | F | H | Br | 1 |
| $CF_3$ | $CH_2CF_3$ | H | F | H | Br | 2 |
| $CF_3$ | $CH_2CF_3$ | H | F | H | I | 0 |
| $CF_3$ | $CH_2CF_3$ | H | F | H | I | 1 |
| $CF_3$ | $CH_2CF_3$ | H | F | H | I | 2 |
| $CF_3$ | $CH_2CF_3$ | H | Cl | H | F | 0 |
| $CF_3$ | $CH_2CF_3$ | H | Cl | H | F | 1 |
| $CF_3$ | $CH_2CF_3$ | H | Cl | H | F | 2 |
| $CF_3$ | $CH_2CF_3$ | H | Cl | H | Br | 0 |
| $CF_3$ | $CH_2CF_3$ | H | Cl | H | Br | 1 |
| $CF_3$ | $CH_2CF_3$ | H | Cl | H | Br | 2 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_3$ | $CH_2CF_3$ | H | Cl | H | I | 0 |
| $CF_3$ | $CH_2CF_3$ | H | Cl | H | I | 1 |
| $CF_3$ | $CH_2CF_3$ | H | Cl | H | I | 2 |
| $CF_3$ | $CH_2CF_3$ | H | Br | H | F | 0 |
| $CF_3$ | $CH_2CF_3$ | H | Br | H | F | 1 |
| $CF_3$ | $CH_2CF_3$ | H | Br | H | F | 2 |
| $CF_3$ | $CH_2CF_3$ | H | Br | H | Cl | 0 |
| $CF_3$ | $CH_2CF_3$ | H | Br | H | Cl | 1 |
| $CF_3$ | $CH_2CF_3$ | H | Br | H | Cl | 2 |
| $CF_3$ | $CH_2CF_3$ | H | Br | H | I | 0 |
| $CF_3$ | $CH_2CF_3$ | H | Br | H | I | 1 |
| $CF_3$ | $CH_2CF_3$ | H | Br | H | I | 2 |
| $CF_3$ | $CH_2CF_3$ | H | I | H | F | 0 |
| $CF_3$ | $CH_2CF_3$ | H | I | H | F | 1 |
| $CF_3$ | $CH_2CF_3$ | H | I | H | F | 2 |
| $CF_3$ | $CH_2CF_3$ | H | I | H | Cl | 0 |
| $CF_3$ | $CH_2CF_3$ | H | I | H | Cl | 1 |
| $CF_3$ | $CH_2CF_3$ | H | I | H | Cl | 2 |
| $CF_3$ | $CH_2CF_3$ | H | I | H | Br | 0 |
| $CF_3$ | $CH_2CF_3$ | H | I | H | Br | 1 |
| $CF_3$ | $CH_2CF_3$ | H | I | H | Br | 2 |
| $CF_3$ | $CH_2CF_3$ | H | F | H | CN | 0 |
| $CF_3$ | $CH_2CF_3$ | H | F | H | CN | 1 |
| $CF_3$ | $CH_2CF_3$ | H | F | H | CN | 2 |
| $CF_3$ | $CH_2CF_3$ | H | Cl | H | CN | 0 |
| $CF_3$ | $CH_2CF_3$ | H | Cl | H | CN | 1 |
| $CF_3$ | $CH_2CF_3$ | H | Cl | H | CN | 2 |
| $CF_3$ | $CH_2CF_3$ | H | Br | H | CN | 0 |
| $CF_3$ | $CH_2CF_3$ | H | Br | H | CN | 1 |
| $CF_3$ | $CH_2CF_3$ | H | Br | H | CN | 2 |
| $CF_3$ | $CH_2CF_3$ | H | I | H | CN | 0 |
| $CF_3$ | $CH_2CF_3$ | H | I | H | CN | 1 |
| $CF_3$ | $CH_2CF_3$ | H | I | H | CN | 2 |
| $CF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | F | 0 |
| $CF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | F | 1 |
| $CF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | F | 2 |
| $CF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | Cl | 0 |
| $CF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | Cl | 1 |
| $CF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | Cl | 2 |
| $CF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | Br | 0 |
| $CF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | Br | 1 |
| $CF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | Br | 2 |
| $CF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | I | 0 |
| $CF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | I | 1 |
| $CF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | I | 2 |
| $CF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | CN | 0 |
| $CF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | CN | 1 |
| $CF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | CN | 2 |
| $CF_3$ | $CH_2CF_3$ | H | F | F | H | 0 |
| $CF_3$ | $CH_2CF_3$ | H | F | F | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | F | F | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | Cl | Cl | H | 0 |
| $CF_3$ | $CH_2CF_3$ | H | Cl | Cl | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | Cl | Cl | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | Br | Br | H | 0 |
| $CF_3$ | $CH_2CF_3$ | H | Br | Br | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | Br | Br | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | I | I | H | 0 |
| $CF_3$ | $CH_2CF_3$ | H | I | I | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | I | I | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | F | Cl | H | 0 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_3$ | $CH_2CF_3$ | H | F | Cl | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | F | Cl | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | F | Br | H | 0 |
| $CF_3$ | $CH_2CF_3$ | H | F | Br | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | F | Br | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | F | I | H | 0 |
| $CF_3$ | $CH_2CF_3$ | H | F | I | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | F | I | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | Cl | F | H | 0 |
| $CF_3$ | $CH_2CF_3$ | H | Cl | F | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | Cl | F | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | Cl | Br | H | 0 |
| $CF_3$ | $CH_2CF_3$ | H | Cl | Br | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | Cl | Br | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | Cl | I | H | 0 |
| $CF_3$ | $CH_2CF_3$ | H | Cl | I | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | Cl | I | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | Br | F | H | 0 |
| $CF_3$ | $CH_2CF_3$ | H | Br | F | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | Br | F | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | Br | Cl | H | 0 |
| $CF_3$ | $CH_2CF_3$ | H | Br | Cl | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | Br | Cl | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | Br | I | H | 0 |
| $CF_3$ | $CH_2CF_3$ | H | Br | I | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | Br | I | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | I | F | H | 0 |
| $CF_3$ | $CH_2CF_3$ | H | I | F | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | I | F | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | I | Cl | H | 0 |
| $CF_3$ | $CH_2CF_3$ | H | I | Cl | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | I | Cl | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | I | Br | H | 0 |
| $CF_3$ | $CH_2CF_3$ | H | I | Br | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | I | Br | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | F | CN | H | 0 |
| $CF_3$ | $CH_2CF_3$ | H | F | CN | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | F | CN | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | Cl | CN | H | 0 |
| $CF_3$ | $CH_2CF_3$ | H | Cl | CN | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | Cl | CN | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | Br | CN | H | 0 |
| $CF_3$ | $CH_2CF_3$ | H | Br | CN | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | Br | CN | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | I | CN | H | 0 |
| $CF_3$ | $CH_2CF_3$ | H | I | CN | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | I | CN | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | $CF_3$ | F | H | 0 |
| $CF_3$ | $CH_2CF_3$ | H | $CF_3$ | F | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | $CF_3$ | F | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | $CF_3$ | Cl | H | 0 |
| $CF_3$ | $CH_2CF_3$ | H | $CF_3$ | Cl | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | $CF_3$ | Cl | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | $CF_3$ | Br | H | 0 |
| $CF_3$ | $CH_2CF_3$ | H | $CF_3$ | Br | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | $CF_3$ | Br | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | $CF_3$ | I | H | 0 |
| $CF_3$ | $CH_2CF_3$ | H | $CF_3$ | I | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | $CF_3$ | I | H | 2 |
| $CF_3$ | $CH_2CF_3$ | H | $CF_3$ | CN | H | 0 |
| $CF_3$ | $CH_2CF_3$ | H | $CF_3$ | CN | H | 1 |
| $CF_3$ | $CH_2CF_3$ | H | $CF_3$ | CN | H | 2 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_2CF_3$ | Me | H | H | H | H | 0 |
| $CF_2CF_3$ | Me | H | H | H | H | 1 |
| $CF_2CF_3$ | Me | H | H | H | H | 2 |
| $CF_2CF_3$ | Me | F | H | H | H | 0 |
| $CF_2CF_3$ | Me | F | H | H | H | 1 |
| $CF_2CF_3$ | Me | F | H | H | H | 2 |
| $CF_2CF_3$ | Me | Cl | H | H | H | 0 |
| $CF_2CF_3$ | Me | Cl | H | H | H | 1 |
| $CF_2CF_3$ | Me | Cl | H | H | H | 2 |
| $CF_2CF_3$ | Me | Br | H | H | H | 0 |
| $CF_2CF_3$ | Me | Br | H | H | H | 1 |
| $CF_2CF_3$ | Me | Br | H | H | H | 2 |
| $CF_2CF_3$ | Me | I | H | H | H | 0 |
| $CF_2CF_3$ | Me | I | H | H | H | 1 |
| $CF_2CF_3$ | Me | I | H | H | H | 2 |
| $CF_2CF_3$ | Me | Me | H | H | H | 0 |
| $CF_2CF_3$ | Me | Me | H | H | H | 1 |
| $CF_2CF_3$ | Me | Me | H | H | H | 2 |
| $CF_2CF_3$ | Me | $CF_3$ | H | H | H | 0 |
| $CF_2CF_3$ | Me | $CF_3$ | H | H | H | 1 |
| $CF_2CF_3$ | Me | $CF_3$ | H | H | H | 2 |
| $CF_2CF_3$ | Me | H | F | H | H | 0 |
| $CF_2CF_3$ | Me | H | F | H | H | 1 |
| $CF_2CF_3$ | Me | H | F | H | H | 2 |
| $CF_2CF_3$ | Me | H | Cl | H | H | 0 |
| $CF_2CF_3$ | Me | H | Cl | H | H | 1 |
| $CF_2CF_3$ | Me | H | Cl | H | H | 2 |
| $CF_2CF_3$ | Me | H | Br | H | H | 0 |
| $CF_2CF_3$ | Me | H | Br | H | H | 1 |
| $CF_2CF_3$ | Me | H | Br | H | H | 2 |
| $CF_2CF_3$ | Me | H | I | H | H | 0 |
| $CF_2CF_3$ | Me | H | I | H | H | 1 |
| $CF_2CF_3$ | Me | H | I | H | H | 2 |
| $CF_2CF_3$ | Me | H | Me | H | H | 0 |
| $CF_2CF_3$ | Me | H | Me | H | H | 1 |
| $CF_2CF_3$ | Me | H | Me | H | H | 2 |
| $CF_2CF_3$ | Me | H | $CF_3$ | H | H | 0 |
| $CF_2CF_3$ | Me | H | $CF_3$ | H | H | 1 |
| $CF_2CF_3$ | Me | H | $CF_3$ | H | H | 2 |
| $CF_2CF_3$ | Me | H | $CF_2CF_3$ | H | H | 0 |
| $CF_2CF_3$ | Me | H | $CF_2CF_3$ | H | H | 1 |
| $CF_2CF_3$ | Me | H | $CF_2CF_3$ | H | H | 2 |
| $CF_2CF_3$ | Me | H | $CF(CF_3)_2$ | H | H | 0 |
| $CF_2CF_3$ | Me | H | $CF(CF_3)_2$ | H | H | 1 |
| $CF_2CF_3$ | Me | H | $CF(CF_3)_2$ | H | H | 2 |
| $CF_2CF_3$ | Me | H | SMe | H | H | 0 |
| $CF_2CF_3$ | Me | H | SMe | H | H | 1 |
| $CF_2CF_3$ | Me | H | SMe | H | H | 2 |
| $CF_2CF_3$ | Me | H | SOMe | H | H | 0 |
| $CF_2CF_3$ | Me | H | SOMe | H | H | 1 |
| $CF_2CF_3$ | Me | H | SOMe | H | H | 2 |
| $CF_2CF_3$ | Me | H | $SO_2Me$ | H | H | 0 |
| $CF_2CF_3$ | Me | H | $SO_2Me$ | H | H | 1 |
| $CF_2CF_3$ | Me | H | $SO_2Me$ | H | H | 2 |
| $CF_2CF_3$ | Me | H | OMe | H | H | 0 |
| $CF_2CF_3$ | Me | H | OMe | H | H | 1 |
| $CF_2CF_3$ | Me | H | OMe | H | H | 2 |
| $CF_2CF_3$ | Me | H | $OCF_3$ | H | H | 0 |
| $CF_2CF_3$ | Me | H | $OCF_3$ | H | H | 1 |
| $CF_2CF_3$ | Me | H | $OCF_3$ | H | H | 2 |
| $CF_2CF_3$ | Me | H | $NO_2$ | H | H | 0 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_2CF_3$ | Me | H | $NO_2$ | H | H | 1 |
| $CF_2CF_3$ | Me | H | $NO_2$ | H | H | 2 |
| $CF_2CF_3$ | Me | H | CN | H | H | 0 |
| $CF_2CF_3$ | Me | H | CN | H | H | 1 |
| $CF_2CF_3$ | Me | H | CN | H | H | 2 |
| $CF_2CF_3$ | Me | H | H | F | H | 0 |
| $CF_2CF_3$ | Me | H | H | F | H | 1 |
| $CF_2CF_3$ | Me | H | H | F | H | 2 |
| $CF_2CF_3$ | Me | H | H | Cl | H | 0 |
| $CF_2CF_3$ | Me | H | H | Cl | H | 1 |
| $CF_2CF_3$ | Me | H | H | Cl | H | 2 |
| $CF_2CF_3$ | Me | H | H | Br | H | 0 |
| $CF_2CF_3$ | Me | H | H | Br | H | 1 |
| $CF_2CF_3$ | Me | H | H | Br | H | 2 |
| $CF_2CF_3$ | Me | H | H | I | H | 0 |
| $CF_2CF_3$ | Me | H | H | I | H | 1 |
| $CF_2CF_3$ | Me | H | H | I | H | 2 |
| $CF_2CF_3$ | Me | H | H | Me | H | 0 |
| $CF_2CF_3$ | Me | H | H | Me | H | 1 |
| $CF_2CF_3$ | Me | H | H | Me | H | 2 |
| $CF_2CF_3$ | Me | H | H | $CF_3$ | H | 0 |
| $CF_2CF_3$ | Me | H | H | $CF_3$ | H | 1 |
| $CF_2CF_3$ | Me | H | H | $CF_3$ | H | 2 |
| $CF_2CF_3$ | Me | H | H | $CF_2CF_3$ | H | 0 |
| $CF_2CF_3$ | Me | H | H | $CF_2CF_3$ | H | 1 |
| $CF_2CF_3$ | Me | H | H | $CF_2CF_3$ | H | 2 |
| $CF_2CF_3$ | Me | H | H | $CF(CF_3)_2$ | H | 0 |
| $CF_2CF_3$ | Me | H | H | $CF(CF_3)_2$ | H | 1 |
| $CF_2CF_3$ | Me | H | H | $CF(CF_3)_2$ | H | 2 |
| $CF_2CF_3$ | Me | H | H | SMe | H | 0 |
| $CF_2CF_3$ | Me | H | H | SMe | H | 1 |
| $CF_2CF_3$ | Me | H | H | SMe | H | 2 |
| $CF_2CF_3$ | Me | H | H | SOMe | H | 0 |
| $CF_2CF_3$ | Me | H | H | SOMe | H | 1 |
| $CF_2CF_3$ | Me | H | H | SOMe | H | 2 |
| $CF_2CF_3$ | Me | H | H | $SO_2Me$ | H | 0 |
| $CF_2CF_3$ | Me | H | H | $SO_2Me$ | H | 1 |
| $CF_2CF_3$ | Me | H | H | $SO_2Me$ | H | 2 |
| $CF_2CF_3$ | Me | H | H | OMe | H | 0 |
| $CF_2CF_3$ | Me | H | H | OMe | H | 1 |
| $CF_2CF_3$ | Me | H | H | OMe | H | 2 |
| $CF_2CF_3$ | Me | H | H | $OCF_3$ | H | 0 |
| $CF_2CF_3$ | Me | H | H | $OCF_3$ | H | 1 |
| $CF_2CF_3$ | Me | H | H | $OCF_3$ | H | 2 |
| $CF_2CF_3$ | Me | H | H | $NO_2$ | H | 0 |
| $CF_2CF_3$ | Me | H | H | $NO_2$ | H | 1 |
| $CF_2CF_3$ | Me | H | H | $NO_2$ | H | 2 |
| $CF_2CF_3$ | Me | H | H | CN | H | 0 |
| $CF_2CF_3$ | Me | H | H | CN | H | 1 |
| $CF_2CF_3$ | Me | H | H | CN | H | 2 |
| $CF_2CF_3$ | Me | H | H | H | F | 0 |
| $CF_2CF_3$ | Me | H | H | H | F | 1 |
| $CF_2CF_3$ | Me | H | H | H | F | 2 |
| $CF_2CF_3$ | Me | H | H | H | Cl | 0 |
| $CF_2CF_3$ | Me | H | H | H | Cl | 1 |
| $CF_2CF_3$ | Me | H | H | H | Cl | 2 |
| $CF_2CF_3$ | Me | H | H | H | Br | 0 |
| $CF_2CF_3$ | Me | H | H | H | Br | 1 |
| $CF_2CF_3$ | Me | H | H | H | Br | 2 |
| $CF_2CF_3$ | Me | H | H | H | I | 0 |
| $CF_2CF_3$ | Me | H | H | H | I | 1 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_2CF_3$ | Me | H | H | H | I | 2 |
| $CF_2CF_3$ | Me | H | H | H | Me | 0 |
| $CF_2CF_3$ | Me | H | H | H | Me | 1 |
| $CF_2CF_3$ | Me | H | H | H | Me | 2 |
| $CF_2CF_3$ | Me | H | H | H | $CF_3$ | 0 |
| $CF_2CF_3$ | Me | H | H | H | $CF_3$ | 1 |
| $CF_2CF_3$ | Me | H | H | H | $CF_3$ | 2 |
| $CF_2CF_3$ | Me | H | H | H | $CF_2CF_3$ | 0 |
| $CF_2CF_3$ | Me | H | H | H | $CF_2CF_3$ | 1 |
| $CF_2CF_3$ | Me | H | H | H | $CF_2CF_3$ | 2 |
| $CF_2CF_3$ | Me | H | H | H | $CF(CF_3)_2$ | 0 |
| $CF_2CF_3$ | Me | H | H | H | $CF(CF_3)_2$ | 1 |
| $CF_2CF_3$ | Me | H | H | H | $CF(CF_3)_2$ | 2 |
| $CF_2CF_3$ | Me | H | H | H | SMe | 0 |
| $CF_2CF_3$ | Me | H | H | H | SMe | 1 |
| $CF_2CF_3$ | Me | H | H | H | SMe | 2 |
| $CF_2CF_3$ | Me | H | H | H | SOMe | 0 |
| $CF_2CF_3$ | Me | H | H | H | SOMe | 1 |
| $CF_2CF_3$ | Me | H | H | H | SOMe | 2 |
| $CF_2CF_3$ | Me | H | H | H | $SO_2Me$ | 0 |
| $CF_2CF_3$ | Me | H | H | H | $SO_2Me$ | 1 |
| $CF_2CF_3$ | Me | H | H | H | $SO_2Me$ | 2 |
| $CF_2CF_3$ | Me | H | H | H | OMe | 0 |
| $CF_2CF_3$ | Me | H | H | H | OMe | 1 |
| $CF_2CF_3$ | Me | H | H | H | OMe | 2 |
| $CF_2CF_3$ | Me | H | H | H | $OCF_3$ | 0 |
| $CF_2CF_3$ | Me | H | H | H | $OCF_3$ | 1 |
| $CF_2CF_3$ | Me | H | H | H | $OCF_3$ | 2 |
| $CF_2CF_3$ | Me | H | H | H | $NO_2$ | 0 |
| $CF_2CF_3$ | Me | H | H | H | $NO_2$ | 1 |
| $CF_2CF_3$ | Me | H | H | H | $NO_2$ | 2 |
| $CF_2CF_3$ | Me | H | H | H | CN | 0 |
| $CF_2CF_3$ | Me | H | H | H | CN | 1 |
| $CF_2CF_3$ | Me | H | H | H | CN | 2 |
| $CF_2CF_3$ | Me | H | F | H | F | 0 |
| $CF_2CF_3$ | Me | H | F | H | F | 1 |
| $CF_2CF_3$ | Me | H | F | H | F | 2 |
| $CF_2CF_3$ | Me | H | Cl | H | Cl | 0 |
| $CF_2CF_3$ | Me | H | Cl | H | Cl | 1 |
| $CF_2CF_3$ | Me | H | Cl | H | Cl | 2 |
| $CF_2CF_3$ | Me | H | Br | H | Br | 0 |
| $CF_2CF_3$ | Me | H | Br | H | Br | 1 |
| $CF_2CF_3$ | Me | H | Br | H | Br | 2 |
| $CF_2CF_3$ | Me | H | I | H | I | 0 |
| $CF_2CF_3$ | Me | H | I | H | I | 1 |
| $CF_2CF_3$ | Me | H | I | H | I | 2 |
| $CF_2CF_3$ | Me | H | F | H | Cl | 0 |
| $CF_2CF_3$ | Me | H | F | H | Cl | 1 |
| $CF_2CF_3$ | Me | H | F | H | Cl | 2 |
| $CF_2CF_3$ | Me | H | F | H | Br | 0 |
| $CF_2CF_3$ | Me | H | F | H | Br | 1 |
| $CF_2CF_3$ | Me | H | F | H | Br | 2 |
| $CF_2CF_3$ | Me | H | F | H | I | 0 |
| $CF_2CF_3$ | Me | H | F | H | I | 1 |
| $CF_2CF_3$ | Me | H | F | H | I | 2 |
| $CF_2CF_3$ | Me | H | Cl | H | F | 0 |
| $CF_2CF_3$ | Me | H | Cl | H | F | 1 |
| $CF_2CF_3$ | Me | H | Cl | H | F | 2 |
| $CF_2CF_3$ | Me | H | Cl | H | Br | 0 |
| $CF_2CF_3$ | Me | H | Cl | H | Br | 1 |
| $CF_2CF_3$ | Me | H | Cl | H | Br | 2 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_2CF_3$ | Me | H | Cl | H | I | 0 |
| $CF_2CF_3$ | Me | H | Cl | H | I | 1 |
| $CF_2CF_3$ | Me | H | Cl | H | I | 2 |
| $CF_2CF_3$ | Me | H | Br | H | F | 0 |
| $CF_2CF_3$ | Me | H | Br | H | F | 1 |
| $CF_2CF_3$ | Me | H | Br | H | F | 2 |
| $CF_2CF_3$ | Me | H | Br | H | Cl | 0 |
| $CF_2CF_3$ | Me | H | Br | H | Cl | 1 |
| $CF_2CF_3$ | Me | H | Br | H | Cl | 2 |
| $CF_2CF_3$ | Me | H | Br | H | I | 0 |
| $CF_2CF_3$ | Me | H | Br | H | I | 1 |
| $CF_2CF_3$ | Me | H | Br | H | I | 2 |
| $CF_2CF_3$ | Me | H | I | H | F | 0 |
| $CF_2CF_3$ | Me | H | I | H | F | 1 |
| $CF_2CF_3$ | Me | H | I | H | F | 2 |
| $CF_2CF_3$ | Me | H | I | H | Cl | 0 |
| $CF_2CF_3$ | Me | H | I | H | Cl | 1 |
| $CF_2CF_3$ | Me | H | I | H | Cl | 2 |
| $CF_2CF_3$ | Me | H | I | H | Br | 0 |
| $CF_2CF_3$ | Me | H | I | H | Br | 1 |
| $CF_2CF_3$ | Me | H | I | H | Br | 2 |
| $CF_2CF_3$ | Me | H | F | H | CN | 0 |
| $CF_2CF_3$ | Me | H | F | H | CN | 1 |
| $CF_2CF_3$ | Me | H | F | H | CN | 2 |
| $CF_2CF_3$ | Me | H | Cl | H | CN | 0 |
| $CF_2CF_3$ | Me | H | Cl | H | CN | 1 |
| $CF_2CF_3$ | Me | H | Cl | H | CN | 2 |
| $CF_2CF_3$ | Me | H | Br | H | CN | 0 |
| $CF_2CF_3$ | Me | H | Br | H | CN | 1 |
| $CF_2CF_3$ | Me | H | Br | H | CN | 2 |
| $CF_2CF_3$ | Me | H | I | H | CN | 0 |
| $CF_2CF_3$ | Me | H | I | H | CN | 1 |
| $CF_2CF_3$ | Me | H | I | H | CN | 2 |
| $CF_2CF_3$ | Me | H | $CF_3$ | H | F | 0 |
| $CF_2CF_3$ | Me | H | $CF_3$ | H | F | 1 |
| $CF_2CF_3$ | Me | H | $CF_3$ | H | F | 2 |
| $CF_2CF_3$ | Me | H | $CF_3$ | H | Cl | 0 |
| $CF_2CF_3$ | Me | H | $CF_3$ | H | Cl | 1 |
| $CF_2CF_3$ | Me | H | $CF_3$ | H | Cl | 2 |
| $CF_2CF_3$ | Me | H | $CF_3$ | H | Br | 0 |
| $CF_2CF_3$ | Me | H | $CF_3$ | H | Br | 1 |
| $CF_2CF_3$ | Me | H | $CF_3$ | H | Br | 2 |
| $CF_2CF_3$ | Me | H | $CF_3$ | H | I | 0 |
| $CF_2CF_3$ | Me | H | $CF_3$ | H | I | 1 |
| $CF_2CF_3$ | Me | H | $CF_3$ | H | I | 2 |
| $CF_2CF_3$ | Me | H | $CF_3$ | H | CN | 0 |
| $CF_2CF_3$ | Me | H | $CF_3$ | H | CN | 1 |
| $CF_2CF_3$ | Me | H | $CF_3$ | H | CN | 2 |
| $CF_2CF_3$ | Me | H | F | F | H | 0 |
| $CF_2CF_3$ | Me | H | F | F | H | 1 |
| $CF_2CF_3$ | Me | H | F | F | H | 2 |
| $CF_2CF_3$ | Me | H | Cl | Cl | H | 0 |
| $CF_2CF_3$ | Me | H | Cl | Cl | H | 1 |
| $CF_2CF_3$ | Me | H | Cl | Cl | H | 2 |
| $CF_2CF_3$ | Me | H | Br | Br | H | 0 |
| $CF_2CF_3$ | Me | H | Br | Br | H | 1 |
| $CF_2CF_3$ | Me | H | Br | Br | H | 2 |
| $CF_2CF_3$ | Me | H | I | I | H | 0 |
| $CF_2CF_3$ | Me | H | I | I | H | 1 |
| $CF_2CF_3$ | Me | H | I | I | H | 2 |
| $CF_2CF_3$ | Me | H | F | Cl | H | 0 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_2CF_3$ | Me | H | F | Cl | H | 1 |
| $CF_2CF_3$ | Me | H | F | Cl | H | 2 |
| $CF_2CF_3$ | Me | H | F | Br | H | 0 |
| $CF_2CF_3$ | Me | H | F | Br | H | 1 |
| $CF_2CF_3$ | Me | H | F | Br | H | 2 |
| $CF_2CF_3$ | Me | H | F | I | H | 0 |
| $CF_2CF_3$ | Me | H | F | I | H | 1 |
| $CF_2CF_3$ | Me | H | F | I | H | 2 |
| $CF_2CF_3$ | Me | H | Cl | F | H | 0 |
| $CF_2CF_3$ | Me | H | Cl | F | H | 1 |
| $CF_2CF_3$ | Me | H | Cl | F | H | 2 |
| $CF_2CF_3$ | Me | H | Cl | Br | H | 0 |
| $CF_2CF_3$ | Me | H | Cl | Br | H | 1 |
| $CF_2CF_3$ | Me | H | Cl | Br | H | 2 |
| $CF_2CF_3$ | Me | H | Cl | I | H | 0 |
| $CF_2CF_3$ | Me | H | Cl | I | H | 1 |
| $CF_2CF_3$ | Me | H | Cl | I | H | 2 |
| $CF_2CF_3$ | Me | H | Br | F | H | 0 |
| $CF_2CF_3$ | Me | H | Br | F | H | 1 |
| $CF_2CF_3$ | Me | H | Br | F | H | 2 |
| $CF_2CF_3$ | Me | H | Br | Cl | H | 0 |
| $CF_2CF_3$ | Me | H | Br | Cl | H | 1 |
| $CF_2CF_3$ | Me | H | Br | Cl | H | 2 |
| $CF_2CF_3$ | Me | H | Br | I | H | 0 |
| $CF_2CF_3$ | Me | H | Br | I | H | 1 |
| $CF_2CF_3$ | Me | H | Br | I | H | 2 |
| $CF_2CF_3$ | Me | H | I | F | H | 0 |
| $CF_2CF_3$ | Me | H | I | F | H | 1 |
| $CF_2CF_3$ | Me | H | I | F | H | 2 |
| $CF_2CF_3$ | Me | H | I | Cl | H | 0 |
| $CF_2CF_3$ | Me | H | I | Cl | H | 1 |
| $CF_2CF_3$ | Me | H | I | Cl | H | 2 |
| $CF_2CF_3$ | Me | H | I | Br | H | 0 |
| $CF_2CF_3$ | Me | H | I | Br | H | 1 |
| $CF_2CF_3$ | Me | H | I | Br | H | 2 |
| $CF_2CF_3$ | Me | H | F | CN | H | 0 |
| $CF_2CF_3$ | Me | H | F | CN | H | 1 |
| $CF_2CF_3$ | Me | H | F | CN | H | 2 |
| $CF_2CF_3$ | Me | H | Cl | CN | H | 0 |
| $CF_2CF_3$ | Me | H | Cl | CN | H | 1 |
| $CF_2CF_3$ | Me | H | Cl | CN | H | 2 |
| $CF_2CF_3$ | Me | H | Br | CN | H | 0 |
| $CF_2CF_3$ | Me | H | Br | CN | H | 1 |
| $CF_2CF_3$ | Me | H | Br | CN | H | 2 |
| $CF_2CF_3$ | Me | H | I | CN | H | 0 |
| $CF_2CF_3$ | Me | H | I | CN | H | 1 |
| $CF_2CF_3$ | Me | H | I | CN | H | 2 |
| $CF_2CF_3$ | Me | H | $CF_3$ | F | H | 0 |
| $CF_2CF_3$ | Me | H | $CF_3$ | F | H | 1 |
| $CF_2CF_3$ | Me | H | $CF_3$ | F | H | 2 |
| $CF_2CF_3$ | Me | H | $CF_3$ | Cl | H | 0 |
| $CF_2CF_3$ | Me | H | $CF_3$ | Cl | H | 1 |
| $CF_2CF_3$ | Me | H | $CF_3$ | Cl | H | 2 |
| $CF_2CF_3$ | Me | H | $CF_3$ | Br | H | 0 |
| $CF_2CF_3$ | Me | H | $CF_3$ | Br | H | 1 |
| $CF_2CF_3$ | Me | H | $CF_3$ | Br | H | 2 |
| $CF_2CF_3$ | Me | H | $CF_3$ | I | H | 0 |
| $CF_2CF_3$ | Me | H | $CF_3$ | I | H | 1 |
| $CF_2CF_3$ | Me | H | $CF_3$ | I | H | 2 |
| $CF_2CF_3$ | Me | H | $CF_3$ | CN | H | 0 |
| $CF_2CF_3$ | Me | H | $CF_3$ | CN | H | 1 |
| $CF_2CF_3$ | Me | H | $CF_3$ | CN | H | 2 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_2CF_3$ | Et | H | H | H | H | 0 |
| $CF_2CF_3$ | Et | H | H | H | H | 1 |
| $CF_2CF_3$ | Et | H | H | H | H | 2 |
| $CF_2CF_3$ | Et | F | H | H | H | 0 |
| $CF_2CF_3$ | Et | F | H | H | H | 1 |
| $CF_2CF_3$ | Et | F | H | H | H | 2 |
| $CF_2CF_3$ | Et | Cl | H | H | H | 0 |
| $CF_2CF_3$ | Et | Cl | H | H | H | 1 |
| $CF_2CF_3$ | Et | Cl | H | H | H | 2 |
| $CF_2CF_3$ | Et | Br | H | H | H | 0 |
| $CF_2CF_3$ | Et | Br | H | H | H | 1 |
| $CF_2CF_3$ | Et | Br | H | H | H | 2 |
| $CF_2CF_3$ | Et | I | H | H | H | 0 |
| $CF_2CF_3$ | Et | I | H | H | H | 1 |
| $CF_2CF_3$ | Et | I | H | H | H | 2 |
| $CF_2CF_3$ | Et | Me | H | H | H | 0 |
| $CF_2CF_3$ | Et | Me | H | H | H | 1 |
| $CF_2CF_3$ | Et | Me | H | H | H | 2 |
| $CF_2CF_3$ | Et | $CF_3$ | H | H | H | 0 |
| $CF_2CF_3$ | Et | $CF_3$ | H | H | H | 1 |
| $CF_2CF_3$ | Et | $CF_3$ | H | H | H | 2 |
| $CF_2CF_3$ | Et | H | F | H | H | 0 |
| $CF_2CF_3$ | Et | H | F | H | H | 1 |
| $CF_2CF_3$ | Et | H | F | H | H | 2 |
| $CF_2CF_3$ | Et | H | Cl | H | H | 0 |
| $CF_2CF_3$ | Et | H | Cl | H | H | 1 |
| $CF_2CF_3$ | Et | H | Cl | H | H | 2 |
| $CF_2CF_3$ | Et | H | Br | H | H | 0 |
| $CF_2CF_3$ | Et | H | Br | H | H | 1 |
| $CF_2CF_3$ | Et | H | Br | H | H | 2 |
| $CF_2CF_3$ | Et | H | I | H | H | 0 |
| $CF_2CF_3$ | Et | H | I | H | H | 1 |
| $CF_2CF_3$ | Et | H | I | H | H | 2 |
| $CF_2CF_3$ | Et | H | Me | H | H | 0 |
| $CF_2CF_3$ | Et | H | Me | H | H | 1 |
| $CF_2CF_3$ | Et | H | Me | H | H | 2 |
| $CF_2CF_3$ | Et | H | $CF_3$ | H | H | 0 |
| $CF_2CF_3$ | Et | H | $CF_3$ | H | H | 1 |
| $CF_2CF_3$ | Et | H | $CF_3$ | H | H | 2 |
| $CF_2CF_3$ | Et | H | $CF_2CF_3$ | H | H | 0 |
| $CF_2CF_3$ | Et | H | $CF_2CF_3$ | H | H | 1 |
| $CF_2CF_3$ | Et | H | $CF_2CF_3$ | H | H | 2 |
| $CF_2CF_3$ | Et | H | $CF(CF_3)_2$ | H | H | 0 |
| $CF_2CF_3$ | Et | H | $CF(CF_3)_2$ | H | H | 1 |
| $CF_2CF_3$ | Et | H | $CF(CF_3)_2$ | H | H | 2 |
| $CF_2CF_3$ | Et | H | SMe | H | H | 0 |
| $CF_2CF_3$ | Et | H | SMe | H | H | 1 |
| $CF_2CF_3$ | Et | H | SMe | H | H | 2 |
| $CF_2CF_3$ | Et | H | SOMe | H | H | 0 |
| $CF_2CF_3$ | Et | H | SOMe | H | H | 1 |
| $CF_2CF_3$ | Et | H | SOMe | H | H | 2 |
| $CF_2CF_3$ | Et | H | $SO_2Me$ | H | H | 0 |
| $CF_2CF_3$ | Et | H | $SO_2Me$ | H | H | 1 |
| $CF_2CF_3$ | Et | H | $SO_2Me$ | H | H | 2 |
| $CF_2CF_3$ | Et | H | OMe | H | H | 0 |
| $CF_2CF_3$ | Et | H | OMe | H | H | 1 |
| $CF_2CF_3$ | Et | H | OMe | H | H | 2 |
| $CF_2CF_3$ | Et | H | $OCF_3$ | H | H | 0 |
| $CF_2CF_3$ | Et | H | $OCF_3$ | H | H | 1 |
| $CF_2CF_3$ | Et | H | $OCF_3$ | H | H | 2 |
| $CF_2CF_3$ | Et | H | $NO_2$ | H | H | 0 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_2CF_3$ | Et | H | $NO_2$ | H | H | 1 |
| $CF_2CF_3$ | Et | H | $NO_2$ | H | H | 2 |
| $CF_2CF_3$ | Et | H | CN | H | H | 0 |
| $CF_2CF_3$ | Et | H | CN | H | H | 1 |
| $CF_2CF_3$ | Et | H | CN | H | H | 2 |
| $CF_2CF_3$ | Et | H | H | F | H | 0 |
| $CF_2CF_3$ | Et | H | H | F | H | 1 |
| $CF_2CF_3$ | Et | H | H | F | H | 2 |
| $CF_2CF_3$ | Et | H | H | Cl | H | 0 |
| $CF_2CF_3$ | Et | H | H | Cl | H | 1 |
| $CF_2CF_3$ | Et | H | H | Cl | H | 2 |
| $CF_2CF_3$ | Et | H | H | Br | H | 0 |
| $CF_2CF_3$ | Et | H | H | Br | H | 1 |
| $CF_2CF_3$ | Et | H | H | Br | H | 2 |
| $CF_2CF_3$ | Et | H | H | I | H | 0 |
| $CF_2CF_3$ | Et | H | H | I | H | 1 |
| $CF_2CF_3$ | Et | H | H | I | H | 2 |
| $CF_2CF_3$ | Et | H | H | Me | H | 0 |
| $CF_2CF_3$ | Et | H | H | Me | H | 1 |
| $CF_2CF_3$ | Et | H | H | Me | H | 2 |
| $CF_2CF_3$ | Et | H | H | $CF_3$ | H | 0 |
| $CF_2CF_3$ | Et | H | H | $CF_3$ | H | 1 |
| $CF_2CF_3$ | Et | H | H | $CF_3$ | H | 2 |
| $CF_2CF_3$ | Et | H | H | $CF_2CF_3$ | H | 0 |
| $CF_2CF_3$ | Et | H | H | $CF_2CF_3$ | H | 1 |
| $CF_2CF_3$ | Et | H | H | $CF_2CF_3$ | H | 2 |
| $CF_2CF_3$ | Et | H | H | $CF(CF_3)_2$ | H | 0 |
| $CF_2CF_3$ | Et | H | H | $CF(CF_3)_2$ | H | 1 |
| $CF_2CF_3$ | Et | H | H | $CF(CF_3)_2$ | H | 2 |
| $CF_2CF_3$ | Et | H | H | SMe | H | 0 |
| $CF_2CF_3$ | Et | H | H | SMe | H | 1 |
| $CF_2CF_3$ | Et | H | H | SMe | H | 2 |
| $CF_2CF_3$ | Et | H | H | SOMe | H | 0 |
| $CF_2CF_3$ | Et | H | H | SOMe | H | 1 |
| $CF_2CF_3$ | Et | H | H | SOMe | H | 2 |
| $CF_2CF_3$ | Et | H | H | $SO_2Me$ | H | 0 |
| $CF_2CF_3$ | Et | H | H | $SO_2Me$ | H | 1 |
| $CF_2CF_3$ | Et | H | H | $SO_2Me$ | H | 2 |
| $CF_2CF_3$ | Et | H | H | OMe | H | 0 |
| $CF_2CF_3$ | Et | H | H | OMe | H | 1 |
| $CF_2CF_3$ | Et | H | H | OMe | H | 2 |
| $CF_2CF_3$ | Et | H | H | $OCF_3$ | H | 0 |
| $CF_2CF_3$ | Et | H | H | $OCF_3$ | H | 1 |
| $CF_2CF_3$ | Et | H | H | $OCF_3$ | H | 2 |
| $CF_2CF_3$ | Et | H | H | $NO_2$ | H | 0 |
| $CF_2CF_3$ | Et | H | H | $NO_2$ | H | 1 |
| $CF_2CF_3$ | Et | H | H | $NO_2$ | H | 2 |
| $CF_2CF_3$ | Et | H | H | CN | H | 0 |
| $CF_2CF_3$ | Et | H | H | CN | H | 1 |
| $CF_2CF_3$ | Et | H | H | CN | H | 2 |
| $CF_2CF_3$ | Et | H | H | H | F | 0 |
| $CF_2CF_3$ | Et | H | H | H | F | 1 |
| $CF_2CF_3$ | Et | H | H | H | F | 2 |
| $CF_2CF_3$ | Et | H | H | H | Cl | 0 |
| $CF_2CF_3$ | Et | H | H | H | Cl | 1 |
| $CF_2CF_3$ | Et | H | H | H | Cl | 2 |
| $CF_2CF_3$ | Et | H | H | H | Br | 0 |
| $CF_2CF_3$ | Et | H | H | H | Br | 1 |
| $CF_2CF_3$ | Et | H | H | H | Br | 2 |
| $CF_2CF_3$ | Et | H | H | H | I | 0 |
| $CF_2CF_3$ | Et | H | H | H | I | 1 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_2CF_3$ | Et | H | H | H | I | 2 |
| $CF_2CF_3$ | Et | H | H | H | Me | 0 |
| $CF_2CF_3$ | Et | H | H | H | Me | 1 |
| $CF_2CF_3$ | Et | H | H | H | Me | 2 |
| $CF_2CF_3$ | Et | H | H | H | $CF_3$ | 0 |
| $CF_2CF_3$ | Et | H | H | H | $CF_3$ | 1 |
| $CF_2CF_3$ | Et | H | H | H | $CF_3$ | 2 |
| $CF_2CF_3$ | Et | H | H | H | $CF_2CF_3$ | 0 |
| $CF_2CF_3$ | Et | H | H | H | $CF_2CF_3$ | 1 |
| $CF_2CF_3$ | Et | H | H | H | $CF_2CF_3$ | 2 |
| $CF_2CF_3$ | Et | H | H | H | $CF(CF_3)_2$ | 0 |
| $CF_2CF_3$ | Et | H | H | H | $CF(CF_3)_2$ | 1 |
| $CF_2CF_3$ | Et | H | H | H | $CF(CF_3)_2$ | 2 |
| $CF_2CF_3$ | Et | H | H | H | SMe | 0 |
| $CF_2CF_3$ | Et | H | H | H | SMe | 1 |
| $CF_2CF_3$ | Et | H | H | H | SMe | 2 |
| $CF_2CF_3$ | Et | H | H | H | SOMe | 0 |
| $CF_2CF_3$ | Et | H | H | H | SOMe | 1 |
| $CF_2CF_3$ | Et | H | H | H | SOMe | 2 |
| $CF_2CF_3$ | Et | H | H | H | $SO_2Me$ | 0 |
| $CF_2CF_3$ | Et | H | H | H | $SO_2Me$ | 1 |
| $CF_2CF_3$ | Et | H | H | H | $SO_2Me$ | 2 |
| $CF_2CF_3$ | Et | H | H | H | OMe | 0 |
| $CF_2CF_3$ | Et | H | H | H | OMe | 1 |
| $CF_2CF_3$ | Et | H | H | H | OMe | 2 |
| $CF_2CF_3$ | Et | H | H | H | $OCF_3$ | 0 |
| $CF_2CF_3$ | Et | H | H | H | $OCF_3$ | 1 |
| $CF_2CF_3$ | Et | H | H | H | $OCF_3$ | 2 |
| $CF_2CF_3$ | Et | H | H | H | $NO_2$ | 0 |
| $CF_2CF_3$ | Et | H | H | H | $NO_2$ | 1 |
| $CF_2CF_3$ | Et | H | H | H | $NO_2$ | 2 |
| $CF_2CF_3$ | Et | H | H | H | CN | 0 |
| $CF_2CF_3$ | Et | H | H | H | CN | 1 |
| $CF_2CF_3$ | Et | H | H | H | CN | 2 |
| $CF_2CF_3$ | Et | H | F | H | F | 0 |
| $CF_2CF_3$ | Et | H | F | H | F | 1 |
| $CF_2CF_3$ | Et | H | F | H | F | 2 |
| $CF_2CF_3$ | Et | H | Cl | H | Cl | 0 |
| $CF_2CF_3$ | Et | H | Cl | H | Cl | 1 |
| $CF_2CF_3$ | Et | H | Cl | H | Cl | 2 |
| $CF_2CF_3$ | Et | H | Br | H | Br | 0 |
| $CF_2CF_3$ | Et | H | Br | H | Br | 1 |
| $CF_2CF_3$ | Et | H | Br | H | Br | 2 |
| $CF_2CF_3$ | Et | H | I | H | I | 0 |
| $CF_2CF_3$ | Et | H | I | H | I | 1 |
| $CF_2CF_3$ | Et | H | I | H | I | 2 |
| $CF_2CF_3$ | Et | H | F | H | Cl | 0 |
| $CF_2CF_3$ | Et | H | F | H | Cl | 1 |
| $CF_2CF_3$ | Et | H | F | H | Cl | 2 |
| $CF_2CF_3$ | Et | H | F | H | Br | 0 |
| $CF_2CF_3$ | Et | H | F | H | Br | 1 |
| $CF_2CF_3$ | Et | H | F | H | Br | 2 |
| $CF_2CF_3$ | Et | H | F | H | I | 0 |
| $CF_2CF_3$ | Et | H | F | H | I | 1 |
| $CF_2CF_3$ | Et | H | F | H | I | 2 |
| $CF_2CF_3$ | Et | H | Cl | H | F | 0 |
| $CF_2CF_3$ | Et | H | Cl | H | F | 1 |
| $CF_2CF_3$ | Et | H | Cl | H | F | 2 |
| $CF_2CF_3$ | Et | H | Cl | H | Br | 0 |
| $CF_2CF_3$ | Et | H | Cl | H | Br | 1 |
| $CF_2CF_3$ | Et | H | Cl | H | Br | 2 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_2CF_3$ | Et | H | Cl | H | I | 0 |
| $CF_2CF_3$ | Et | H | Cl | H | I | 1 |
| $CF_2CF_3$ | Et | H | Cl | H | I | 2 |
| $CF_2CF_3$ | Et | H | Br | H | F | 0 |
| $CF_2CF_3$ | Et | H | Br | H | F | 1 |
| $CF_2CF_3$ | Et | H | Br | H | F | 2 |
| $CF_2CF_3$ | Et | H | Br | H | Cl | 0 |
| $CF_2CF_3$ | Et | H | Br | H | Cl | 1 |
| $CF_2CF_3$ | Et | H | Br | H | Cl | 2 |
| $CF_2CF_3$ | Et | H | Br | H | I | 0 |
| $CF_2CF_3$ | Et | H | Br | H | I | 1 |
| $CF_2CF_3$ | Et | H | Br | H | I | 2 |
| $CF_2CF_3$ | Et | H | I | H | F | 0 |
| $CF_2CF_3$ | Et | H | I | H | F | 1 |
| $CF_2CF_3$ | Et | H | I | H | F | 2 |
| $CF_2CF_3$ | Et | H | I | H | Cl | 0 |
| $CF_2CF_3$ | Et | H | I | H | Cl | 1 |
| $CF_2CF_3$ | Et | H | I | H | Cl | 2 |
| $CF_2CF_3$ | Et | H | I | H | Br | 0 |
| $CF_2CF_3$ | Et | H | I | H | Br | 1 |
| $CF_2CF_3$ | Et | H | I | H | Br | 2 |
| $CF_2CF_3$ | Et | H | F | H | CN | 0 |
| $CF_2CF_3$ | Et | H | F | H | CN | 1 |
| $CF_2CF_3$ | Et | H | F | H | CN | 2 |
| $CF_2CF_3$ | Et | H | Cl | H | CN | 0 |
| $CF_2CF_3$ | Et | H | Cl | H | CN | 1 |
| $CF_2CF_3$ | Et | H | Cl | H | CN | 2 |
| $CF_2CF_3$ | Et | H | Br | H | CN | 0 |
| $CF_2CF_3$ | Et | H | Br | H | CN | 1 |
| $CF_2CF_3$ | Et | H | Br | H | CN | 2 |
| $CF_2CF_3$ | Et | H | I | H | CN | 0 |
| $CF_2CF_3$ | Et | H | I | H | CN | 1 |
| $CF_2CF_3$ | Et | H | I | H | CN | 2 |
| $CF_2CF_3$ | Et | H | $CF_3$ | H | F | 0 |
| $CF_2CF_3$ | Et | H | $CF_3$ | H | F | 1 |
| $CF_2CF_3$ | Et | H | $CF_3$ | H | F | 2 |
| $CF_2CF_3$ | Et | H | $CF_3$ | H | Cl | 0 |
| $CF_2CF_3$ | Et | H | $CF_3$ | H | Cl | 1 |
| $CF_2CF_3$ | Et | H | $CF_3$ | H | Cl | 2 |
| $CF_2CF_3$ | Et | H | $CF_3$ | H | Br | 0 |
| $CF_2CF_3$ | Et | H | $CF_3$ | H | Br | 1 |
| $CF_2CF_3$ | Et | H | $CF_3$ | H | Br | 2 |
| $CF_2CF_3$ | Et | H | $CF_3$ | H | I | 0 |
| $CF_2CF_3$ | Et | H | $CF_3$ | H | I | 1 |
| $CF_2CF_3$ | Et | H | $CF_3$ | H | I | 2 |
| $CF_2CF_3$ | Et | H | $CF_3$ | H | CN | 0 |
| $CF_2CF_3$ | Et | H | $CF_3$ | H | CN | 1 |
| $CF_2CF_3$ | Et | H | $CF_3$ | H | CN | 2 |
| $CF_2CF_3$ | Et | H | F | F | H | 0 |
| $CF_2CF_3$ | Et | H | F | F | H | 1 |
| $CF_2CF_3$ | Et | H | F | F | H | 2 |
| $CF_2CF_3$ | Et | H | Cl | Cl | H | 0 |
| $CF_2CF_3$ | Et | H | Cl | Cl | H | 1 |
| $CF_2CF_3$ | Et | H | Cl | Cl | H | 2 |
| $CF_2CF_3$ | Et | H | Br | Br | H | 0 |
| $CF_2CF_3$ | Et | H | Br | Br | H | 1 |
| $CF_2CF_3$ | Et | H | Br | Br | H | 2 |
| $CF_2CF_3$ | Et | H | I | I | H | 0 |
| $CF_2CF_3$ | Et | H | I | I | H | 1 |
| $CF_2CF_3$ | Et | H | I | I | H | 2 |
| $CF_2CF_3$ | Et | H | F | Cl | H | 0 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_2CF_3$ | Et | H | F | Cl | H | 1 |
| $CF_2CF_3$ | Et | H | F | Cl | H | 2 |
| $CF_2CF_3$ | Et | H | F | Br | H | 0 |
| $CF_2CF_3$ | Et | H | F | Br | H | 1 |
| $CF_2CF_3$ | Et | H | F | Br | H | 2 |
| $CF_2CF_3$ | Et | H | F | I | H | 0 |
| $CF_2CF_3$ | Et | H | F | I | H | 1 |
| $CF_2CF_3$ | Et | H | F | I | H | 2 |
| $CF_2CF_3$ | Et | H | Cl | F | H | 0 |
| $CF_2CF_3$ | Et | H | Cl | F | H | 1 |
| $CF_2CF_3$ | Et | H | Cl | F | H | 2 |
| $CF_2CF_3$ | Et | H | Cl | Br | H | 0 |
| $CF_2CF_3$ | Et | H | Cl | Br | H | 1 |
| $CF_2CF_3$ | Et | H | Cl | Br | H | 2 |
| $CF_2CF_3$ | Et | H | Cl | I | H | 0 |
| $CF_2CF_3$ | Et | H | Cl | I | H | 1 |
| $CF_2CF_3$ | Et | H | Cl | I | H | 2 |
| $CF_2CF_3$ | Et | H | Br | F | H | 0 |
| $CF_2CF_3$ | Et | H | Br | F | H | 1 |
| $CF_2CF_3$ | Et | H | Br | F | H | 2 |
| $CF_2CF_3$ | Et | H | Br | Cl | H | 0 |
| $CF_2CF_3$ | Et | H | Br | Cl | H | 1 |
| $CF_2CF_3$ | Et | H | Br | Cl | H | 2 |
| $CF_2CF_3$ | Et | H | Br | I | H | 0 |
| $CF_2CF_3$ | Et | H | Br | I | H | 1 |
| $CF_2CF_3$ | Et | H | Br | I | H | 2 |
| $CF_2CF_3$ | Et | H | I | F | H | 0 |
| $CF_2CF_3$ | Et | H | I | F | H | 1 |
| $CF_2CF_3$ | Et | H | I | F | H | 2 |
| $CF_2CF_3$ | Et | H | I | Cl | H | 0 |
| $CF_2CF_3$ | Et | H | I | Cl | H | 1 |
| $CF_2CF_3$ | Et | H | I | Cl | H | 2 |
| $CF_2CF_3$ | Et | H | I | Br | H | 0 |
| $CF_2CF_3$ | Et | H | I | Br | H | 1 |
| $CF_2CF_3$ | Et | H | I | Br | H | 2 |
| $CF_2CF_3$ | Et | H | F | CN | H | 0 |
| $CF_2CF_3$ | Et | H | F | CN | H | 1 |
| $CF_2CF_3$ | Et | H | F | CN | H | 2 |
| $CF_2CF_3$ | Et | H | Cl | CN | H | 0 |
| $CF_2CF_3$ | Et | H | Cl | CN | H | 1 |
| $CF_2CF_3$ | Et | H | Cl | CN | H | 2 |
| $CF_2CF_3$ | Et | H | Br | CN | H | 0 |
| $CF_2CF_3$ | Et | H | Br | CN | H | 1 |
| $CF_2CF_3$ | Et | H | Br | CN | H | 2 |
| $CF_2CF_3$ | Et | H | I | CN | H | 0 |
| $CF_2CF_3$ | Et | H | I | CN | H | 1 |
| $CF_2CF_3$ | Et | H | I | CN | H | 2 |
| $CF_2CF_3$ | Et | H | $CF_3$ | F | H | 0 |
| $CF_2CF_3$ | Et | H | $CF_3$ | F | H | 1 |
| $CF_2CF_3$ | Et | H | $CF_3$ | F | H | 2 |
| $CF_2CF_3$ | Et | H | $CF_3$ | Cl | H | 0 |
| $CF_2CF_3$ | Et | H | $CF_3$ | Cl | H | 1 |
| $CF_2CF_3$ | Et | H | $CF_3$ | Cl | H | 2 |
| $CF_2CF_3$ | Et | H | $CF_3$ | Br | H | 0 |
| $CF_2CF_3$ | Et | H | $CF_3$ | Br | H | 1 |
| $CF_2CF_3$ | Et | H | $CF_3$ | Br | H | 2 |
| $CF_2CF_3$ | Et | H | $CF_3$ | I | H | 0 |
| $CF_2CF_3$ | Et | H | $CF_3$ | I | H | 1 |
| $CF_2CF_3$ | Et | H | $CF_3$ | I | H | 2 |
| $CF_2CF_3$ | Et | H | $CF_3$ | CN | H | 0 |
| $CF_2CF_3$ | Et | H | $CF_3$ | CN | H | 1 |
| $CF_2CF_3$ | Et | H | $CF_3$ | CN | H | 2 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_2CF_3$ | $^n$Pr | H | H | H | H | 0 |
| $CF_2CF_3$ | $^n$Pr | H | H | H | H | 1 |
| $CF_2CF_3$ | $^n$Pr | H | H | H | H | 2 |
| $CF_2CF_3$ | $^n$Pr | F | H | H | H | 0 |
| $CF_2CF_3$ | $^n$Pr | F | H | H | H | 1 |
| $CF_2CF_3$ | $^n$Pr | F | H | H | H | 2 |
| $CF_2CF_3$ | $^n$Pr | Cl | H | H | H | 0 |
| $CF_2CF_3$ | $^n$Pr | Cl | H | H | H | 1 |
| $CF_2CF_3$ | $^n$Pr | Cl | H | H | H | 2 |
| $CF_2CF_3$ | $^n$Pr | Br | H | H | H | 0 |
| $CF_2CF_3$ | $^n$Pr | Br | H | H | H | 1 |
| $CF_2CF_3$ | $^n$Pr | Br | H | H | H | 2 |
| $CF_2CF_3$ | $^n$Pr | I | H | H | H | 0 |
| $CF_2CF_3$ | $^n$Pr | I | H | H | H | 1 |
| $CF_2CF_3$ | $^n$Pr | I | H | H | H | 2 |
| $CF_2CF_3$ | $^n$Pr | Me | H | H | H | 0 |
| $CF_2CF_3$ | $^n$Pr | Me | H | H | H | 1 |
| $CF_2CF_3$ | $^n$Pr | Me | H | H | H | 2 |
| $CF_2CF_3$ | $^n$Pr | $CF_3$ | H | H | H | 0 |
| $CF_2CF_3$ | $^n$Pr | $CF_3$ | H | H | H | 1 |
| $CF_2CF_3$ | $^n$Pr | $CF_3$ | H | H | H | 2 |
| $CF_2CF_3$ | $^n$Pr | H | F | H | H | 0 |
| $CF_2CF_3$ | $^n$Pr | H | F | H | H | 1 |
| $CF_2CF_3$ | $^n$Pr | H | F | H | H | 2 |
| $CF_2CF_3$ | $^n$Pr | H | Cl | H | H | 0 |
| $CF_2CF_3$ | $^n$Pr | H | Cl | H | H | 1 |
| $CF_2CF_3$ | $^n$Pr | H | Cl | H | H | 2 |
| $CF_2CF_3$ | $^n$Pr | H | Br | H | H | 0 |
| $CF_2CF_3$ | $^n$Pr | H | Br | H | H | 1 |
| $CF_2CF_3$ | $^n$Pr | H | Br | H | H | 2 |
| $CF_2CF_3$ | $^n$Pr | H | I | H | H | 0 |
| $CF_2CF_3$ | $^n$Pr | H | I | H | H | 1 |
| $CF_2CF_3$ | $^n$Pr | H | I | H | H | 2 |
| $CF_2CF_3$ | $^n$Pr | H | Me | H | H | 0 |
| $CF_2CF_3$ | $^n$Pr | H | Me | H | H | 1 |
| $CF_2CF_3$ | $^n$Pr | H | Me | H | H | 2 |
| $CF_2CF_3$ | $^n$Pr | H | $CF_3$ | H | H | 0 |
| $CF_2CF_3$ | $^n$Pr | H | $CF_3$ | H | H | 1 |
| $CF_2CF_3$ | $^n$Pr | H | $CF_3$ | H | H | 2 |
| $CF_2CF_3$ | $^n$Pr | H | $CF_2CF_3$ | H | H | 0 |
| $CF_2CF_3$ | $^n$Pr | H | $CF_2CF_3$ | H | H | 1 |
| $CF_2CF_3$ | $^n$Pr | H | $CF_2CF_3$ | H | H | 2 |
| $CF_2CF_3$ | $^n$Pr | H | $CF(CF_3)_2$ | H | H | 0 |
| $CF_2CF_3$ | $^n$Pr | H | $CF(CF_3)_2$ | H | H | 1 |
| $CF_2CF_3$ | $^n$Pr | H | $CF(CF_3)_2$ | H | H | 2 |
| $CF_2CF_3$ | $^n$Pr | H | SMe | H | H | 0 |
| $CF_2CF_3$ | $^n$Pr | H | SMe | H | H | 1 |
| $CF_2CF_3$ | $^n$Pr | H | SMe | H | H | 2 |
| $CF_2CF_3$ | $^n$Pr | H | SOMe | H | H | 0 |
| $CF_2CF_3$ | $^n$Pr | H | SOMe | H | H | 1 |
| $CF_2CF_3$ | $^n$Pr | H | SOMe | H | H | 2 |
| $CF_2CF_3$ | $^n$Pr | H | $SO_2Me$ | H | H | 0 |
| $CF_2CF_3$ | $^n$Pr | H | $SO_2Me$ | H | H | 1 |
| $CF_2CF_3$ | $^n$Pr | H | $SO_2Me$ | H | H | 2 |
| $CF_2CF_3$ | $^n$Pr | H | OMe | H | H | 0 |
| $CF_2CF_3$ | $^n$Pr | H | OMe | H | H | 1 |
| $CF_2CF_3$ | $^n$Pr | H | OMe | H | H | 2 |
| $CF_2CF_3$ | $^n$Pr | H | $OCF_3$ | H | H | 0 |
| $CF_2CF_3$ | $^n$Pr | H | $OCF_3$ | H | H | 1 |
| $CF_2CF_3$ | $^n$Pr | H | $OCF_3$ | H | H | 2 |
| $CF_2CF_3$ | $^n$Pr | H | $NO_2$ | H | H | 0 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_2CF_3$ | $^nPr$ | H | $NO_2$ | H | H | 1 |
| $CF_2CF_3$ | $^nPr$ | H | $NO_2$ | H | H | 2 |
| $CF_2CF_3$ | $^nPr$ | H | CN | H | H | 0 |
| $CF_2CF_3$ | $^nPr$ | H | CN | H | H | 1 |
| $CF_2CF_3$ | $^nPr$ | H | CN | H | H | 2 |
| $CF_2CF_3$ | $^nPr$ | H | H | F | H | 0 |
| $CF_2CF_3$ | $^nPr$ | H | H | F | H | 1 |
| $CF_2CF_3$ | $^nPr$ | H | H | F | H | 2 |
| $CF_2CF_3$ | $^nPr$ | H | H | Cl | H | 0 |
| $CF_2CF_3$ | $^nPr$ | H | H | Cl | H | 1 |
| $CF_2CF_3$ | $^nPr$ | H | H | Cl | H | 2 |
| $CF_2CF_3$ | $^nPr$ | H | H | Br | H | 0 |
| $CF_2CF_3$ | $^nPr$ | H | H | Br | H | 1 |
| $CF_2CF_3$ | $^nPr$ | H | H | Br | H | 2 |
| $CF_2CF_3$ | $^nPr$ | H | H | I | H | 0 |
| $CF_2CF_3$ | $^nPr$ | H | H | I | H | 1 |
| $CF_2CF_3$ | $^nPr$ | H | H | I | H | 2 |
| $CF_2CF_3$ | $^nPr$ | H | H | Me | H | 0 |
| $CF_2CF_3$ | $^nPr$ | H | H | Me | H | 1 |
| $CF_2CF_3$ | $^nPr$ | H | H | Me | H | 2 |
| $CF_2CF_3$ | $^nPr$ | H | H | $CF_3$ | H | 0 |
| $CF_2CF_3$ | $^nPr$ | H | H | $CF_3$ | H | 1 |
| $CF_2CF_3$ | $^nPr$ | H | H | $CF_3$ | H | 2 |
| $CF_2CF_3$ | $^nPr$ | H | H | $CF_2CF_3$ | H | 0 |
| $CF_2CF_3$ | $^nPr$ | H | H | $CF_2CF_3$ | H | 1 |
| $CF_2CF_3$ | $^nPr$ | H | H | $CF_2CF_3$ | H | 2 |
| $CF_2CF_3$ | $^nPr$ | H | H | $CF(CF_3)_2$ | H | 0 |
| $CF_2CF_3$ | $^nPr$ | H | H | $CF(CF_3)_2$ | H | 1 |
| $CF_2CF_3$ | $^nPr$ | H | H | $CF(CF_3)_2$ | H | 2 |
| $CF_2CF_3$ | $^nPr$ | H | H | SMe | H | 0 |
| $CF_2CF_3$ | $^nPr$ | H | H | SMe | H | 1 |
| $CF_2CF_3$ | $^nPr$ | H | H | SMe | H | 2 |
| $CF_2CF_3$ | $^nPr$ | H | H | SOMe | H | 0 |
| $CF_2CF_3$ | $^nPr$ | H | H | SOMe | H | 1 |
| $CF_2CF_3$ | $^nPr$ | H | H | SOMe | H | 2 |
| $CF_2CF_3$ | $^nPr$ | H | H | $SO_2Me$ | H | 0 |
| $CF_2CF_3$ | $^nPr$ | H | H | $SO_2Me$ | H | 1 |
| $CF_2CF_3$ | $^nPr$ | H | H | $SO_2Me$ | H | 2 |
| $CF_2CF_3$ | $^nPr$ | H | H | OMe | H | 0 |
| $CF_2CF_3$ | $^nPr$ | H | H | OMe | H | 1 |
| $CF_2CF_3$ | $^nPr$ | H | H | OMe | H | 2 |
| $CF_2CF_3$ | $^nPr$ | H | H | $OCF_3$ | H | 0 |
| $CF_2CF_3$ | $^nPr$ | H | H | $OCF_3$ | H | 1 |
| $CF_2CF_3$ | $^nPr$ | H | H | $OCF_3$ | H | 2 |
| $CF_2CF_3$ | $^nPr$ | H | H | $NO_2$ | H | 0 |
| $CF_2CF_3$ | $^nPr$ | H | H | $NO_2$ | H | 1 |
| $CF_2CF_3$ | $^nPr$ | H | H | $NO_2$ | H | 2 |
| $CF_2CF_3$ | $^nPr$ | H | H | CN | H | 0 |
| $CF_2CF_3$ | $^nPr$ | H | H | CN | H | 1 |
| $CF_2CF_3$ | $^nPr$ | H | H | CN | H | 2 |
| $CF_2CF_3$ | $^nPr$ | H | H | H | F | 0 |
| $CF_2CF_3$ | $^nPr$ | H | H | H | F | 1 |
| $CF_2CF_3$ | $^nPr$ | H | H | H | F | 2 |
| $CF_2CF_3$ | $^nPr$ | H | H | H | Cl | 0 |
| $CF_2CF_3$ | $^nPr$ | H | H | H | Cl | 1 |
| $CF_2CF_3$ | $^nPr$ | H | H | H | Cl | 2 |
| $CF_2CF_3$ | $^nPr$ | H | H | H | Br | 0 |
| $CF_2CF_3$ | $^nPr$ | H | H | H | Br | 1 |
| $CF_2CF_3$ | $^nPr$ | H | H | H | Br | 2 |
| $CF_2CF_3$ | $^nPr$ | H | H | H | I | 0 |
| $CF_2CF_3$ | $^nPr$ | H | H | H | I | 1 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_2CF_3$ | $^nPr$ | H | H | H | I | 2 |
| $CF_2CF_3$ | $^nPr$ | H | H | H | Me | 0 |
| $CF_2CF_3$ | $^nPr$ | H | H | H | Me | 1 |
| $CF_2CF_3$ | $^nPr$ | H | H | H | Me | 2 |
| $CF_2CF_3$ | $^nPr$ | H | H | H | $CF_3$ | 0 |
| $CF_2CF_3$ | $^nPr$ | H | H | H | $CF_3$ | 1 |
| $CF_2CF_3$ | $^nPr$ | H | H | H | $CF_3$ | 2 |
| $CF_2CF_3$ | $^nPr$ | H | H | H | $CF_2CF_3$ | 0 |
| $CF_2CF_3$ | $^nPr$ | H | H | H | $CF_2CF_3$ | 1 |
| $CF_2CF_3$ | $^nPr$ | H | H | H | $CF_2CF_3$ | 2 |
| $CF_2CF_3$ | $^nPr$ | H | H | H | $CF(CF_3)_2$ | 0 |
| $CF_2CF_3$ | $^nPr$ | H | H | H | $CF(CF_3)_2$ | 1 |
| $CF_2CF_3$ | $^nPr$ | H | H | H | $CF(CF_3)_2$ | 2 |
| $CF_2CF_3$ | $^nPr$ | H | H | H | SMe | 0 |
| $CF_2CF_3$ | $^nPr$ | H | H | H | SMe | 1 |
| $CF_2CF_3$ | $^nPr$ | H | H | H | SMe | 2 |
| $CF_2CF_3$ | $^nPr$ | H | H | H | SOMe | 0 |
| $CF_2CF_3$ | $^nPr$ | H | H | H | SOMe | 1 |
| $CF_2CF_3$ | $^nPr$ | H | H | H | SOMe | 2 |
| $CF_2CF_3$ | $^nPr$ | H | H | H | $SO_2Me$ | 0 |
| $CF_2CF_3$ | $^nPr$ | H | H | H | $SO_2Me$ | 1 |
| $CF_2CF_3$ | $^nPr$ | H | H | H | $SO_2Me$ | 2 |
| $CF_2CF_3$ | $^nPr$ | H | H | H | OMe | 0 |
| $CF_2CF_3$ | $^nPr$ | H | H | H | OMe | 1 |
| $CF_2CF_3$ | $^nPr$ | H | H | H | OMe | 2 |
| $CF_2CF_3$ | $^nPr$ | H | H | H | $OCF_3$ | 0 |
| $CF_2CF_3$ | $^nPr$ | H | H | H | $OCF_3$ | 1 |
| $CF_2CF_3$ | $^nPr$ | H | H | H | $OCF_3$ | 2 |
| $CF_2CF_3$ | $^nPr$ | H | H | H | $NO_2$ | 0 |
| $CF_2CF_3$ | $^nPr$ | H | H | H | $NO_2$ | 1 |
| $CF_2CF_3$ | $^nPr$ | H | H | H | $NO_2$ | 2 |
| $CF_2CF_3$ | $^nPr$ | H | H | H | CN | 0 |
| $CF_2CF_3$ | $^nPr$ | H | H | H | CN | 1 |
| $CF_2CF_3$ | $^nPr$ | H | H | H | CN | 2 |
| $CF_2CF_3$ | $^nPr$ | H | F | H | F | 0 |
| $CF_2CF_3$ | $^nPr$ | H | F | H | F | 1 |
| $CF_2CF_3$ | $^nPr$ | H | F | H | F | 2 |
| $CF_2CF_3$ | $^nPr$ | H | Cl | H | Cl | 0 |
| $CF_2CF_3$ | $^nPr$ | H | Cl | H | Cl | 1 |
| $CF_2CF_3$ | $^nPr$ | H | Cl | H | Cl | 2 |
| $CF_2CF_3$ | $^nPr$ | H | Br | H | Br | 0 |
| $CF_2CF_3$ | $^nPr$ | H | Br | H | Br | 1 |
| $CF_2CF_3$ | $^nPr$ | H | Br | H | Br | 2 |
| $CF_2CF_3$ | $^nPr$ | H | I | H | I | 0 |
| $CF_2CF_3$ | $^nPr$ | H | I | H | I | 1 |
| $CF_2CF_3$ | $^nPr$ | H | I | H | I | 2 |
| $CF_2CF_3$ | $^nPr$ | H | F | H | Cl | 0 |
| $CF_2CF_3$ | $^nPr$ | H | F | H | Cl | 1 |
| $CF_2CF_3$ | $^nPr$ | H | F | H | Cl | 2 |
| $CF_2CF_3$ | $^nPr$ | H | F | H | Br | 0 |
| $CF_2CF_3$ | $^nPr$ | H | F | H | Br | 1 |
| $CF_2CF_3$ | $^nPr$ | H | F | H | Br | 2 |
| $CF_2CF_3$ | $^nPr$ | H | F | H | I | 0 |
| $CF_2CF_3$ | $^nPr$ | H | F | H | I | 1 |
| $CF_2CF_3$ | $^nPr$ | H | F | H | I | 2 |
| $CF_2CF_3$ | $^nPr$ | H | Cl | H | F | 0 |
| $CF_2CF_3$ | $^nPr$ | H | Cl | H | F | 1 |
| $CF_2CF_3$ | $^nPr$ | H | Cl | H | F | 2 |
| $CF_2CF_3$ | $^nPr$ | H | Cl | H | Br | 0 |
| $CF_2CF_3$ | $^nPr$ | H | Cl | H | Br | 1 |
| $CF_2CF_3$ | $^nPr$ | H | Cl | H | Br | 2 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_2CF_3$ | $^nPr$ | H | Cl | H | I | 0 |
| $CF_2CF_3$ | $^nPr$ | H | Cl | H | I | 1 |
| $CF_2CF_3$ | $^nPr$ | H | Cl | H | I | 2 |
| $CF_2CF_3$ | $^nPr$ | H | Br | H | F | 0 |
| $CF_2CF_3$ | $^nPr$ | H | Br | H | F | 1 |
| $CF_2CF_3$ | $^nPr$ | H | Br | H | F | 2 |
| $CF_2CF_3$ | $^nPr$ | H | Br | H | Cl | 0 |
| $CF_2CF_3$ | $^nPr$ | H | Br | H | Cl | 1 |
| $CF_2CF_3$ | $^nPr$ | H | Br | H | Cl | 2 |
| $CF_2CF_3$ | $^nPr$ | H | Br | H | I | 0 |
| $CF_2CF_3$ | $^nPr$ | H | Br | H | I | 1 |
| $CF_2CF_3$ | $^nPr$ | H | Br | H | I | 2 |
| $CF_2CF_3$ | $^nPr$ | H | I | H | F | 0 |
| $CF_2CF_3$ | $^nPr$ | H | I | H | F | 1 |
| $CF_2CF_3$ | $^nPr$ | H | I | H | F | 2 |
| $CF_2CF_3$ | $^nPr$ | H | I | H | Cl | 0 |
| $CF_2CF_3$ | $^nPr$ | H | I | H | Cl | 1 |
| $CF_2CF_3$ | $^nPr$ | H | I | H | Cl | 2 |
| $CF_2CF_3$ | $^nPr$ | H | I | H | Br | 0 |
| $CF_2CF_3$ | $^nPr$ | H | I | H | Br | 1 |
| $CF_2CF_3$ | $^nPr$ | H | I | H | Br | 2 |
| $CF_2CF_3$ | $^nPr$ | H | F | H | CN | 0 |
| $CF_2CF_3$ | $^nPr$ | H | F | H | CN | 1 |
| $CF_2CF_3$ | $^nPr$ | H | F | H | CN | 2 |
| $CF_2CF_3$ | $^nPr$ | H | Cl | H | CN | 0 |
| $CF_2CF_3$ | $^nPr$ | H | Cl | H | CN | 1 |
| $CF_2CF_3$ | $^nPr$ | H | Cl | H | CN | 2 |
| $CF_2CF_3$ | $^nPr$ | H | Br | H | CN | 0 |
| $CF_2CF_3$ | $^nPr$ | H | Br | H | CN | 1 |
| $CF_2CF_3$ | $^nPr$ | H | Br | H | CN | 2 |
| $CF_2CF_3$ | $^nPr$ | H | I | H | CN | 0 |
| $CF_2CF_3$ | $^nPr$ | H | I | H | CN | 1 |
| $CF_2CF_3$ | $^nPr$ | H | I | H | CN | 2 |
| $CF_2CF_3$ | $^nPr$ | H | $CF_3$ | H | F | 0 |
| $CF_2CF_3$ | $^nPr$ | H | $CF_3$ | H | F | 1 |
| $CF_2CF_3$ | $^nPr$ | H | $CF_3$ | H | F | 2 |
| $CF_2CF_3$ | $^nPr$ | H | $CF_3$ | H | Cl | 0 |
| $CF_2CF_3$ | $^nPr$ | H | $CF_3$ | H | Cl | 1 |
| $CF_2CF_3$ | $^nPr$ | H | $CF_3$ | H | Cl | 2 |
| $CF_2CF_3$ | $^nPr$ | H | $CF_3$ | H | Br | 0 |
| $CF_2CF_3$ | $^nPr$ | H | $CF_3$ | H | Br | 1 |
| $CF_2CF_3$ | $^nPr$ | H | $CF_3$ | H | Br | 2 |
| $CF_2CF_3$ | $^nPr$ | H | $CF_3$ | H | I | 0 |
| $CF_2CF_3$ | $^nPr$ | H | $CF_3$ | H | I | 1 |
| $CF_2CF_3$ | $^nPr$ | H | $CF_3$ | H | I | 2 |
| $CF_2CF_3$ | $^nPr$ | H | $CF_3$ | H | CN | 0 |
| $CF_2CF_3$ | $^nPr$ | H | $CF_3$ | H | CN | 1 |
| $CF_2CF_3$ | $^nPr$ | H | $CF_3$ | H | CN | 2 |
| $CF_2CF_3$ | $^nPr$ | H | F | F | H | 0 |
| $CF_2CF_3$ | $^nPr$ | H | F | F | H | 1 |
| $CF_2CF_3$ | $^nPr$ | H | F | F | H | 2 |
| $CF_2CF_3$ | $^nPr$ | H | Cl | Cl | H | 0 |
| $CF_2CF_3$ | $^nPr$ | H | Cl | Cl | H | 1 |
| $CF_2CF_3$ | $^nPr$ | H | Cl | Cl | H | 2 |
| $CF_2CF_3$ | $^nPr$ | H | Br | Br | H | 0 |
| $CF_2CF_3$ | $^nPr$ | H | Br | Br | H | 1 |
| $CF_2CF_3$ | $^nPr$ | H | Br | Br | H | 2 |
| $CF_2CF_3$ | $^nPr$ | H | I | I | H | 0 |
| $CF_2CF_3$ | $^nPr$ | H | I | I | H | 1 |
| $CF_2CF_3$ | $^nPr$ | H | I | I | H | 2 |
| $CF_2CF_3$ | $^nPr$ | H | F | Cl | H | 0 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_2CF_3$ | $^nPr$ | H | F | Cl | H | 1 |
| $CF_2CF_3$ | $^nPr$ | H | F | Cl | H | 2 |
| $CF_2CF_3$ | $^nPr$ | H | F | Br | H | 0 |
| $CF_2CF_3$ | $^nPr$ | H | F | Br | H | 1 |
| $CF_2CF_3$ | $^nPr$ | H | F | Br | H | 2 |
| $CF_2CF_3$ | $^nPr$ | H | F | I | H | 0 |
| $CF_2CF_3$ | $^nPr$ | H | F | I | H | 1 |
| $CF_2CF_3$ | $^nPr$ | H | F | I | H | 2 |
| $CF_2CF_3$ | $^nPr$ | H | Cl | F | H | 0 |
| $CF_2CF_3$ | $^nPr$ | H | Cl | F | H | 1 |
| $CF_2CF_3$ | $^nPr$ | H | Cl | F | H | 2 |
| $CF_2CF_3$ | $^nPr$ | H | Cl | Br | H | 0 |
| $CF_2CF_3$ | $^nPr$ | H | Cl | Br | H | 1 |
| $CF_2CF_3$ | $^nPr$ | H | Cl | Br | H | 2 |
| $CF_2CF_3$ | $^nPr$ | H | Cl | I | H | 0 |
| $CF_2CF_3$ | $^nPr$ | H | Cl | I | H | 1 |
| $CF_2CF_3$ | $^nPr$ | H | Cl | I | H | 2 |
| $CF_2CF_3$ | $^nPr$ | H | Br | F | H | 0 |
| $CF_2CF_3$ | $^nPr$ | H | Br | F | H | 1 |
| $CF_2CF_3$ | $^nPr$ | H | Br | F | H | 2 |
| $CF_2CF_3$ | $^nPr$ | H | Br | Cl | H | 0 |
| $CF_2CF_3$ | $^nPr$ | H | Br | Cl | H | 1 |
| $CF_2CF_3$ | $^nPr$ | H | Br | Cl | H | 2 |
| $CF_2CF_3$ | $^nPr$ | H | Br | I | H | 0 |
| $CF_2CF_3$ | $^nPr$ | H | Br | I | H | 1 |
| $CF_2CF_3$ | $^nPr$ | H | Br | I | H | 2 |
| $CF_2CF_3$ | $^nPr$ | H | I | F | H | 0 |
| $CF_2CF_3$ | $^nPr$ | H | I | F | H | 1 |
| $CF_2CF_3$ | $^nPr$ | H | I | F | H | 2 |
| $CF_2CF_3$ | $^nPr$ | H | I | Cl | H | 0 |
| $CF_2CF_3$ | $^nPr$ | H | I | Cl | H | 1 |
| $CF_2CF_3$ | $^nPr$ | H | I | Cl | H | 2 |
| $CF_2CF_3$ | $^nPr$ | H | I | Br | H | 0 |
| $CF_2CF_3$ | $^nPr$ | H | I | Br | H | 1 |
| $CF_2CF_3$ | $^nPr$ | H | I | Br | H | 2 |
| $CF_2CF_3$ | $^nPr$ | H | F | CN | H | 0 |
| $CF_2CF_3$ | $^nPr$ | H | F | CN | H | 1 |
| $CF_2CF_3$ | $^nPr$ | H | F | CN | H | 2 |
| $CF_2CF_3$ | $^nPr$ | H | Cl | CN | H | 0 |
| $CF_2CF_3$ | $^nPr$ | H | Cl | CN | H | 1 |
| $CF_2CF_3$ | $^nPr$ | H | Cl | CN | H | 2 |
| $CF_2CF_3$ | $^nPr$ | H | Br | CN | H | 0 |
| $CF_2CF_3$ | $^nPr$ | H | Br | CN | H | 1 |
| $CF_2CF_3$ | $^nPr$ | H | Br | CN | H | 2 |
| $CF_2CF_3$ | $^nPr$ | H | I | CN | H | 0 |
| $CF_2CF_3$ | $^nPr$ | H | I | CN | H | 1 |
| $CF_2CF_3$ | $^nPr$ | H | I | CN | H | 2 |
| $CF_2CF_3$ | $^nPr$ | H | $CF_3$ | F | H | 0 |
| $CF_2CF_3$ | $^nPr$ | H | $CF_3$ | F | H | 1 |
| $CF_2CF_3$ | $^nPr$ | H | $CF_3$ | F | H | 2 |
| $CF_2CF_3$ | $^nPr$ | H | $CF_3$ | Cl | H | 0 |
| $CF_2CF_3$ | $^nPr$ | H | $CF_3$ | Cl | H | 1 |
| $CF_2CF_3$ | $^nPr$ | H | $CF_3$ | Cl | H | 2 |
| $CF_2CF_3$ | $^nPr$ | H | $CF_3$ | Br | H | 0 |
| $CF_2CF_3$ | $^nPr$ | H | $CF_3$ | Br | H | 1 |
| $CF_2CF_3$ | $^nPr$ | H | $CF_3$ | Br | H | 2 |
| $CF_2CF_3$ | $^nPr$ | H | $CF_3$ | I | H | 0 |
| $CF_2CF_3$ | $^nPr$ | H | $CF_3$ | I | H | 1 |
| $CF_2CF_3$ | $^nPr$ | H | $CF_3$ | I | H | 2 |
| $CF_2CF_3$ | $^nPr$ | H | $CF_3$ | CN | H | 0 |
| $CF_2CF_3$ | $^nPr$ | H | $CF_3$ | CN | H | 1 |
| $CF_2CF_3$ | $^nPr$ | H | $CF_3$ | CN | H | 2 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_2CF_3$ | $^iPr$ | H | H | H | H | 0 |
| $CF_2CF_3$ | $^iPr$ | H | H | H | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | H | H | H | 2 |
| $CF_2CF_3$ | $^iPr$ | F | H | H | H | 0 |
| $CF_2CF_3$ | $^iPr$ | F | H | H | H | 1 |
| $CF_2CF_3$ | $^iPr$ | F | H | H | H | 2 |
| $CF_2CF_3$ | $^iPr$ | Cl | H | H | H | 0 |
| $CF_2CF_3$ | $^iPr$ | Cl | H | H | H | 1 |
| $CF_2CF_3$ | $^iPr$ | Cl | H | H | H | 2 |
| $CF_2CF_3$ | $^iPr$ | Br | H | H | H | 0 |
| $CF_2CF_3$ | $^iPr$ | Br | H | H | H | 1 |
| $CF_2CF_3$ | $^iPr$ | Br | H | H | H | 2 |
| $CF_2CF_3$ | $^iPr$ | I | H | H | H | 0 |
| $CF_2CF_3$ | $^iPr$ | I | H | H | H | 1 |
| $CF_2CF_3$ | $^iPr$ | I | H | H | H | 2 |
| $CF_2CF_3$ | $^iPr$ | Me | H | H | H | 0 |
| $CF_2CF_3$ | $^iPr$ | Me | H | H | H | 1 |
| $CF_2CF_3$ | $^iPr$ | Me | H | H | H | 2 |
| $CF_2CF_3$ | $^iPr$ | $CF_3$ | H | H | H | 0 |
| $CF_2CF_3$ | $^iPr$ | $CF_3$ | H | H | H | 1 |
| $CF_2CF_3$ | $^iPr$ | $CF_3$ | H | H | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | F | H | H | 0 |
| $CF_2CF_3$ | $^iPr$ | H | F | H | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | F | H | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | Cl | H | H | 0 |
| $CF_2CF_3$ | $^iPr$ | H | Cl | H | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | Cl | H | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | Br | H | H | 0 |
| $CF_2CF_3$ | $^iPr$ | H | Br | H | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | Br | H | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | I | H | H | 0 |
| $CF_2CF_3$ | $^iPr$ | H | I | H | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | I | H | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | Me | H | H | 0 |
| $CF_2CF_3$ | $^iPr$ | H | Me | H | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | Me | H | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | $CF_3$ | H | H | 0 |
| $CF_2CF_3$ | $^iPr$ | H | $CF_3$ | H | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | $CF_3$ | H | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | $CF_2CF_3$ | H | H | 0 |
| $CF_2CF_3$ | $^iPr$ | H | $CF_2CF_3$ | H | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | $CF_2CF_3$ | H | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | $CF(CF_3)_2$ | H | H | 0 |
| $CF_2CF_3$ | $^iPr$ | H | $CF(CF_3)_2$ | H | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | $CF(CF_3)_2$ | H | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | SMe | H | H | 0 |
| $CF_2CF_3$ | $^iPr$ | H | SMe | H | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | SMe | H | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | SOMe | H | H | 0 |
| $CF_2CF_3$ | $^iPr$ | H | SOMe | H | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | SOMe | H | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | $SO_2Me$ | H | H | 0 |
| $CF_2CF_3$ | $^iPr$ | H | $SO_2Me$ | H | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | $SO_2Me$ | H | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | OMe | H | H | 0 |
| $CF_2CF_3$ | $^iPr$ | H | OMe | H | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | OMe | H | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | $OCF_3$ | H | H | 0 |
| $CF_2CF_3$ | $^iPr$ | H | $OCF_3$ | H | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | $OCF_3$ | H | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | $NO_2$ | H | H | 0 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_2CF_3$ | $^iPr$ | H | $NO_2$ | H | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | $NO_2$ | H | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | CN | H | H | 0 |
| $CF_2CF_3$ | $^iPr$ | H | CN | H | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | CN | H | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | H | F | H | 0 |
| $CF_2CF_3$ | $^iPr$ | H | H | F | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | H | F | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | H | Cl | H | 0 |
| $CF_2CF_3$ | $^iPr$ | H | H | Cl | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | H | Cl | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | H | Br | H | 0 |
| $CF_2CF_3$ | $^iPr$ | H | H | Br | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | H | Br | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | H | I | H | 0 |
| $CF_2CF_3$ | $^iPr$ | H | H | I | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | H | I | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | H | Me | H | 0 |
| $CF_2CF_3$ | $^iPr$ | H | H | Me | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | H | Me | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | H | $CF_3$ | H | 0 |
| $CF_2CF_3$ | $^iPr$ | H | H | $CF_3$ | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | H | $CF_3$ | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | H | $CF_2CF_3$ | H | 0 |
| $CF_2CF_3$ | $^iPr$ | H | H | $CF_2CF_3$ | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | H | $CF_2CF_3$ | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | H | $CF(CF_3)_2$ | H | 0 |
| $CF_2CF_3$ | $^iPr$ | H | H | $CF(CF_3)_2$ | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | H | $CF(CF_3)_2$ | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | H | SMe | H | 0 |
| $CF_2CF_3$ | $^iPr$ | H | H | SMe | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | H | SMe | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | H | SOMe | H | 0 |
| $CF_2CF_3$ | $^iPr$ | H | H | SOMe | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | H | SOMe | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | H | $SO_2Me$ | H | 0 |
| $CF_2CF_3$ | $^iPr$ | H | H | $SO_2Me$ | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | H | $SO_2Me$ | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | H | OMe | H | 0 |
| $CF_2CF_3$ | $^iPr$ | H | H | OMe | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | H | OMe | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | H | $OCF_3$ | H | 0 |
| $CF_2CF_3$ | $^iPr$ | H | H | $OCF_3$ | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | H | $OCF_3$ | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | H | $NO_2$ | H | 0 |
| $CF_2CF_3$ | $^iPr$ | H | H | $NO_2$ | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | H | $NO_2$ | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | H | CN | H | 0 |
| $CF_2CF_3$ | $^iPr$ | H | H | CN | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | H | CN | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | H | H | F | 0 |
| $CF_2CF_3$ | $^iPr$ | H | H | H | F | 1 |
| $CF_2CF_3$ | $^iPr$ | H | H | H | F | 2 |
| $CF_2CF_3$ | $^iPr$ | H | H | H | Cl | 0 |
| $CF_2CF_3$ | $^iPr$ | H | H | H | Cl | 1 |
| $CF_2CF_3$ | $^iPr$ | H | H | H | Cl | 2 |
| $CF_2CF_3$ | $^iPr$ | H | H | H | Br | 0 |
| $CF_2CF_3$ | $^iPr$ | H | H | H | Br | 1 |
| $CF_2CF_3$ | $^iPr$ | H | H | H | Br | 2 |
| $CF_2CF_3$ | $^iPr$ | H | H | H | I | 0 |
| $CF_2CF_3$ | $^iPr$ | H | H | H | I | 1 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_2CF_3$ | $^iPr$ | H | H | H | I | 2 |
| $CF_2CF_3$ | $^iPr$ | H | H | H | Me | 0 |
| $CF_2CF_3$ | $^iPr$ | H | H | H | Me | 1 |
| $CF_2CF_3$ | $^iPr$ | H | H | H | Me | 2 |
| $CF_2CF_3$ | $^iPr$ | H | H | H | $CF_3$ | 0 |
| $CF_2CF_3$ | $^iPr$ | H | H | H | $CF_3$ | 1 |
| $CF_2CF_3$ | $^iPr$ | H | H | H | $CF_3$ | 2 |
| $CF_2CF_3$ | $^iPr$ | H | H | H | $CF_2CF_3$ | 0 |
| $CF_2CF_3$ | $^iPr$ | H | H | H | $CF_2CF_3$ | 1 |
| $CF_2CF_3$ | $^iPr$ | H | H | H | $CF_2CF_3$ | 2 |
| $CF_2CF_3$ | $^iPr$ | H | H | H | $CF(CF_3)_2$ | 0 |
| $CF_2CF_3$ | $^iPr$ | H | H | H | $CF(CF_3)_2$ | 1 |
| $CF_2CF_3$ | $^iPr$ | H | H | H | $CF(CF_3)_2$ | 2 |
| $CF_2CF_3$ | $^iPr$ | H | H | H | SMe | 0 |
| $CF_2CF_3$ | $^iPr$ | H | H | H | SMe | 1 |
| $CF_2CF_3$ | $^iPr$ | H | H | H | SMe | 2 |
| $CF_2CF_3$ | $^iPr$ | H | H | H | SOMe | 0 |
| $CF_2CF_3$ | $^iPr$ | H | H | H | SOMe | 1 |
| $CF_2CF_3$ | $^iPr$ | H | H | H | SOMe | 2 |
| $CF_2CF_3$ | $^iPr$ | H | H | H | $SO_2Me$ | 0 |
| $CF_2CF_3$ | $^iPr$ | H | H | H | $SO_2Me$ | 1 |
| $CF_2CF_3$ | $^iPr$ | H | H | H | $SO_2Me$ | 2 |
| $CF_2CF_3$ | $^iPr$ | H | H | H | OMe | 0 |
| $CF_2CF_3$ | $^iPr$ | H | H | H | OMe | 1 |
| $CF_2CF_3$ | $^iPr$ | H | H | H | OMe | 2 |
| $CF_2CF_3$ | $^iPr$ | H | H | H | $OCF_3$ | 0 |
| $CF_2CF_3$ | $^iPr$ | H | H | H | $OCF_3$ | 1 |
| $CF_2CF_3$ | $^iPr$ | H | H | H | $OCF_3$ | 2 |
| $CF_2CF_3$ | $^iPr$ | H | H | H | $NO_2$ | 0 |
| $CF_2CF_3$ | $^iPr$ | H | H | H | $NO_2$ | 1 |
| $CF_2CF_3$ | $^iPr$ | H | H | H | $NO_2$ | 2 |
| $CF_2CF_3$ | $^iPr$ | H | H | H | CN | 0 |
| $CF_2CF_3$ | $^iPr$ | H | H | H | CN | 1 |
| $CF_2CF_3$ | $^iPr$ | H | H | H | CN | 2 |
| $CF_2CF_3$ | $^iPr$ | H | F | H | F | 0 |
| $CF_2CF_3$ | $^iPr$ | H | F | H | F | 1 |
| $CF_2CF_3$ | $^iPr$ | H | F | H | F | 2 |
| $CF_2CF_3$ | $^iPr$ | H | Cl | H | Cl | 0 |
| $CF_2CF_3$ | $^iPr$ | H | Cl | H | Cl | 1 |
| $CF_2CF_3$ | $^iPr$ | H | Cl | H | Cl | 2 |
| $CF_2CF_3$ | $^iPr$ | H | Br | H | Br | 0 |
| $CF_2CF_3$ | $^iPr$ | H | Br | H | Br | 1 |
| $CF_2CF_3$ | $^iPr$ | H | Br | H | Br | 2 |
| $CF_2CF_3$ | $^iPr$ | H | I | H | I | 0 |
| $CF_2CF_3$ | $^iPr$ | H | I | H | I | 1 |
| $CF_2CF_3$ | $^iPr$ | H | I | H | I | 2 |
| $CF_2CF_3$ | $^iPr$ | H | F | H | Cl | 0 |
| $CF_2CF_3$ | $^iPr$ | H | F | H | Cl | 1 |
| $CF_2CF_3$ | $^iPr$ | H | F | H | Cl | 2 |
| $CF_2CF_3$ | $^iPr$ | H | F | H | Br | 0 |
| $CF_2CF_3$ | $^iPr$ | H | F | H | Br | 1 |
| $CF_2CF_3$ | $^iPr$ | H | F | H | Br | 2 |
| $CF_2CF_3$ | $^iPr$ | H | F | H | I | 0 |
| $CF_2CF_3$ | $^iPr$ | H | F | H | I | 1 |
| $CF_2CF_3$ | $^iPr$ | H | F | H | I | 2 |
| $CF_2CF_3$ | $^iPr$ | H | Cl | H | F | 0 |
| $CF_2CF_3$ | $^iPr$ | H | Cl | H | F | 1 |
| $CF_2CF_3$ | $^iPr$ | H | Cl | H | F | 2 |
| $CF_2CF_3$ | $^iPr$ | H | Cl | H | Br | 0 |
| $CF_2CF_3$ | $^iPr$ | H | Cl | H | Br | 1 |
| $CF_2CF_3$ | $^iPr$ | H | Cl | H | Br | 2 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_2CF_3$ | $^iPr$ | H | Cl | H | I | 0 |
| $CF_2CF_3$ | $^iPr$ | H | Cl | H | I | 1 |
| $CF_2CF_3$ | $^iPr$ | H | Cl | H | I | 2 |
| $CF_2CF_3$ | $^iPr$ | H | Br | H | F | 0 |
| $CF_2CF_3$ | $^iPr$ | H | Br | H | F | 1 |
| $CF_2CF_3$ | $^iPr$ | H | Br | H | F | 2 |
| $CF_2CF_3$ | $^iPr$ | H | Br | H | Cl | 0 |
| $CF_2CF_3$ | $^iPr$ | H | Br | H | Cl | 1 |
| $CF_2CF_3$ | $^iPr$ | H | Br | H | Cl | 2 |
| $CF_2CF_3$ | $^iPr$ | H | Br | H | I | 0 |
| $CF_2CF_3$ | $^iPr$ | H | Br | H | I | 1 |
| $CF_2CF_3$ | $^iPr$ | H | Br | H | I | 2 |
| $CF_2CF_3$ | $^iPr$ | H | I | H | F | 0 |
| $CF_2CF_3$ | $^iPr$ | H | I | H | F | 1 |
| $CF_2CF_3$ | $^iPr$ | H | I | H | F | 2 |
| $CF_2CF_3$ | $^iPr$ | H | I | H | Cl | 0 |
| $CF_2CF_3$ | $^iPr$ | H | I | H | Cl | 1 |
| $CF_2CF_3$ | $^iPr$ | H | I | H | Cl | 2 |
| $CF_2CF_3$ | $^iPr$ | H | I | H | Br | 0 |
| $CF_2CF_3$ | $^iPr$ | H | I | H | Br | 1 |
| $CF_2CF_3$ | $^iPr$ | H | I | H | Br | 2 |
| $CF_2CF_3$ | $^iPr$ | H | F | H | CN | 0 |
| $CF_2CF_3$ | $^iPr$ | H | F | H | CN | 1 |
| $CF_2CF_3$ | $^iPr$ | H | F | H | CN | 2 |
| $CF_2CF_3$ | $^iPr$ | H | Cl | H | CN | 0 |
| $CF_2CF_3$ | $^iPr$ | H | Cl | H | CN | 1 |
| $CF_2CF_3$ | $^iPr$ | H | Cl | H | CN | 2 |
| $CF_2CF_3$ | $^iPr$ | H | Br | H | CN | 0 |
| $CF_2CF_3$ | $^iPr$ | H | Br | H | CN | 1 |
| $CF_2CF_3$ | $^iPr$ | H | Br | H | CN | 2 |
| $CF_2CF_3$ | $^iPr$ | H | I | H | CN | 0 |
| $CF_2CF_3$ | $^iPr$ | H | I | H | CN | 1 |
| $CF_2CF_3$ | $^iPr$ | H | I | H | CN | 2 |
| $CF_2CF_3$ | $^iPr$ | H | $CF_3$ | H | F | 0 |
| $CF_2CF_3$ | $^iPr$ | H | $CF_3$ | H | F | 1 |
| $CF_2CF_3$ | $^iPr$ | H | $CF_3$ | H | F | 2 |
| $CF_2CF_3$ | $^iPr$ | H | $CF_3$ | H | Cl | 0 |
| $CF_2CF_3$ | $^iPr$ | H | $CF_3$ | H | Cl | 1 |
| $CF_2CF_3$ | $^iPr$ | H | $CF_3$ | H | Cl | 2 |
| $CF_2CF_3$ | $^iPr$ | H | $CF_3$ | H | Br | 0 |
| $CF_2CF_3$ | $^iPr$ | H | $CF_3$ | H | Br | 1 |
| $CF_2CF_3$ | $^iPr$ | H | $CF_3$ | H | Br | 2 |
| $CF_2CF_3$ | $^iPr$ | H | $CF_3$ | H | I | 0 |
| $CF_2CF_3$ | $^iPr$ | H | $CF_3$ | H | I | 1 |
| $CF_2CF_3$ | $^iPr$ | H | $CF_3$ | H | I | 2 |
| $CF_2CF_3$ | $^iPr$ | H | $CF_3$ | H | CN | 0 |
| $CF_2CF_3$ | $^iPr$ | H | $CF_3$ | H | CN | 1 |
| $CF_2CF_3$ | $^iPr$ | H | $CF_3$ | H | CN | 2 |
| $CF_2CF_3$ | $^iPr$ | H | F | F | H | 0 |
| $CF_2CF_3$ | $^iPr$ | H | F | F | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | F | F | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | Cl | Cl | H | 0 |
| $CF_2CF_3$ | $^iPr$ | H | Cl | Cl | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | Cl | Cl | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | Br | Br | H | 0 |
| $CF_2CF_3$ | $^iPr$ | H | Br | Br | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | Br | Br | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | I | I | H | 0 |
| $CF_2CF_3$ | $^iPr$ | H | I | I | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | I | I | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | F | Cl | H | 0 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_2CF_3$ | $^iPr$ | H | F | Cl | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | F | Cl | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | F | Br | H | 0 |
| $CF_2CF_3$ | $^iPr$ | H | F | Br | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | F | Br | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | F | I | H | 0 |
| $CF_2CF_3$ | $^iPr$ | H | F | I | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | F | I | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | Cl | F | H | 0 |
| $CF_2CF_3$ | $^iPr$ | H | Cl | F | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | Cl | F | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | Cl | Br | H | 0 |
| $CF_2CF_3$ | $^iPr$ | H | Cl | Br | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | Cl | Br | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | Cl | I | H | 0 |
| $CF_2CF_3$ | $^iPr$ | H | Cl | I | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | Cl | I | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | Br | F | H | 0 |
| $CF_2CF_3$ | $^iPr$ | H | Br | F | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | Br | F | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | Br | Cl | H | 0 |
| $CF_2CF_3$ | $^iPr$ | H | Br | Cl | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | Br | Cl | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | Br | I | H | 0 |
| $CF_2CF_3$ | $^iPr$ | H | Br | I | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | Br | I | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | I | F | H | 0 |
| $CF_2CF_3$ | $^iPr$ | H | I | F | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | I | F | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | I | Cl | H | 0 |
| $CF_2CF_3$ | $^iPr$ | H | I | Cl | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | I | Cl | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | I | Br | H | 0 |
| $CF_2CF_3$ | $^iPr$ | H | I | Br | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | I | Br | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | F | CN | H | 0 |
| $CF_2CF_3$ | $^iPr$ | H | F | CN | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | F | CN | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | Cl | CN | H | 0 |
| $CF_2CF_3$ | $^iPr$ | H | Cl | CN | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | Cl | CN | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | Br | CN | H | 0 |
| $CF_2CF_3$ | $^iPr$ | H | Br | CN | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | Br | CN | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | I | CN | H | 0 |
| $CF_2CF_3$ | $^iPr$ | H | I | CN | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | I | CN | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | $CF_3$ | F | H | 0 |
| $CF_2CF_3$ | $^iPr$ | H | $CF_3$ | F | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | $CF_3$ | F | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | $CF_3$ | Cl | H | 0 |
| $CF_2CF_3$ | $^iPr$ | H | $CF_3$ | Cl | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | $CF_3$ | Cl | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | $CF_3$ | Br | H | 0 |
| $CF_2CF_3$ | $^iPr$ | H | $CF_3$ | Br | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | $CF_3$ | Br | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | $CF_3$ | I | H | 0 |
| $CF_2CF_3$ | $^iPr$ | H | $CF_3$ | I | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | $CF_3$ | I | H | 2 |
| $CF_2CF_3$ | $^iPr$ | H | $CF_3$ | CN | H | 0 |
| $CF_2CF_3$ | $^iPr$ | H | $CF_3$ | CN | H | 1 |
| $CF_2CF_3$ | $^iPr$ | H | $CF_3$ | CN | H | 2 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | H | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | H | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | H | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | F | H | H | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | F | H | H | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | F | H | H | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | Cl | H | H | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | Cl | H | H | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | Cl | H | H | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | Br | H | H | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | Br | H | H | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | Br | H | H | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | I | H | H | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | I | H | H | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | I | H | H | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | Me | H | H | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | Me | H | H | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | Me | H | H | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | $CF_3$ | H | H | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | $CF_3$ | H | H | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | $CF_3$ | H | H | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | F | H | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | F | H | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | F | H | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Cl | H | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Cl | H | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Cl | H | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Br | H | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Br | H | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Br | H | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | I | H | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | I | H | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | I | H | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Me | H | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Me | H | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Me | H | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | $CF_2CF_3$ | H | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | $CF_2CF_3$ | H | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | $CF_2CF_3$ | H | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | $CF(CF_3)_2$ | H | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | $CF(CF_3)_2$ | H | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | $CF(CF_3)_2$ | H | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | SMe | H | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | SMe | H | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | SMe | H | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | SOMe | H | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | SOMe | H | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | SOMe | H | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | $SO_2Me$ | H | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | $SO_2Me$ | H | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | $SO_2Me$ | H | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | OMe | H | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | OMe | H | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | OMe | H | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | $OCF_3$ | H | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | $OCF_3$ | H | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | $OCF_3$ | H | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | $NO_2$ | H | H | 0 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_2CF_3$ | $CH_2CF_3$ | H | $NO_2$ | H | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | $NO_2$ | H | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | CN | H | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | CN | H | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | CN | H | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | F | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | F | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | F | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | Cl | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | Cl | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | Cl | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | Br | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | Br | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | Br | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | I | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | I | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | I | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | Me | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | Me | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | Me | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | $CF_3$ | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | $CF_3$ | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | $CF_3$ | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | $CF_2CF_3$ | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | $CF_2CF_3$ | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | $CF_2CF_3$ | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | $CF(CF_3)_2$ | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | $CF(CF_3)_2$ | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | $CF(CF_3)_2$ | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | SMe | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | SMe | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | SMe | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | SOMe | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | SOMe | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | SOMe | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | $SO_2Me$ | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | $SO_2Me$ | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | $SO_2Me$ | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | OMe | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | OMe | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | OMe | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | $OCF_3$ | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | $OCF_3$ | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | $OCF_3$ | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | $NO_2$ | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | $NO_2$ | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | $NO_2$ | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | CN | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | CN | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | CN | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | H | F | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | H | F | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | H | F | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | H | Cl | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | H | Cl | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | H | Cl | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | H | Br | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | H | Br | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | H | Br | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | H | I | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | H | I | 1 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | H | I | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | H | Me | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | H | Me | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | H | Me | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | H | $CF_3$ | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | H | $CF_3$ | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | H | $CF_3$ | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | H | $CF_2CF_3$ | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | H | $CF_2CF_3$ | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | H | $CF_2CF_3$ | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | H | $CF(CF_3)_2$ | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | H | $CF(CF_3)_2$ | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | H | $CF(CF_3)_2$ | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | H | SMe | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | H | SMe | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | H | SMe | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | H | SOMe | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | H | SOMe | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | H | SOMe | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | H | $SO_2Me$ | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | H | $SO_2Me$ | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | H | $SO_2Me$ | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | H | OMe | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | H | OMe | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | H | OMe | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | H | $OCF_3$ | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | H | $OCF_3$ | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | H | $OCF_3$ | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | H | $NO_2$ | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | H | $NO_2$ | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | H | $NO_2$ | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | H | CN | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | H | CN | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | H | H | CN | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | F | H | F | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | F | H | F | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | F | H | F | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Cl | H | Cl | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Cl | H | Cl | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Cl | H | Cl | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Br | H | Br | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Br | H | Br | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Br | H | Br | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | I | H | I | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | I | H | I | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | I | H | I | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | F | H | Cl | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | F | H | Cl | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | F | H | Cl | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | F | H | Br | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | F | H | Br | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | F | H | Br | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | F | H | I | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | F | H | I | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | F | H | I | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Cl | H | F | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Cl | H | F | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Cl | H | F | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Cl | H | Br | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Cl | H | Br | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Cl | H | Br | 2 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_2CF_3$ | $CH_2CF_3$ | H | Cl | H | I | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Cl | H | I | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Cl | H | I | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Br | H | F | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Br | H | F | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Br | H | F | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Br | H | Cl | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Br | H | Cl | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Br | H | Cl | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Br | H | I | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Br | H | I | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Br | H | I | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | I | H | F | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | I | H | F | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | I | H | F | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | I | H | Cl | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | I | H | Cl | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | I | H | Cl | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | I | H | Br | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | I | H | Br | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | I | H | Br | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | F | H | CN | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | F | H | CN | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | F | H | CN | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Cl | H | CN | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Cl | H | CN | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Cl | H | CN | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Br | H | CN | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Br | H | CN | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Br | H | CN | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | I | H | CN | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | I | H | CN | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | I | H | CN | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | F | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | F | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | F | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | Cl | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | Cl | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | Cl | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | Br | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | Br | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | Br | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | I | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | I | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | I | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | CN | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | CN | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | CN | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | F | F | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | F | F | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | F | F | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Cl | Cl | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Cl | Cl | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Cl | Cl | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Br | Br | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Br | Br | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Br | Br | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | I | I | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | I | I | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | I | I | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | F | Cl | H | 0 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_2CF_3$ | $CH_2CF_3$ | H | F | Cl | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | F | Cl | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | F | Br | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | F | Br | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | F | Br | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | F | I | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | F | I | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | F | I | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Cl | F | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Cl | F | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Cl | F | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Cl | Br | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Cl | Br | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Cl | Br | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Cl | I | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Cl | I | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Cl | I | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Br | F | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Br | F | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Br | F | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Br | Cl | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Br | Cl | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Br | Cl | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Br | I | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Br | I | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Br | I | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | I | F | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | I | F | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | I | F | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | I | Cl | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | I | Cl | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | I | Cl | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | I | Br | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | I | Br | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | I | Br | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | F | CN | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | F | CN | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | F | CN | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Cl | CN | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Cl | CN | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Cl | CN | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Br | CN | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Br | CN | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | Br | CN | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | I | CN | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | I | CN | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | I | CN | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | F | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | F | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | F | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | Cl | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | Cl | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | Cl | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | Br | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | Br | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | Br | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | I | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | I | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | I | H | 2 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | CN | H | 0 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | CN | H | 1 |
| $CF_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | CN | H | 2 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SCF_3$ | Me | H | H | H | H | 0 |
| $SCF_3$ | Me | H | H | H | H | 1 |
| $SCF_3$ | Me | H | H | H | H | 2 |
| $SCF_3$ | Me | F | H | H | H | 0 |
| $SCF_3$ | Me | F | H | H | H | 1 |
| $SCF_3$ | Me | F | H | H | H | 2 |
| $SCF_3$ | Me | Cl | H | H | H | 0 |
| $SCF_3$ | Me | Cl | H | H | H | 1 |
| $SCF_3$ | Me | Cl | H | H | H | 2 |
| $SCF_3$ | Me | Br | H | H | H | 0 |
| $SCF_3$ | Me | Br | H | H | H | 1 |
| $SCF_3$ | Me | Br | H | H | H | 2 |
| $SCF_3$ | Me | I | H | H | H | 0 |
| $SCF_3$ | Me | I | H | H | H | 1 |
| $SCF_3$ | Me | I | H | H | H | 2 |
| $SCF_3$ | Me | Me | H | H | H | 0 |
| $SCF_3$ | Me | Me | H | H | H | 1 |
| $SCF_3$ | Me | Me | H | H | H | 2 |
| $SCF_3$ | Me | $CF_3$ | H | H | H | 0 |
| $SCF_3$ | Me | $CF_3$ | H | H | H | 1 |
| $SCF_3$ | Me | $CF_3$ | H | H | H | 2 |
| $SCF_3$ | Me | H | F | H | H | 0 |
| $SCF_3$ | Me | H | F | H | H | 1 |
| $SCF_3$ | Me | H | F | H | H | 2 |
| $SCF_3$ | Me | H | Cl | H | H | 0 |
| $SCF_3$ | Me | H | Cl | H | H | 1 |
| $SCF_3$ | Me | H | Cl | H | H | 2 |
| $SCF_3$ | Me | H | Br | H | H | 0 |
| $SCF_3$ | Me | H | Br | H | H | 1 |
| $SCF_3$ | Me | H | Br | H | H | 2 |
| $SCF_3$ | Me | H | I | H | H | 0 |
| $SCF_3$ | Me | H | I | H | H | 1 |
| $SCF_3$ | Me | H | I | H | H | 2 |
| $SCF_3$ | Me | H | Me | H | H | 0 |
| $SCF_3$ | Me | H | Me | H | H | 1 |
| $SCF_3$ | Me | H | Me | H | H | 2 |
| $SCF_3$ | Me | H | $CF_3$ | H | H | 0 |
| $SCF_3$ | Me | H | $CF_3$ | H | H | 1 |
| $SCF_3$ | Me | H | $CF_3$ | H | H | 2 |
| $SCF_3$ | Me | H | $CF_2CF_3$ | H | H | 0 |
| $SCF_3$ | Me | H | $CF_2CF_3$ | H | H | 1 |
| $SCF_3$ | Me | H | $CF_2CF_3$ | H | H | 2 |
| $SCF_3$ | Me | H | $CF(CF_3)_2$ | H | H | 0 |
| $SCF_3$ | Me | H | $CF(CF_3)_2$ | H | H | 1 |
| $SCF_3$ | Me | H | $CF(CF_3)_2$ | H | H | 2 |
| $SCF_3$ | Me | H | SMe | H | H | 0 |
| $SCF_3$ | Me | H | SMe | H | H | 1 |
| $SCF_3$ | Me | H | SMe | H | H | 2 |
| $SCF_3$ | Me | H | SOMe | H | H | 0 |
| $SCF_3$ | Me | H | SOMe | H | H | 1 |
| $SCF_3$ | Me | H | SOMe | H | H | 2 |
| $SCF_3$ | Me | H | $SO_2Me$ | H | H | 0 |
| $SCF_3$ | Me | H | $SO_2Me$ | H | H | 1 |
| $SCF_3$ | Me | H | $SO_2Me$ | H | H | 2 |
| $SCF_3$ | Me | H | OMe | H | H | 0 |
| $SCF_3$ | Me | H | OMe | H | H | 1 |
| $SCF_3$ | Me | H | OMe | H | H | 2 |
| $SCF_3$ | Me | H | $OCF_3$ | H | H | 0 |
| $SCF_3$ | Me | H | $OCF_3$ | H | H | 1 |
| $SCF_3$ | Me | H | $OCF_3$ | H | H | 2 |
| $SCF_3$ | Me | H | $NO_2$ | H | H | 0 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SCF_3$ | Me | H | $NO_2$ | H | H | 1 |
| $SCF_3$ | Me | H | $NO_2$ | H | H | 2 |
| $SCF_3$ | Me | H | CN | H | H | 0 |
| $SCF_3$ | Me | H | CN | H | H | 1 |
| $SCF_3$ | Me | H | CN | H | H | 2 |
| $SCF_3$ | Me | H | H | F | H | 0 |
| $SCF_3$ | Me | H | H | F | H | 1 |
| $SCF_3$ | Me | H | H | F | H | 2 |
| $SCF_3$ | Me | H | H | Cl | H | 0 |
| $SCF_3$ | Me | H | H | Cl | H | 1 |
| $SCF_3$ | Me | H | H | Cl | H | 2 |
| $SCF_3$ | Me | H | H | Br | H | 0 |
| $SCF_3$ | Me | H | H | Br | H | 1 |
| $SCF_3$ | Me | H | H | Br | H | 2 |
| $SCF_3$ | Me | H | H | I | H | 0 |
| $SCF_3$ | Me | H | H | I | H | 1 |
| $SCF_3$ | Me | H | H | I | H | 2 |
| $SCF_3$ | Me | H | H | Me | H | 0 |
| $SCF_3$ | Me | H | H | Me | H | 1 |
| $SCF_3$ | Me | H | H | Me | H | 2 |
| $SCF_3$ | Me | H | H | $CF_3$ | H | 0 |
| $SCF_3$ | Me | H | H | $CF_3$ | H | 1 |
| $SCF_3$ | Me | H | H | $CF_3$ | H | 2 |
| $SCF_3$ | Me | H | H | $CF_2CF_3$ | H | 0 |
| $SCF_3$ | Me | H | H | $CF_2CF_3$ | H | 1 |
| $SCF_3$ | Me | H | H | $CF_2CF_3$ | H | 2 |
| $SCF_3$ | Me | H | H | $CF(CF_3)_2$ | H | 0 |
| $SCF_3$ | Me | H | H | $CF(CF_3)_2$ | H | 1 |
| $SCF_3$ | Me | H | H | $CF(CF_3)_2$ | H | 2 |
| $SCF_3$ | Me | H | H | SMe | H | 0 |
| $SCF_3$ | Me | H | H | SMe | H | 1 |
| $SCF_3$ | Me | H | H | SMe | H | 2 |
| $SCF_3$ | Me | H | H | SOMe | H | 0 |
| $SCF_3$ | Me | H | H | SOMe | H | 1 |
| $SCF_3$ | Me | H | H | SOMe | H | 2 |
| $SCF_3$ | Me | H | H | $SO_2Me$ | H | 0 |
| $SCF_3$ | Me | H | H | $SO_2Me$ | H | 1 |
| $SCF_3$ | Me | H | H | $SO_2Me$ | H | 2 |
| $SCF_3$ | Me | H | H | OMe | H | 0 |
| $SCF_3$ | Me | H | H | OMe | H | 1 |
| $SCF_3$ | Me | H | H | OMe | H | 2 |
| $SCF_3$ | Me | H | H | $OCF_3$ | H | 0 |
| $SCF_3$ | Me | H | H | $OCF_3$ | H | 1 |
| $SCF_3$ | Me | H | H | $OCF_3$ | H | 2 |
| $SCF_3$ | Me | H | H | $NO_2$ | H | 0 |
| $SCF_3$ | Me | H | H | $NO_2$ | H | 1 |
| $SCF_3$ | Me | H | H | $NO_2$ | H | 2 |
| $SCF_3$ | Me | H | H | CN | H | 0 |
| $SCF_3$ | Me | H | H | CN | H | 1 |
| $SCF_3$ | Me | H | H | CN | H | 2 |
| $SCF_3$ | Me | H | H | H | F | 0 |
| $SCF_3$ | Me | H | H | H | F | 1 |
| $SCF_3$ | Me | H | H | H | F | 2 |
| $SCF_3$ | Me | H | H | H | Cl | 0 |
| $SCF_3$ | Me | H | H | H | Cl | 1 |
| $SCF_3$ | Me | H | H | H | Cl | 2 |
| $SCF_3$ | Me | H | H | H | Br | 0 |
| $SCF_3$ | Me | H | H | H | Br | 1 |
| $SCF_3$ | Me | H | H | H | Br | 2 |
| $SCF_3$ | Me | H | H | H | I | 0 |
| $SCF_3$ | Me | H | H | H | I | 1 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SCF_3$ | Me | H | H | H | I | 2 |
| $SCF_3$ | Me | H | H | H | Me | 0 |
| $SCF_3$ | Me | H | H | H | Me | 1 |
| $SCF_2$ | Me | H | H | H | Me | 2 |
| $SCF_3$ | Me | H | H | H | $CF_3$ | 0 |
| $SCF_3$ | Me | H | H | H | $CF_3$ | 1 |
| $SCF_3$ | Me | H | H | H | $CF_3$ | 2 |
| $SCF_3$ | Me | H | H | H | $CF_2CF_3$ | 0 |
| $SCF_3$ | Me | H | H | H | $CF_2CF_3$ | 1 |
| $SCF_3$ | Me | H | H | H | $CF_2CF_3$ | 2 |
| $SCF_3$ | Me | H | H | H | $CF(CF_3)_2$ | 0 |
| $SCF_3$ | Me | H | H | H | $CF(CF_3)_2$ | 1 |
| $SCF_3$ | Me | H | H | H | $CF(CF_3)_2$ | 2 |
| $SCF_3$ | Me | H | H | H | SMe | 0 |
| $SCF_3$ | Me | H | H | H | SMe | 1 |
| $SCF_3$ | Me | H | H | H | SMe | 2 |
| $SCF_3$ | Me | H | H | H | SOMe | 0 |
| $SCF_3$ | Me | H | H | H | SOMe | 1 |
| $SCF_3$ | Me | H | H | H | SOMe | 2 |
| $SCF_3$ | Me | H | H | H | $SO_2Me$ | 0 |
| $SCF_3$ | Me | H | H | H | $SO_2Me$ | 1 |
| $SCF_3$ | Me | H | H | H | $SO_2Me$ | 2 |
| $SCF_3$ | Me | H | H | H | OMe | 0 |
| $SCF_3$ | Me | H | H | H | OMe | 1 |
| $SCF_3$ | Me | H | H | H | OMe | 2 |
| $SCF_3$ | Me | H | H | H | $OCF_3$ | 0 |
| $SCF_3$ | Me | H | H | H | $OCF_3$ | 1 |
| $SCF_3$ | Me | H | H | H | $OCF_3$ | 2 |
| $SCF_3$ | Me | H | H | H | $NO_2$ | 0 |
| $SCF_3$ | Me | H | H | H | $NO_2$ | 1 |
| $SCF_3$ | Me | H | H | H | $NO_2$ | 2 |
| $SCF_3$ | Me | H | H | H | CN | 0 |
| $SCF_3$ | Me | H | H | H | CN | 1 |
| $SCF_3$ | Me | H | H | H | CN | 2 |
| $SCF_3$ | Me | H | F | H | F | 0 |
| $SCF_3$ | Me | H | F | H | F | 1 |
| $SCF_3$ | Me | H | F | H | F | 2 |
| $SCF_3$ | Me | H | Cl | H | Cl | 0 |
| $SCF_3$ | Me | H | Cl | H | Cl | 1 |
| $SCF_3$ | Me | H | Cl | H | Cl | 2 |
| $SCF_3$ | Me | H | Br | H | Br | 0 |
| $SCF_3$ | Me | H | Br | H | Br | 1 |
| $SCF_3$ | Me | H | Br | H | Br | 2 |
| $SCF_3$ | Me | H | I | H | I | 0 |
| $SCF_3$ | Me | H | I | H | I | 1 |
| $SCF_3$ | Me | H | I | H | I | 2 |
| $SCF_3$ | Me | H | F | H | Cl | 0 |
| $SCF_3$ | Me | H | F | H | Cl | 1 |
| $SCF_3$ | Me | H | F | H | Cl | 2 |
| $SCF_3$ | Me | H | F | H | Br | 0 |
| $SCF_3$ | Me | H | F | H | Br | 1 |
| $SCF_3$ | Me | H | F | H | Br | 2 |
| $SCF_3$ | Me | H | F | H | I | 0 |
| $SCF_3$ | Me | H | F | H | I | 1 |
| $SCF_3$ | Me | H | F | H | I | 2 |
| $SCF_3$ | Me | H | Cl | H | F | 0 |
| $SCF_3$ | Me | H | Cl | H | F | 1 |
| $SCF_3$ | Me | H | Cl | H | F | 2 |
| $SCF_3$ | Me | H | Cl | H | Br | 0 |
| $SCF_3$ | Me | H | Cl | H | Br | 1 |
| $SCF_3$ | Me | H | Cl | H | Br | 2 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SCF_3$ | Me | H | Cl | H | I | 0 |
| $SCF_3$ | Me | H | Cl | H | I | 1 |
| $SCF_3$ | Me | H | Cl | H | I | 2 |
| $SCF_3$ | Me | H | Br | H | F | 0 |
| $SCF_3$ | Me | H | Br | H | F | 1 |
| $SCF_3$ | Me | H | Br | H | F | 2 |
| $SCF_3$ | Me | H | Br | H | Cl | 0 |
| $SCF_3$ | Me | H | Br | H | Cl | 1 |
| $SCF_3$ | Me | H | Br | H | Cl | 2 |
| $SCF_3$ | Me | H | Br | H | I | 0 |
| $SCF_3$ | Me | H | Br | H | I | 1 |
| $SCF_3$ | Me | H | Br | H | I | 2 |
| $SCF_3$ | Me | H | I | H | F | 0 |
| $SCF_3$ | Me | H | I | H | F | 1 |
| $SCF_3$ | Me | H | I | H | F | 2 |
| $SCF_3$ | Me | H | I | H | Cl | 0 |
| $SCF_3$ | Me | H | I | H | Cl | 1 |
| $SCF_3$ | Me | H | I | H | Cl | 2 |
| $SCF_3$ | Me | H | I | H | Br | 0 |
| $SCF_3$ | Me | H | I | H | Br | 1 |
| $SCF_3$ | Me | H | I | H | Br | 2 |
| $SCF_3$ | Me | H | F | H | CN | 0 |
| $SCF_3$ | Me | H | F | H | CN | 1 |
| $SCF_3$ | Me | H | F | H | CN | 2 |
| $SCF_3$ | Me | H | Cl | H | CN | 0 |
| $SCF_3$ | Me | H | Cl | H | CN | 1 |
| $SCF_3$ | Me | H | Cl | H | CN | 2 |
| $SCF_3$ | Me | H | Br | H | CN | 0 |
| $SCF_3$ | Me | H | Br | H | CN | 1 |
| $SCF_3$ | Me | H | Br | H | CN | 2 |
| $SCF_3$ | Me | H | I | H | CN | 0 |
| $SCF_3$ | Me | H | I | H | CN | 1 |
| $SCF_3$ | Me | H | I | H | CN | 2 |
| $SCF_3$ | Me | H | $CF_3$ | H | F | 0 |
| $SCF_3$ | Me | H | $CF_3$ | H | F | 1 |
| $SCF_3$ | Me | H | $CF_3$ | H | F | 2 |
| $SCF_3$ | Me | H | $CF_3$ | H | Cl | 0 |
| $SCF_3$ | Me | H | $CF_3$ | H | Cl | 1 |
| $SCF_3$ | Me | H | $CF_3$ | H | Cl | 2 |
| $SCF_3$ | Me | H | $CF_3$ | H | Br | 0 |
| $SCF_3$ | Me | H | $CF_3$ | H | Br | 1 |
| $SCF_3$ | Me | H | $CF_3$ | H | Br | 2 |
| $SCF_3$ | Me | H | $CF_3$ | H | I | 0 |
| $SCF_3$ | Me | H | $CF_3$ | H | I | 1 |
| $SCF_3$ | Me | H | $CF_3$ | H | I | 2 |
| $SCF_3$ | Me | H | $CF_3$ | H | CN | 0 |
| $SCF_3$ | Me | H | $CF_3$ | H | CN | 1 |
| $SCF_3$ | Me | H | $CF_3$ | H | CN | 2 |
| $SCF_3$ | Me | H | F | F | H | 0 |
| $SCF_3$ | Me | H | F | F | H | 1 |
| $SCF_3$ | Me | H | F | F | H | 2 |
| $SCF_3$ | Me | H | Cl | Cl | H | 0 |
| $SCF_3$ | Me | H | Cl | Cl | H | 1 |
| $SCF_3$ | Me | H | Cl | Cl | H | 2 |
| $SCF_3$ | Me | H | Br | Br | H | 0 |
| $SCF_3$ | Me | H | Br | Br | H | 1 |
| $SCF_3$ | Me | H | Br | Br | H | 2 |
| $SCF_3$ | Me | H | I | I | H | 0 |
| $SCF_3$ | Me | H | I | I | H | 1 |
| $SCF_3$ | Me | H | I | I | H | 2 |
| $SCF_3$ | Me | H | F | Cl | H | 0 |

Table 1 (Continued)

| W1 | R1 | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SCF_3$ | Me | H | F | Cl | H | 1 |
| $SCF_3$ | Me | H | F | Cl | H | 2 |
| $SCF_3$ | Me | H | F | Br | H | 0 |
| $SCF_3$ | Me | H | F | Br | H | 1 |
| $SCF_3$ | Me | H | F | Br | H | 2 |
| $SCF_3$ | Me | H | F | I | H | 0 |
| $SCF_3$ | Me | H | F | I | H | 1 |
| $SCF_3$ | Me | H | F | I | H | 2 |
| $SCF_3$ | Me | H | Cl | F | H | 0 |
| $SCF_3$ | Me | H | Cl | F | H | 1 |
| $SCF_3$ | Me | H | Cl | F | H | 2 |
| $SCF_3$ | Me | H | Cl | Br | H | 0 |
| $SCF_3$ | Me | H | Cl | Br | H | 1 |
| $SCF_3$ | Me | H | Cl | Br | H | 2 |
| $SCF_3$ | Me | H | Cl | I | H | 0 |
| $SCF_3$ | Me | H | Cl | I | H | 1 |
| $SCF_3$ | Me | H | Cl | I | H | 2 |
| $SCF_3$ | Me | H | Br | F | H | 0 |
| $SCF_3$ | Me | H | Br | F | H | 1 |
| $SCF_3$ | Me | H | Br | F | H | 2 |
| $SCF_3$ | Me | H | Br | Cl | H | 0 |
| $SCF_3$ | Me | H | Br | Cl | H | 1 |
| $SCF_3$ | Me | H | Br | Cl | H | 2 |
| $SCF_3$ | Me | H | Br | I | H | 0 |
| $SCF_3$ | Me | H | Br | I | H | 1 |
| $SCF_3$ | Me | H | Br | I | H | 2 |
| $SCF_3$ | Me | H | I | F | H | 0 |
| $SCF_3$ | Me | H | I | F | H | 1 |
| $SCF_3$ | Me | H | I | F | H | 2 |
| $SCF_3$ | Me | H | I | Cl | H | 0 |
| $SCF_3$ | Me | H | I | Cl | H | 1 |
| $SCF_3$ | Me | H | I | Cl | H | 2 |
| $SCF_3$ | Me | H | I | Br | H | 0 |
| $SCF_3$ | Me | H | I | Br | H | 1 |
| $SCF_3$ | Me | H | I | Br | H | 2 |
| $SCF_3$ | Me | H | F | CN | H | 0 |
| $SCF_3$ | Me | H | F | CN | H | 1 |
| $SCF_3$ | Me | H | F | CN | H | 2 |
| $SCF_3$ | Me | H | Cl | CN | H | 0 |
| $SCF_3$ | Me | H | Cl | CN | H | 1 |
| $SCF_3$ | Me | H | Cl | CN | H | 2 |
| $SCF_3$ | Me | H | Br | CN | H | 0 |
| $SCF_3$ | Me | H | Br | CN | H | 1 |
| $SCF_3$ | Me | H | Br | CN | H | 2 |
| $SCF_3$ | Me | H | I | CN | H | 0 |
| $SCF_3$ | Me | H | I | CN | H | 1 |
| $SCF_3$ | Me | H | I | CN | H | 2 |
| $SCF_3$ | Me | H | $CF_3$ | F | H | 0 |
| $SCF_3$ | Me | H | $CF_3$ | F | H | 1 |
| $SCF_3$ | Me | H | $CF_3$ | F | H | 2 |
| $SCF_3$ | Me | H | $CF_3$ | Cl | H | 0 |
| $SCF_3$ | Me | H | $CF_3$ | Cl | H | 1 |
| $SCF_3$ | Me | H | $CF_3$ | Cl | H | 2 |
| $SCF_3$ | Me | H | $CF_3$ | Br | H | 0 |
| $SCF_3$ | Me | H | $CF_3$ | Br | H | 1 |
| $SCF_3$ | Me | H | $CF_3$ | Br | H | 2 |
| $SCF_3$ | Me | H | $CF_3$ | I | H | 0 |
| $SCF_3$ | Me | H | $CF_3$ | I | H | 1 |
| $SCF_3$ | Me | H | $CF_3$ | I | H | 2 |
| $SCF_3$ | Me | H | $CF_3$ | CN | H | 0 |
| $SCF_3$ | Me | H | $CF_3$ | CN | H | 1 |
| $SCF_3$ | Me | H | $CF_3$ | CN | H | 2 |

Table 1 (Continued)

| W1 | R1 | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SCF_3$ | Et | H | H | H | H | 0 |
| $SCF_3$ | Et | H | H | H | H | 1 |
| $SCF_3$ | Et | H | H | H | H | 2 |
| $SCF_3$ | Et | F | H | H | H | 0 |
| $SCF_3$ | Et | F | H | H | H | 1 |
| $SCF_3$ | Et | F | H | H | H | 2 |
| $SCF_3$ | Et | Cl | H | H | H | 0 |
| $SCF_3$ | Et | Cl | H | H | H | 1 |
| $SCF_3$ | Et | Cl | H | H | H | 2 |
| $SCF_3$ | Et | Br | H | H | H | 0 |
| $SCF_3$ | Et | Br | H | H | H | 1 |
| $SCF_3$ | Et | Br | H | H | H | 2 |
| $SCF_3$ | Et | I | H | H | H | 0 |
| $SCF_3$ | Et | I | H | H | H | 1 |
| $SCF_3$ | Et | I | H | H | H | 2 |
| $SCF_3$ | Et | Me | H | H | H | 0 |
| $SCF_3$ | Et | Me | H | H | H | 1 |
| $SCF_3$ | Et | Me | H | H | H | 2 |
| $SCF_3$ | Et | $CF_3$ | H | H | H | 0 |
| $SCF_3$ | Et | $CF_3$ | H | H | H | 1 |
| $SCF_3$ | Et | $CF_3$ | H | H | H | 2 |
| $SCF_3$ | Et | H | F | H | H | 0 |
| $SCF_3$ | Et | H | F | H | H | 1 |
| $SCF_3$ | Et | H | F | H | H | 2 |
| $SCF_3$ | Et | H | Cl | H | H | 0 |
| $SCF_3$ | Et | H | Cl | H | H | 1 |
| $SCF_3$ | Et | H | Cl | H | H | 2 |
| $SCF_3$ | Et | H | Br | H | H | 0 |
| $SCF_3$ | Et | H | Br | H | H | 1 |
| $SCF_3$ | Et | H | Br | H | H | 2 |
| $SCF_3$ | Et | H | I | H | H | 0 |
| $SCF_3$ | Et | H | I | H | H | 1 |
| $SCF_3$ | Et | H | I | H | H | 2 |
| $SCF_3$ | Et | H | Me | H | H | 0 |
| $SCF_3$ | Et | H | Me | H | H | 1 |
| $SCF_3$ | Et | H | Me | H | H | 2 |
| $SCF_3$ | Et | H | $CF_3$ | H | H | 0 |
| $SCF_3$ | Et | H | $CF_3$ | H | H | 1 |
| $SCF_3$ | Et | H | $CF_3$ | H | H | 2 |
| $SCF_3$ | Et | H | $CF_2CF_3$ | H | H | 0 |
| $SCF_3$ | Et | H | $CF_2CF_3$ | H | H | 1 |
| $SCF_3$ | Et | H | $CF_2CF_3$ | H | H | 2 |
| $SCF_3$ | Et | H | $CF(CF_3)_2$ | H | H | 0 |
| $SCF_3$ | Et | H | $CF(CF_3)_2$ | H | H | 1 |
| $SCF_3$ | Et | H | $CF(CF_3)_2$ | H | H | 2 |
| $SCF_3$ | Et | H | SMe | H | H | 0 |
| $SCF_3$ | Et | H | SMe | H | H | 1 |
| $SCF_3$ | Et | H | SMe | H | H | 2 |
| $SCF_3$ | Et | H | SOMe | H | H | 0 |
| $SCF_3$ | Et | H | SOMe | H | H | 1 |
| $SCF_3$ | Et | H | SOMe | H | H | 2 |
| $SCF_3$ | Et | H | $SO_2Me$ | H | H | 0 |
| $SCF_3$ | Et | H | $SO_2Me$ | H | H | 1 |
| $SCF_3$ | Et | H | $SO_2Me$ | H | H | 2 |
| $SCF_3$ | Et | H | OMe | H | H | 0 |
| $SCF_3$ | Et | H | OMe | H | H | 1 |
| $SCF_3$ | Et | H | OMe | H | H | 2 |
| $SCF_3$ | Et | H | $OCF_3$ | H | H | 0 |
| $SCF_3$ | Et | H | $OCF_3$ | H | H | 1 |
| $SCF_3$ | Et | H | $OCF_3$ | H | H | 2 |
| $SCF_3$ | Et | H | $NO_2$ | H | H | 0 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SCF_3$ | Et | H | $NO_2$ | H | H | 1 |
| $SCF_3$ | Et | H | $NO_2$ | H | H | 2 |
| $SCF_3$ | Et | H | CN | H | H | 0 |
| $SCF_3$ | Et | H | CN | H | H | 1 |
| $SCF_3$ | Et | H | CN | H | H | 2 |
| $SCF_3$ | Et | H | H | F | H | 0 |
| $SCF_3$ | Et | H | H | F | H | 1 |
| $SCF_3$ | Et | H | H | F | H | 2 |
| $SCF_3$ | Et | H | H | Cl | H | 0 |
| $SCF_3$ | Et | H | H | Cl | H | 1 |
| $SCF_3$ | Et | H | H | Cl | H | 2 |
| $SCF_3$ | Et | H | H | Br | H | 0 |
| $SCF_3$ | Et | H | H | Br | H | 1 |
| $SCF_3$ | Et | H | H | Br | H | 2 |
| $SCF_3$ | Et | H | H | I | H | 0 |
| $SCF_3$ | Et | H | H | I | H | 1 |
| $SCF_3$ | Et | H | H | I | H | 2 |
| $SCF_3$ | Et | H | H | Me | H | 0 |
| $SCF_3$ | Et | H | H | Me | H | 1 |
| $SCF_3$ | Et | H | H | Me | H | 2 |
| $SCF_3$ | Et | H | H | $CF_3$ | H | 0 |
| $SCF_3$ | Et | H | H | $CF_3$ | H | 1 |
| $SCF_3$ | Et | H | H | $CF_3$ | H | 2 |
| $SCF_3$ | Et | H | H | $CF_2CF_3$ | H | 0 |
| $SCF_3$ | Et | H | H | $CF_2CF_3$ | H | 1 |
| $SCF_3$ | Et | H | H | $CF_2CF_3$ | H | 2 |
| $SCF_3$ | Et | H | H | $CF(CF_3)_2$ | H | 0 |
| $SCF_3$ | Et | H | H | $CF(CF_3)_2$ | H | 1 |
| $SCF_3$ | Et | H | H | $CF(CF_3)_2$ | H | 2 |
| $SCF_3$ | Et | H | H | SMe | H | 0 |
| $SCF_3$ | Et | H | H | SMe | H | 1 |
| $SCF_3$ | Et | H | H | SMe | H | 2 |
| $SCF_3$ | Et | H | H | SOMe | H | 0 |
| $SCF_3$ | Et | H | H | SOMe | H | 1 |
| $SCF_3$ | Et | H | H | SOMe | H | 2 |
| $SCF_3$ | Et | H | H | $SO_2Me$ | H | 0 |
| $SCF_3$ | Et | H | H | $SO_2Me$ | H | 1 |
| $SCF_3$ | Et | H | H | $SO_2Me$ | H | 2 |
| $SCF_3$ | Et | H | H | OMe | H | 0 |
| $SCF_3$ | Et | H | H | OMe | H | 1 |
| $SCF_3$ | Et | H | H | OMe | H | 2 |
| $SCF_3$ | Et | H | H | $OCF_3$ | H | 0 |
| $SCF_3$ | Et | H | H | $OCF_3$ | H | 1 |
| $SCF_3$ | Et | H | H | $OCF_3$ | H | 2 |
| $SCF_3$ | Et | H | H | $NO_2$ | H | 0 |
| $SCF_3$ | Et | H | H | $NO_2$ | H | 1 |
| $SCF_3$ | Et | H | H | $NO_2$ | H | 2 |
| $SCF_3$ | Et | H | H | CN | H | 0 |
| $SCF_3$ | Et | H | H | CN | H | 1 |
| $SCF_3$ | Et | H | H | CN | H | 2 |
| $SCF_3$ | Et | H | H | H | F | 0 |
| $SCF_3$ | Et | H | H | H | F | 1 |
| $SCF_3$ | Et | H | H | H | F | 2 |
| $SCF_3$ | Et | H | H | H | Cl | 0 |
| $SCF_3$ | Et | H | H | H | Cl | 1 |
| $SCF_3$ | Et | H | H | H | Cl | 2 |
| $SCF_3$ | Et | H | H | H | Br | 0 |
| $SCF_3$ | Et | H | H | H | Br | 1 |
| $SCF_3$ | Et | H | H | H | Br | 2 |
| $SCF_3$ | Et | H | H | H | I | 0 |
| $SCF_3$ | Et | H | H | H | I | 1 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SCF_3$ | Et | H | H | H | I | 2 |
| $SCF_3$ | Et | H | H | H | Me | 0 |
| $SCF_3$ | Et | H | H | H | Me | 1 |
| $SCF_3$ | Et | H | H | H | Me | 2 |
| $SCF_3$ | Et | H | H | H | $CF_3$ | 0 |
| $SCF_3$ | Et | H | H | H | $CF_3$ | 1 |
| $SCF_3$ | Et | H | H | H | $CF_3$ | 2 |
| $SCF_3$ | Et | H | H | H | $CF_2CF_3$ | 0 |
| $SCF_3$ | Et | H | H | H | $CF_2CF_3$ | 1 |
| $SCF_3$ | Et | H | H | H | $CF_2CF_3$ | 2 |
| $SCF_3$ | Et | H | H | H | $CF(CF_3)_2$ | 0 |
| $SCF_3$ | Et | H | H | H | $CF(CF_3)_2$ | 1 |
| $SCF_3$ | Et | H | H | H | $CF(CF_3)_2$ | 2 |
| $SCF_3$ | Et | H | H | H | SMe | 0 |
| $SCF_3$ | Et | H | H | H | SMe | 1 |
| $SCF_3$ | Et | H | H | H | SMe | 2 |
| $SCF_3$ | Et | H | H | H | SOMe | 0 |
| $SCF_3$ | Et | H | H | H | SOMe | 1 |
| $SCF_3$ | Et | H | H | H | SOMe | 2 |
| $SCF_3$ | Et | H | H | H | $SO_2Me$ | 0 |
| $SCF_3$ | Et | H | H | H | $SO_2Me$ | 1 |
| $SCF_3$ | Et | H | H | H | $SO_2Me$ | 2 |
| $SCF_3$ | Et | H | H | H | OMe | 0 |
| $SCF_3$ | Et | H | H | H | OMe | 1 |
| $SCF_3$ | Et | H | H | H | OMe | 2 |
| $SCF_3$ | Et | H | H | H | $OCF_3$ | 0 |
| $SCF_3$ | Et | H | H | H | $OCF_3$ | 1 |
| $SCF_3$ | Et | H | H | H | $OCF_3$ | 2 |
| $SCF_3$ | Et | H | H | H | $NO_2$ | 0 |
| $SCF_3$ | Et | H | H | H | $NO_2$ | 1 |
| $SCF_3$ | Et | H | H | H | $NO_2$ | 2 |
| $SCF_3$ | Et | H | H | H | CN | 0 |
| $SCF_3$ | Et | H | H | H | CN | 1 |
| $SCF_3$ | Et | H | H | H | CN | 2 |
| $SCF_3$ | Et | H | F | H | F | 0 |
| $SCF_3$ | Et | H | F | H | F | 1 |
| $SCF_3$ | Et | H | F | H | F | 2 |
| $SCF_3$ | Et | H | Cl | H | Cl | 0 |
| $SCF_3$ | Et | H | Cl | H | Cl | 1 |
| $SCF_3$ | Et | H | Cl | H | Cl | 2 |
| $SCF_3$ | Et | H | Br | H | Br | 0 |
| $SCF_3$ | Et | H | Br | H | Br | 1 |
| $SCF_3$ | Et | H | Br | H | Br | 2 |
| $SCF_3$ | Et | H | I | H | I | 0 |
| $SCF_3$ | Et | H | I | H | I | 1 |
| $SCF_3$ | Et | H | I | H | I | 2 |
| $SCF_3$ | Et | H | F | H | Cl | 0 |
| $SCF_3$ | Et | H | F | H | Cl | 1 |
| $SCF_3$ | Et | H | F | H | Cl | 2 |
| $SCF_3$ | Et | H | F | H | Br | 0 |
| $SCF_3$ | Et | H | F | H | Br | 1 |
| $SCF_3$ | Et | H | F | H | Br | 2 |
| $SCF_3$ | Et | H | F | H | I | 0 |
| $SCF_3$ | Et | H | F | H | I | 1 |
| $SCF_3$ | Et | H | F | H | I | 2 |
| $SCF_3$ | Et | H | Cl | H | F | 0 |
| $SCF_3$ | Et | H | Cl | H | F | 1 |
| $SCF_3$ | Et | H | Cl | H | F | 2 |
| $SCF_3$ | Et | H | Cl | H | Br | 0 |
| $SCF_3$ | Et | H | Cl | H | Br | 1 |
| $SCF_3$ | Et | H | Cl | H | Br | 2 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SCF_3$ | Et | H | Cl | H | I | 0 |
| $SCF_3$ | Et | H | Cl | H | I | 1 |
| $SCF_3$ | Et | H | Cl | H | I | 2 |
| $SCF_3$ | Et | H | Br | H | F | 0 |
| $SCF_3$ | Et | H | Br | H | F | 1 |
| $SCF_3$ | Et | H | Br | H | F | 2 |
| $SCF_3$ | Et | H | Br | H | Cl | 0 |
| $SCF_3$ | Et | H | Br | H | Cl | 1 |
| $SCF_3$ | Et | H | Br | H | Cl | 2 |
| $SCF_3$ | Et | H | Br | H | I | 0 |
| $SCF_3$ | Et | H | Br | H | I | 1 |
| $SCF_3$ | Et | H | Br | H | I | 2 |
| $SCF_3$ | Et | H | I | H | F | 0 |
| $SCF_3$ | Et | H | I | H | F | 1 |
| $SCF_3$ | Et | H | I | H | F | 2 |
| $SCF_3$ | Et | H | I | H | Cl | 0 |
| $SCF_3$ | Et | H | I | H | Cl | 1 |
| $SCF_3$ | Et | H | I | H | Cl | 2 |
| $SCF_3$ | Et | H | I | H | Br | 0 |
| $SCF_3$ | Et | H | I | H | Br | 1 |
| $SCF_3$ | Et | H | I | H | Br | 2 |
| $SCF_3$ | Et | H | F | H | CN | 0 |
| $SCF_3$ | Et | H | F | H | CN | 1 |
| $SCF_3$ | Et | H | F | H | CN | 2 |
| $SCF_3$ | Et | H | Cl | H | CN | 0 |
| $SCF_3$ | Et | H | Cl | H | CN | 1 |
| $SCF_3$ | Et | H | Cl | H | CN | 2 |
| $SCF_3$ | Et | H | Br | H | CN | 0 |
| $SCF_3$ | Et | H | Br | H | CN | 1 |
| $SCF_3$ | Et | H | Br | H | CN | 2 |
| $SCF_3$ | Et | H | I | H | CN | 0 |
| $SCF_3$ | Et | H | I | H | CN | 1 |
| $SCF_3$ | Et | H | I | H | CN | 2 |
| $SCF_3$ | Et | H | $CF_3$ | H | F | 0 |
| $SCF_3$ | Et | H | $CF_3$ | H | F | 1 |
| $SCF_3$ | Et | H | $CF_3$ | H | F | 2 |
| $SCF_3$ | Et | H | $CF_3$ | H | Cl | 0 |
| $SCF_3$ | Et | H | $CF_3$ | H | Cl | 1 |
| $SCF_3$ | Et | H | $CF_3$ | H | Cl | 2 |
| $SCF_3$ | Et | H | $CF_3$ | H | Br | 0 |
| $SCF_3$ | Et | H | $CF_3$ | H | Br | 1 |
| $SCF_3$ | Et | H | $CF_3$ | H | Br | 2 |
| $SCF_3$ | Et | H | $CF_3$ | H | I | 0 |
| $SCF_3$ | Et | H | $CF_3$ | H | I | 1 |
| $SCF_3$ | Et | H | $CF_3$ | H | I | 2 |
| $SCF_3$ | Et | H | $CF_3$ | H | CN | 0 |
| $SCF_3$ | Et | H | $CF_3$ | H | CN | 1 |
| $SCF_3$ | Et | H | $CF_3$ | H | CN | 2 |
| $SCF_3$ | Et | H | F | F | H | 0 |
| $SCF_3$ | Et | H | F | F | H | 1 |
| $SCF_3$ | Et | H | F | F | H | 2 |
| $SCF_3$ | Et | H | Cl | Cl | H | 0 |
| $SCF_3$ | Et | H | Cl | Cl | H | 1 |
| $SCF_3$ | Et | H | Cl | Cl | H | 2 |
| $SCF_3$ | Et | H | Br | Br | H | 0 |
| $SCF_3$ | Et | H | Br | Br | H | 1 |
| $SCF_3$ | Et | H | Br | Br | H | 2 |
| $SCF_3$ | Et | H | I | I | H | 0 |
| $SCF_3$ | Et | H | I | I | H | 1 |
| $SCF_3$ | Et | H | I | I | H | 2 |
| $SCF_3$ | Et | H | F | Cl | H | 0 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SCF_3$ | Et | H | F | Cl | H | 1 |
| $SCF_3$ | Et | H | F | Cl | H | 2 |
| $SCF_3$ | Et | H | F | Br | H | 0 |
| $SCF_3$ | Et | H | F | Br | H | 1 |
| $SCF_3$ | Et | H | F | Br | H | 2 |
| $SCF_3$ | Et | H | F | I | H | 0 |
| $SCF_3$ | Et | H | F | I | H | 1 |
| $SCF_3$ | Et | H | F | I | H | 2 |
| $SCF_3$ | Et | H | Cl | F | H | 0 |
| $SCF_3$ | Et | H | Cl | F | H | 1 |
| $SCF_3$ | Et | H | Cl | F | H | 2 |
| $SCF_3$ | Et | H | Cl | Br | H | 0 |
| $SCF_3$ | Et | H | Cl | Br | H | 1 |
| $SCF_3$ | Et | H | Cl | Br | H | 2 |
| $SCF_3$ | Et | H | Cl | I | H | 0 |
| $SCF_3$ | Et | H | Cl | I | H | 1 |
| $SCF_3$ | Et | H | Cl | I | H | 2 |
| $SCF_3$ | Et | H | Br | F | H | 0 |
| $SCF_3$ | Et | H | Br | F | H | 1 |
| $SCF_3$ | Et | H | Br | F | H | 2 |
| $SCF_3$ | Et | H | Br | Cl | H | 0 |
| $SCF_3$ | Et | H | Br | Cl | H | 1 |
| $SCF_3$ | Et | H | Br | Cl | H | 2 |
| $SCF_3$ | Et | H | Br | I | H | 0 |
| $SCF_3$ | Et | H | Br | I | H | 1 |
| $SCF_3$ | Et | H | Br | I | H | 2 |
| $SCF_3$ | Et | H | I | F | H | 0 |
| $SCF_3$ | Et | H | I | F | H | 1 |
| $SCF_3$ | Et | H | I | F | H | 2 |
| $SCF_3$ | Et | H | I | Cl | H | 0 |
| $SCF_3$ | Et | H | I | Cl | H | 1 |
| $SCF_3$ | Et | H | I | Cl | H | 2 |
| $SCF_3$ | Et | H | I | Br | H | 0 |
| $SCF_3$ | Et | H | I | Br | H | 1 |
| $SCF_3$ | Et | H | I | Br | H | 2 |
| $SCF_3$ | Et | H | F | CN | H | 0 |
| $SCF_3$ | Et | H | F | CN | H | 1 |
| $SCF_3$ | Et | H | F | CN | H | 2 |
| $SCF_3$ | Et | H | Cl | CN | H | 0 |
| $SCF_3$ | Et | H | Cl | CN | H | 1 |
| $SCF_3$ | Et | H | Cl | CN | H | 2 |
| $SCF_3$ | Et | H | Br | CN | H | 0 |
| $SCF_3$ | Et | H | Br | CN | H | 1 |
| $SCF_3$ | Et | H | Br | CN | H | 2 |
| $SCF_3$ | Et | H | I | CN | H | 0 |
| $SCF_3$ | Et | H | I | CN | H | 1 |
| $SCF_3$ | Et | H | I | CN | H | 2 |
| $SCF_3$ | Et | H | $CF_3$ | F | H | 0 |
| $SCF_3$ | Et | H | $CF_3$ | F | H | 1 |
| $SCF_3$ | Et | H | $CF_3$ | F | H | 2 |
| $SCF_3$ | Et | H | $CF_3$ | Cl | H | 0 |
| $SCF_3$ | Et | H | $CF_3$ | Cl | H | 1 |
| $SCF_3$ | Et | H | $CF_3$ | Cl | H | 2 |
| $SCF_3$ | Et | H | $CF_3$ | Br | H | 0 |
| $SCF_3$ | Et | H | $CF_3$ | Br | H | 1 |
| $SCF_3$ | Et | H | $CF_3$ | Br | H | 2 |
| $SCF_3$ | Et | H | $CF_3$ | I | H | 0 |
| $SCF_3$ | Et | H | $CF_3$ | I | H | 1 |
| $SCF_3$ | Et | H | $CF_3$ | I | H | 2 |
| $SCF_3$ | Et | H | $CF_3$ | CN | H | 0 |
| $SCF_3$ | Et | H | $CF_3$ | CN | H | 1 |
| $SCF_3$ | Et | H | $CF_3$ | CN | H | 2 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SCF_3$ | $^nPr$ | H | H | H | H | 0 |
| $SCF_3$ | $^nPr$ | H | H | H | H | 1 |
| $SCF_3$ | $^nPr$ | H | H | H | H | 2 |
| $SCF_3$ | $^nPr$ | F | H | H | H | 0 |
| $SCF_3$ | $^nPr$ | F | H | H | H | 1 |
| $SCF_3$ | $^nPr$ | F | H | H | H | 2 |
| $SCF_3$ | $^nPr$ | Cl | H | H | H | 0 |
| $SCF_3$ | $^nPr$ | Cl | H | H | H | 1 |
| $SCF_3$ | $^nPr$ | Cl | H | H | H | 2 |
| $SCF_3$ | $^nPr$ | Br | H | H | H | 0 |
| $SCF_3$ | $^nPr$ | Br | H | H | H | 1 |
| $SCF_3$ | $^nPr$ | Br | H | H | H | 2 |
| $SCF_3$ | $^nPr$ | I | H | H | H | 0 |
| $SCF_3$ | $^nPr$ | I | H | H | H | 1 |
| $SCF_3$ | $^nPr$ | I | H | H | H | 2 |
| $SCF_3$ | $^nPr$ | Me | H | H | H | 0 |
| $SCF_3$ | $^nPr$ | Me | H | H | H | 1 |
| $SCF_3$ | $^nPr$ | Me | H | H | H | 2 |
| $SCF_3$ | $^nPr$ | $CF_3$ | H | H | H | 0 |
| $SCF_3$ | $^nPr$ | $CF_3$ | H | H | H | 1 |
| $SCF_3$ | $^nPr$ | $CF_3$ | H | H | H | 2 |
| $SCF_3$ | $^nPr$ | H | F | H | H | 0 |
| $SCF_3$ | $^nPr$ | H | F | H | H | 1 |
| $SCF_3$ | $^nPr$ | H | F | H | H | 2 |
| $SCF_3$ | $^nPr$ | H | Cl | H | H | 0 |
| $SCF_3$ | $^nPr$ | H | Cl | H | H | 1 |
| $SCF_3$ | $^nPr$ | H | Cl | H | H | 2 |
| $SCF_3$ | $^nPr$ | H | Br | H | H | 0 |
| $SCF_3$ | $^nPr$ | H | Br | H | H | 1 |
| $SCF_3$ | $^nPr$ | H | Br | H | H | 2 |
| $SCF_3$ | $^nPr$ | H | I | H | H | 0 |
| $SCF_3$ | $^nPr$ | H | I | H | H | 1 |
| $SCF_3$ | $^nPr$ | H | I | H | H | 2 |
| $SCF_3$ | $^nPr$ | H | Me | H | H | 0 |
| $SCF_3$ | $^nPr$ | H | Me | H | H | 1 |
| $SCF_3$ | $^nPr$ | H | Me | H | H | 2 |
| $SCF_3$ | $^nPr$ | H | $CF_3$ | H | H | 0 |
| $SCF_3$ | $^nPr$ | H | $CF_3$ | H | H | 1 |
| $SCF_3$ | $^nPr$ | H | $CF_3$ | H | H | 2 |
| $SCF_3$ | $^nPr$ | H | $CF_2CF_3$ | H | H | 0 |
| $SCF_3$ | $^nPr$ | H | $CF_2CF_3$ | H | H | 1 |
| $SCF_3$ | $^nPr$ | H | $CF_2CF_3$ | H | H | 2 |
| $SCF_3$ | $^nPr$ | H | $CF(CF_3)_2$ | H | H | 0 |
| $SCF_3$ | $^nPr$ | H | $CF(CF_3)_2$ | H | H | 1 |
| $SCF_3$ | $^nPr$ | H | $CF(CF_3)_2$ | H | H | 2 |
| $SCF_3$ | $^nPr$ | H | SMe | H | H | 0 |
| $SCF_3$ | $^nPr$ | H | SMe | H | H | 1 |
| $SCF_3$ | $^nPr$ | H | SMe | H | H | 2 |
| $SCF_3$ | $^nPr$ | H | SOMe | H | H | 0 |
| $SCF_3$ | $^nPr$ | H | SOMe | H | H | 1 |
| $SCF_3$ | $^nPr$ | H | SOMe | H | H | 2 |
| $SCF_3$ | $^nPr$ | H | $SO_2Me$ | H | H | 0 |
| $SCF_3$ | $^nPr$ | H | $SO_2Me$ | H | H | 1 |
| $SCF_3$ | $^nPr$ | H | $SO_2Me$ | H | H | 2 |
| $SCF_3$ | $^nPr$ | H | OMe | H | H | 0 |
| $SCF_3$ | $^nPr$ | H | OMe | H | H | 1 |
| $SCF_3$ | $^nPr$ | H | OMe | H | H | 2 |
| $SCF_3$ | $^nPr$ | H | $OCF_3$ | H | H | 0 |
| $SCF_3$ | $^nPr$ | H | $OCF_3$ | H | H | 1 |
| $SCF_3$ | $^nPr$ | H | $OCF_3$ | H | H | 2 |
| $SCF_3$ | $^nPr$ | H | $NO_2$ | H | H | 0 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SCF_3$ | $^nPr$ | H | $NO_2$ | H | H | 1 |
| $SCF_3$ | $^nPr$ | H | $NO_2$ | H | H | 2 |
| $SCF_3$ | $^nPr$ | H | CN | H | H | 0 |
| $SCF_3$ | $^nPr$ | H | CN | H | H | 1 |
| $SCF_3$ | $^nPr$ | H | CN | H | H | 2 |
| $SCF_3$ | $^nPr$ | H | H | F | H | 0 |
| $SCF_3$ | $^nPr$ | H | H | F | H | 1 |
| $SCF_3$ | $^nPr$ | H | H | F | H | 2 |
| $SCF_3$ | $^nPr$ | H | H | Cl | H | 0 |
| $SCF_3$ | $^nPr$ | H | H | Cl | H | 1 |
| $SCF_3$ | $^nPr$ | H | H | Cl | H | 2 |
| $SCF_3$ | $^nPr$ | H | H | Br | H | 0 |
| $SCF_3$ | $^nPr$ | H | H | Br | H | 1 |
| $SCF_3$ | $^nPr$ | H | H | Br | H | 2 |
| $SCF_3$ | $^nPr$ | H | H | I | H | 0 |
| $SCF_3$ | $^nPr$ | H | H | I | H | 1 |
| $SCF_3$ | $^nPr$ | H | H | I | H | 2 |
| $SCF_3$ | $^nPr$ | H | H | Me | H | 0 |
| $SCF_3$ | $^nPr$ | H | H | Me | H | 1 |
| $SCF_3$ | $^nPr$ | H | H | Me | H | 2 |
| $SCF_3$ | $^nPr$ | H | H | $CF_3$ | H | 0 |
| $SCF_3$ | $^nPr$ | H | H | $CF_3$ | H | 1 |
| $SCF_3$ | $^nPr$ | H | H | $CF_3$ | H | 2 |
| $SCF_3$ | $^nPr$ | H | H | $CF_2CF_3$ | H | 0 |
| $SCF_3$ | $^nPr$ | H | H | $CF_2CF_3$ | H | 1 |
| $SCF_3$ | $^nPr$ | H | H | $CF_2CF_3$ | H | 2 |
| $SCF_3$ | $^nPr$ | H | H | $CF(CF_3)_2$ | H | 0 |
| $SCF_3$ | $^nPr$ | H | H | $CF(CF_3)_2$ | H | 1 |
| $SCF_3$ | $^nPr$ | H | H | $CF(CF_3)_2$ | H | 2 |
| $SCF_3$ | $^nPr$ | H | H | SMe | H | 0 |
| $SCF_3$ | $^nPr$ | H | H | SMe | H | 1 |
| $SCF_3$ | $^nPr$ | H | H | SMe | H | 2 |
| $SCF_3$ | $^nPr$ | H | H | SOMe | H | 0 |
| $SCF_3$ | $^nPr$ | H | H | SOMe | H | 1 |
| $SCF_3$ | $^nPr$ | H | H | SOMe | H | 2 |
| $SCF_3$ | $^nPr$ | H | H | $SO_2Me$ | H | 0 |
| $SCF_3$ | $^nPr$ | H | H | $SO_2Me$ | H | 1 |
| $SCF_3$ | $^nPr$ | H | H | $SO_2Me$ | H | 2 |
| $SCF_3$ | $^nPr$ | H | H | OMe | H | 0 |
| $SCF_3$ | $^nPr$ | H | H | OMe | H | 1 |
| $SCF_3$ | $^nPr$ | H | H | OMe | H | 2 |
| $SCF_3$ | $^nPr$ | H | H | $OCF_3$ | H | 0 |
| $SCF_3$ | $^nPr$ | H | H | $OCF_3$ | H | 1 |
| $SCF_3$ | $^nPr$ | H | H | $OCF_3$ | H | 2 |
| $SCF_3$ | $^nPr$ | H | H | $NO_2$ | H | 0 |
| $SCF_3$ | $^nPr$ | H | H | $NO_2$ | H | 1 |
| $SCF_3$ | $^nPr$ | H | H | $NO_2$ | H | 2 |
| $SCF_3$ | $^nPr$ | H | H | CN | H | 0 |
| $SCF_3$ | $^nPr$ | H | H | CN | H | 1 |
| $SCF_3$ | $^nPr$ | H | H | CN | H | 2 |
| $SCF_3$ | $^nPr$ | H | H | H | F | 0 |
| $SCF_3$ | $^nPr$ | H | H | H | F | 1 |
| $SCF_3$ | $^nPr$ | H | H | H | F | 2 |
| $SCF_3$ | $^nPr$ | H | H | H | Cl | 0 |
| $SCF_3$ | $^nPr$ | H | H | H | Cl | 1 |
| $SCF_3$ | $^nPr$ | H | H | H | Cl | 2 |
| $SCF_3$ | $^nPr$ | H | H | H | Br | 0 |
| $SCF_3$ | $^nPr$ | H | H | H | Br | 1 |
| $SCF_3$ | $^nPr$ | H | H | H | Br | 2 |
| $SCF_3$ | $^nPr$ | H | H | H | I | 0 |
| $SCF_3$ | $^nPr$ | H | H | H | I | 1 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SCF_3$ | $^nPr$ | H | H | H | I | 2 |
| $SCF_3$ | $^nPr$ | H | H | H | Me | 0 |
| $SCF_3$ | $^nPr$ | H | H | H | Me | 1 |
| $SCF_3$ | $^nPr$ | H | H | H | Me | 2 |
| $SCF_3$ | $^nPr$ | H | H | H | $CF_3$ | 0 |
| $SCF_3$ | $^nPr$ | H | H | H | $CF_3$ | 1 |
| $SCF_3$ | $^nPr$ | H | H | H | $CF_3$ | 2 |
| $SCF_3$ | $^nPr$ | H | H | H | $CF_2CF_3$ | 0 |
| $SCF_3$ | $^nPr$ | H | H | H | $CF_2CF_3$ | 1 |
| $SCF_3$ | $^nPr$ | H | H | H | $CF_2CF_3$ | 2 |
| $SCF_3$ | $^nPr$ | H | H | H | $CF(CF_3)_2$ | 0 |
| $SCF_3$ | $^nPr$ | H | H | H | $CF(CF_3)_2$ | 1 |
| $SCF_3$ | $^nPr$ | H | H | H | $CF(CF_3)_2$ | 2 |
| $SCF_3$ | $^nPr$ | H | H | H | SMe | 0 |
| $SCF_3$ | $^nPr$ | H | H | H | SMe | 1 |
| $SCF_3$ | $^nPr$ | H | H | H | SMe | 2 |
| $SCF_3$ | $^nPr$ | H | H | H | SOMe | 0 |
| $SCF_3$ | $^nPr$ | H | H | H | SOMe | 1 |
| $SCF_3$ | $^nPr$ | H | H | H | SOMe | 2 |
| $SCF_3$ | $^nPr$ | H | H | H | $SO_2Me$ | 0 |
| $SCF_3$ | $^nPr$ | H | H | H | $SO_2Me$ | 1 |
| $SCF_3$ | $^nPr$ | H | H | H | $SO_2Me$ | 2 |
| $SCF_3$ | $^nPr$ | H | H | H | OMe | 0 |
| $SCF_3$ | $^nPr$ | H | H | H | OMe | 1 |
| $SCF_3$ | $^nPr$ | H | H | H | OMe | 2 |
| $SCF_3$ | $^nPr$ | H | H | H | $OCF_3$ | 0 |
| $SCF_3$ | $^nPr$ | H | H | H | $OCF_3$ | 1 |
| $SCF_3$ | $^nPr$ | H | H | H | $OCF_3$ | 2 |
| $SCF_3$ | $^nPr$ | H | H | H | $NO_2$ | 0 |
| $SCF_3$ | $^nPr$ | H | H | H | $NO_2$ | 1 |
| $SCF_3$ | $^nPr$ | H | H | H | $NO_2$ | 2 |
| $SCF_3$ | $^nPr$ | H | H | H | CN | 0 |
| $SCF_3$ | $^nPr$ | H | H | H | CN | 1 |
| $SCF_3$ | $^nPr$ | H | H | H | CN | 2 |
| $SCF_3$ | $^nPr$ | H | F | H | F | 0 |
| $SCF_3$ | $^nPr$ | H | F | H | F | 1 |
| $SCF_3$ | $^nPr$ | H | F | H | F | 2 |
| $SCF_3$ | $^nPr$ | H | Cl | H | Cl | 0 |
| $SCF_3$ | $^nPr$ | H | Cl | H | Cl | 1 |
| $SCF_3$ | $^nPr$ | H | Cl | H | Cl | 2 |
| $SCF_3$ | $^nPr$ | H | Br | H | Br | 0 |
| $SCF_3$ | $^nPr$ | H | Br | H | Br | 1 |
| $SCF_3$ | $^nPr$ | H | Br | H | Br | 2 |
| $SCF_3$ | $^nPr$ | H | I | H | I | 0 |
| $SCF_3$ | $^nPr$ | H | I | H | I | 1 |
| $SCF_3$ | $^nPr$ | H | I | H | I | 2 |
| $SCF_3$ | $^nPr$ | H | F | H | Cl | 0 |
| $SCF_3$ | $^nPr$ | H | F | H | Cl | 1 |
| $SCF_3$ | $^nPr$ | H | F | H | Cl | 2 |
| $SCF_3$ | $^nPr$ | H | F | H | Br | 0 |
| $SCF_3$ | $^nPr$ | H | F | H | Br | 1 |
| $SCF_3$ | $^nPr$ | H | F | H | Br | 2 |
| $SCF_3$ | $^nPr$ | H | F | H | I | 0 |
| $SCF_3$ | $^nPr$ | H | F | H | I | 1 |
| $SCF_3$ | $^nPr$ | H | F | H | I | 2 |
| $SCF_3$ | $^nPr$ | H | Cl | H | F | 0 |
| $SCF_3$ | $^nPr$ | H | Cl | H | F | 1 |
| $SCF_3$ | $^nPr$ | H | Cl | H | F | 2 |
| $SCF_3$ | $^nPr$ | H | Cl | H | Br | 0 |
| $SCF_3$ | $^nPr$ | H | Cl | H | Br | 1 |
| $SCF_3$ | $^nPr$ | H | Cl | H | Br | 2 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SCF_3$ | $^nPr$ | H | Cl | H | I | 0 |
| $SCF_3$ | $^nPr$ | H | Cl | H | I | 1 |
| $SCF_3$ | $^nPr$ | H | Cl | H | I | 2 |
| $SCF_3$ | $^nPr$ | H | Br | H | F | 0 |
| $SCF_3$ | $^nPr$ | H | Br | H | F | 1 |
| $SCF_3$ | $^nPr$ | H | Br | H | F | 2 |
| $SCF_3$ | $^nPr$ | H | Br | H | Cl | 0 |
| $SCF_3$ | $^nPr$ | H | Br | H | Cl | 1 |
| $SCF_3$ | $^nPr$ | H | Br | H | Cl | 2 |
| $SCF_3$ | $^nPr$ | H | Br | H | I | 0 |
| $SCF_3$ | $^nPr$ | H | Br | H | I | 1 |
| $SCF_3$ | $^nPr$ | H | Br | H | I | 2 |
| $SCF_3$ | $^nPr$ | H | I | H | F | 0 |
| $SCF_3$ | $^nPr$ | H | I | H | F | 1 |
| $SCF_3$ | $^nPr$ | H | I | H | F | 2 |
| $SCF_3$ | $^nPr$ | H | I | H | Cl | 0 |
| $SCF_3$ | $^nPr$ | H | I | H | Cl | 1 |
| $SCF_3$ | $^nPr$ | H | I | H | Cl | 2 |
| $SCF_3$ | $^nPr$ | H | I | H | Br | 0 |
| $SCF_3$ | $^nPr$ | H | I | H | Br | 1 |
| $SCF_3$ | $^nPr$ | H | I | H | Br | 2 |
| $SCF_3$ | $^nPr$ | H | F | H | CN | 0 |
| $SCF_3$ | $^nPr$ | H | F | H | CN | 1 |
| $SCF_3$ | $^nPr$ | H | F | H | CN | 2 |
| $SCF_3$ | $^nPr$ | H | Cl | H | CN | 0 |
| $SCF_3$ | $^nPr$ | H | Cl | H | CN | 1 |
| $SCF_3$ | $^nPr$ | H | Cl | H | CN | 2 |
| $SCF_3$ | $^nPr$ | H | Br | H | CN | 0 |
| $SCF_3$ | $^nPr$ | H | Br | H | CN | 1 |
| $SCF_3$ | $^nPr$ | H | Br | H | CN | 2 |
| $SCF_3$ | $^nPr$ | H | I | H | CN | 0 |
| $SCF_3$ | $^nPr$ | H | I | H | CN | 1 |
| $SCF_3$ | $^nPr$ | H | I | H | CN | 2 |
| $SCF_3$ | $^nPr$ | H | $CF_3$ | H | F | 0 |
| $SCF_3$ | $^nPr$ | H | $CF_3$ | H | F | 1 |
| $SCF_3$ | $^nPr$ | H | $CF_3$ | H | F | 2 |
| $SCF_3$ | $^nPr$ | H | $CF_3$ | H | Cl | 0 |
| $SCF_3$ | $^nPr$ | H | $CF_3$ | H | Cl | 1 |
| $SCF_3$ | $^nPr$ | H | $CF_3$ | H | Cl | 2 |
| $SCF_3$ | $^nPr$ | H | $CF_3$ | H | Br | 0 |
| $SCF_3$ | $^nPr$ | H | $CF_3$ | H | Br | 1 |
| $SCF_3$ | $^nPr$ | H | $CF_3$ | H | Br | 2 |
| $SCF_3$ | $^nPr$ | H | $CF_3$ | H | I | 0 |
| $SCF_3$ | $^nPr$ | H | $CF_3$ | H | I | 1 |
| $SCF_3$ | $^nPr$ | H | $CF_3$ | H | I | 2 |
| $SCF_3$ | $^nPr$ | H | $CF_3$ | H | CN | 0 |
| $SCF_3$ | $^nPr$ | H | $CF_3$ | H | CN | 1 |
| $SCF_3$ | $^nPr$ | H | $CF_3$ | H | CN | 2 |
| $SCF_3$ | $^nPr$ | H | F | F | H | 0 |
| $SCF_3$ | $^nPr$ | H | F | F | H | 1 |
| $SCF_3$ | $^nPr$ | H | F | F | H | 2 |
| $SCF_3$ | $^nPr$ | H | Cl | Cl | H | 0 |
| $SCF_3$ | $^nPr$ | H | Cl | Cl | H | 1 |
| $SCF_3$ | $^nPr$ | H | Cl | Cl | H | 2 |
| $SCF_3$ | $^nPr$ | H | Br | Br | H | 0 |
| $SCF_3$ | $^nPr$ | H | Br | Br | H | 1 |
| $SCF_3$ | $^nPr$ | H | Br | Br | H | 2 |
| $SCF_3$ | $^nPr$ | H | I | I | H | 0 |
| $SCF_3$ | $^nPr$ | H | I | I | H | 1 |
| $SCF_3$ | $^nPr$ | H | I | I | H | 2 |
| $SCF_3$ | $^nPr$ | H | F | Cl | H | 0 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SCF_3$ | $^nPr$ | H | F | Cl | H | 1 |
| $SCF_3$ | $^nPr$ | H | F | Cl | H | 2 |
| $SCF_3$ | $^nPr$ | H | F | Br | H | 0 |
| $SCF_3$ | $^nPr$ | H | F | Br | H | 1 |
| $SCF_3$ | $^nPr$ | H | F | Br | H | 2 |
| $SCF_3$ | $^nPr$ | H | F | I | H | 0 |
| $SCF_3$ | $^nPr$ | H | F | I | H | 1 |
| $SCF_3$ | $^nPr$ | H | F | I | H | 2 |
| $SCF_3$ | $^nPr$ | H | Cl | F | H | 0 |
| $SCF_3$ | $^nPr$ | H | Cl | F | H | 1 |
| $SCF_3$ | $^nPr$ | H | Cl | F | H | 2 |
| $SCF_3$ | $^nPr$ | H | Cl | Br | H | 0 |
| $SCF_3$ | $^nPr$ | H | Cl | Br | H | 1 |
| $SCF_3$ | $^nPr$ | H | Cl | Br | H | 2 |
| $SCF_3$ | $^nPr$ | H | Cl | I | H | 0 |
| $SCF_3$ | $^nPr$ | H | Cl | I | H | 1 |
| $SCF_3$ | $^nPr$ | H | Cl | I | H | 2 |
| $SCF_3$ | $^nPr$ | H | Br | F | H | 0 |
| $SCF_3$ | $^nPr$ | H | Br | F | H | 1 |
| $SCF_3$ | $^nPr$ | H | Br | F | H | 2 |
| $SCF_3$ | $^nPr$ | H | Br | Cl | H | 0 |
| $SCF_3$ | $^nPr$ | H | Br | Cl | H | 1 |
| $SCF_3$ | $^nPr$ | H | Br | Cl | H | 2 |
| $SCF_3$ | $^nPr$ | H | Br | I | H | 0 |
| $SCF_3$ | $^nPr$ | H | Br | I | H | 1 |
| $SCF_3$ | $^nPr$ | H | Br | I | H | 2 |
| $SCF_3$ | $^nPr$ | H | I | F | H | 0 |
| $SCF_3$ | $^nPr$ | H | I | F | H | 1 |
| $SCF_3$ | $^nPr$ | H | I | F | H | 2 |
| $SCF_3$ | $^nPr$ | H | I | Cl | H | 0 |
| $SCF_3$ | $^nPr$ | H | I | Cl | H | 1 |
| $SCF_3$ | $^nPr$ | H | I | Cl | H | 2 |
| $SCF_3$ | $^nPr$ | H | I | Br | H | 0 |
| $SCF_3$ | $^nPr$ | H | I | Br | H | 1 |
| $SCF_3$ | $^nPr$ | H | I | Br | H | 2 |
| $SCF_3$ | $^nPr$ | H | F | CN | H | 0 |
| $SCF_3$ | $^nPr$ | H | F | CN | H | 1 |
| $SCF_3$ | $^nPr$ | H | F | CN | H | 2 |
| $SCF_3$ | $^nPr$ | H | Cl | CN | H | 0 |
| $SCF_3$ | $^nPr$ | H | Cl | CN | H | 1 |
| $SCF_3$ | $^nPr$ | H | Cl | CN | H | 2 |
| $SCF_3$ | $^nPr$ | H | Br | CN | H | 0 |
| $SCF_3$ | $^nPr$ | H | Br | CN | H | 1 |
| $SCF_3$ | $^nPr$ | H | Br | CN | H | 2 |
| $SCF_3$ | $^nPr$ | H | I | CN | H | 0 |
| $SCF_3$ | $^nPr$ | H | I | CN | H | 1 |
| $SCF_3$ | $^nPr$ | H | I | CN | H | 2 |
| $SCF_3$ | $^nPr$ | H | $CF_3$ | F | H | 0 |
| $SCF_3$ | $^nPr$ | H | $CF_3$ | F | H | 1 |
| $SCF_3$ | $^nPr$ | H | $CF_3$ | F | H | 2 |
| $SCF_3$ | $^nPr$ | H | $CF_3$ | Cl | H | 0 |
| $SCF_3$ | $^nPr$ | H | $CF_3$ | Cl | H | 1 |
| $SCF_3$ | $^nPr$ | H | $CF_3$ | Cl | H | 2 |
| $SCF_3$ | $^nPr$ | H | $CF_3$ | Br | H | 0 |
| $SCF_3$ | $^nPr$ | H | $CF_3$ | Br | H | 1 |
| $SCF_3$ | $^nPr$ | H | $CF_3$ | Br | H | 2 |
| $SCF_3$ | $^nPr$ | H | $CF_3$ | I | H | 0 |
| $SCF_3$ | $^nPr$ | H | $CF_3$ | I | H | 1 |
| $SCF_3$ | $^nPr$ | H | $CF_3$ | I | H | 2 |
| $SCF_3$ | $^nPr$ | H | $CF_3$ | CN | H | 0 |
| $SCF_3$ | $^nPr$ | H | $CF_3$ | CN | H | 1 |
| $SCF_3$ | $^nPr$ | H | $CF_3$ | CN | H | 2 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SCF_3$ | $^iPr$ | H | H | H | H | 0 |
| $SCF_3$ | $^iPr$ | H | H | H | H | 1 |
| $SCF_3$ | $^iPr$ | H | H | H | H | 2 |
| $SCF_3$ | $^iPr$ | F | H | H | H | 0 |
| $SCF_3$ | $^iPr$ | F | H | H | H | 1 |
| $SCF_3$ | $^iPr$ | F | H | H | H | 2 |
| $SCF_3$ | $^iPr$ | Cl | H | H | H | 0 |
| $SCF_3$ | $^iPr$ | Cl | H | H | H | 1 |
| $SCF_3$ | $^iPr$ | Cl | H | H | H | 2 |
| $SCF_3$ | $^iPr$ | Br | H | H | H | 0 |
| $SCF_3$ | $^iPr$ | Br | H | H | H | 1 |
| $SCF_3$ | $^iPr$ | Br | H | H | H | 2 |
| $SCF_3$ | $^iPr$ | I | H | H | H | 0 |
| $SCF_3$ | $^iPr$ | I | H | H | H | 1 |
| $SCF_3$ | $^iPr$ | I | H | H | H | 2 |
| $SCF_3$ | $^iPr$ | Me | H | H | H | 0 |
| $SCF_3$ | $^iPr$ | Me | H | H | H | 1 |
| $SCF_3$ | $^iPr$ | Me | H | H | H | 2 |
| $SCF_3$ | $^iPr$ | $CF_3$ | H | H | H | 0 |
| $SCF_3$ | $^iPr$ | $CF_3$ | H | H | H | 1 |
| $SCF_3$ | $^iPr$ | $CF_3$ | H | H | H | 2 |
| $SCF_3$ | $^iPr$ | H | F | H | H | 0 |
| $SCF_3$ | $^iPr$ | H | F | H | H | 1 |
| $SCF_3$ | $^iPr$ | H | F | H | H | 2 |
| $SCF_3$ | $^iPr$ | H | Cl | H | H | 0 |
| $SCF_3$ | $^iPr$ | H | Cl | H | H | 1 |
| $SCF_3$ | $^iPr$ | H | Cl | H | H | 2 |
| $SCF_3$ | $^iPr$ | H | Br | H | H | 0 |
| $SCF_3$ | $^iPr$ | H | Br | H | H | 1 |
| $SCF_3$ | $^iPr$ | H | Br | H | H | 2 |
| $SCF_3$ | $^iPr$ | H | I | H | H | 0 |
| $SCF_3$ | $^iPr$ | H | I | H | H | 1 |
| $SCF_3$ | $^iPr$ | H | I | H | H | 2 |
| $SCF_3$ | $^iPr$ | H | Me | H | H | 0 |
| $SCF_3$ | $^iPr$ | H | Me | H | H | 1 |
| $SCF_3$ | $^iPr$ | H | Me | H | H | 2 |
| $SCF_3$ | $^iPr$ | H | $CF_3$ | H | H | 0 |
| $SCF_3$ | $^iPr$ | H | $CF_3$ | H | H | 1 |
| $SCF_3$ | $^iPr$ | H | $CF_3$ | H | H | 2 |
| $SCF_3$ | $^iPr$ | H | $CF_2CF_3$ | H | H | 0 |
| $SCF_3$ | $^iPr$ | H | $CF_2CF_3$ | H | H | 1 |
| $SCF_3$ | $^iPr$ | H | $CF_2CF_3$ | H | H | 2 |
| $SCF_3$ | $^iPr$ | H | $CF(CF_3)_2$ | H | H | 0 |
| $SCF_3$ | $^iPr$ | H | $CF(CF_3)_2$ | H | H | 1 |
| $SCF_3$ | $^iPr$ | H | $CF(CF_3)_2$ | H | H | 2 |
| $SCF_3$ | $^iPr$ | H | SMe | H | H | 0 |
| $SCF_3$ | $^iPr$ | H | SMe | H | H | 1 |
| $SCF_3$ | $^iPr$ | H | SMe | H | H | 2 |
| $SCF_3$ | $^iPr$ | H | SOMe | H | H | 0 |
| $SCF_3$ | $^iPr$ | H | SOMe | H | H | 1 |
| $SCF_3$ | $^iPr$ | H | SOMe | H | H | 2 |
| $SCF_3$ | $^iPr$ | H | $SO_2Me$ | H | H | 0 |
| $SCF_3$ | $^iPr$ | H | $SO_2Me$ | H | H | 1 |
| $SCF_3$ | $^iPr$ | H | $SO_2Me$ | H | H | 2 |
| $SCF_3$ | $^iPr$ | H | OMe | H | H | 0 |
| $SCF_3$ | $^iPr$ | H | OMe | H | H | 1 |
| $SCF_3$ | $^iPr$ | H | OMe | H | H | 2 |
| $SCF_3$ | $^iPr$ | H | $OCF_3$ | H | H | 0 |
| $SCF_3$ | $^iPr$ | H | $OCF_3$ | H | H | 1 |
| $SCF_3$ | $^iPr$ | H | $OCF_3$ | H | H | 2 |
| $SCF_3$ | $^iPr$ | H | $NO_2$ | H | H | 0 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SCF_3$ | $^iPr$ | H | $NO_2$ | H | H | 1 |
| $SCF_3$ | $^iPr$ | H | $NO_2$ | H | H | 2 |
| $SCF_3$ | $^iPr$ | H | CN | H | H | 0 |
| $SCF_3$ | $^iPr$ | H | CN | H | H | 1 |
| $SCF_3$ | $^iPr$ | H | CN | H | H | 2 |
| $SCF_3$ | $^iPr$ | H | H | F | H | 0 |
| $SCF_3$ | $^iPr$ | H | H | F | H | 1 |
| $SCF_3$ | $^iPr$ | H | H | F | H | 2 |
| $SCF_3$ | $^iPr$ | H | H | Cl | H | 0 |
| $SCF_3$ | $^iPr$ | H | H | Cl | H | 1 |
| $SCF_3$ | $^iPr$ | H | H | Cl | H | 2 |
| $SCF_3$ | $^iPr$ | H | H | Br | H | 0 |
| $SCF_3$ | $^iPr$ | H | H | Br | H | 1 |
| $SCF_3$ | $^iPr$ | H | H | Br | H | 2 |
| $SCF_3$ | $^iPr$ | H | H | I | H | 0 |
| $SCF_3$ | $^iPr$ | H | H | I | H | 1 |
| $SCF_3$ | $^iPr$ | H | H | I | H | 2 |
| $SCF_3$ | $^iPr$ | H | H | Me | H | 0 |
| $SCF_3$ | $^iPr$ | H | H | Me | H | 1 |
| $SCF_3$ | $^iPr$ | H | H | Me | H | 2 |
| $SCF_3$ | $^iPr$ | H | H | $CF_3$ | H | 0 |
| $SCF_3$ | $^iPr$ | H | H | $CF_3$ | H | 1 |
| $SCF_3$ | $^iPr$ | H | H | $CF_3$ | H | 2 |
| $SCF_3$ | $^iPr$ | H | H | $CF_2CF_3$ | H | 0 |
| $SCF_3$ | $^iPr$ | H | H | $CF_2CF_3$ | H | 1 |
| $SCF_3$ | $^iPr$ | H | H | $CF_2CF_3$ | H | 2 |
| $SCF_3$ | $^iPr$ | H | H | $CF(CF_3)_2$ | H | 0 |
| $SCF_3$ | $^iPr$ | H | H | $CF(CF_3)_2$ | H | 1 |
| $SCF_3$ | $^iPr$ | H | H | $CF(CF_3)_2$ | H | 2 |
| $SCF_3$ | $^iPr$ | H | H | SMe | H | 0 |
| $SCF_3$ | $^iPr$ | H | H | SMe | H | 1 |
| $SCF_3$ | $^iPr$ | H | H | SMe | H | 2 |
| $SCF_3$ | $^iPr$ | H | H | SOMe | H | 0 |
| $SCF_3$ | $^iPr$ | H | H | SOMe | H | 1 |
| $SCF_3$ | $^iPr$ | H | H | SOMe | H | 2 |
| $SCF_3$ | $^iPr$ | H | H | $SO_2Me$ | H | 0 |
| $SCF_3$ | $^iPr$ | H | H | $SO_2Me$ | H | 1 |
| $SCF_3$ | $^iPr$ | H | H | $SO_2Me$ | H | 2 |
| $SCF_3$ | $^iPr$ | H | H | OMe | H | 0 |
| $SCF_3$ | $^iPr$ | H | H | OMe | H | 1 |
| $SCF_3$ | $^iPr$ | H | H | OMe | H | 2 |
| $SCF_3$ | $^iPr$ | H | H | $OCF_3$ | H | 0 |
| $SCF_3$ | $^iPr$ | H | H | $OCF_3$ | H | 1 |
| $SCF_3$ | $^iPr$ | H | H | $OCF_3$ | H | 2 |
| $SCF_3$ | $^iPr$ | H | H | $NO_2$ | H | 0 |
| $SCF_3$ | $^iPr$ | H | H | $NO_2$ | H | 1 |
| $SCF_3$ | $^iPr$ | H | H | $NO_2$ | H | 2 |
| $SCF_3$ | $^iPr$ | H | H | CN | H | 0 |
| $SCF_3$ | $^iPr$ | H | H | CN | H | 1 |
| $SCF_3$ | $^iPr$ | H | H | CN | H | 2 |
| $SCF_3$ | $^iPr$ | H | H | H | F | 0 |
| $SCF_3$ | $^iPr$ | H | H | H | F | 1 |
| $SCF_3$ | $^iPr$ | H | H | H | F | 2 |
| $SCF_3$ | $^iPr$ | H | H | H | Cl | 0 |
| $SCF_3$ | $^iPr$ | H | H | H | Cl | 1 |
| $SCF_3$ | $^iPr$ | H | H | H | Cl | 2 |
| $SCF_3$ | $^iPr$ | H | H | H | Br | 0 |
| $SCF_3$ | $^iPr$ | H | H | H | Br | 1 |
| $SCF_3$ | $^iPr$ | H | H | H | Br | 2 |
| $SCF_3$ | $^iPr$ | H | H | H | I | 0 |
| $SCF_3$ | $^iPr$ | H | H | H | I | 1 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SCF_3$ | $^iPr$ | H | H | H | I | 2 |
| $SCF_3$ | $^iPr$ | H | H | H | Me | 0 |
| $SCF_3$ | $^iPr$ | H | H | H | Me | 1 |
| $SCF_3$ | $^iPr$ | H | H | H | Me | 2 |
| $SCF_3$ | $^iPr$ | H | H | H | $CF_3$ | 0 |
| $SCF_3$ | $^iPr$ | H | H | H | $CF_3$ | 1 |
| $SCF_3$ | $^iPr$ | H | H | H | $CF_3$ | 2 |
| $SCF_3$ | $^iPr$ | H | H | H | $CF_2CF_3$ | 0 |
| $SCF_3$ | $^iPr$ | H | H | H | $CF_2CF_3$ | 1 |
| $SCF_3$ | $^iPr$ | H | H | H | $CF_2CF_3$ | 2 |
| $SCF_3$ | $^iPr$ | H | H | H | $CF(CF_3)_2$ | 0 |
| $SCF_3$ | $^iPr$ | H | H | H | $CF(CF_3)_2$ | 1 |
| $SCF_3$ | $^iPr$ | H | H | H | $CF(CF_3)_2$ | 2 |
| $SCF_3$ | $^iPr$ | H | H | H | SMe | 0 |
| $SCF_3$ | $^iPr$ | H | H | H | SMe | 1 |
| $SCF_3$ | $^iPr$ | H | H | H | SMe | 2 |
| $SCF_3$ | $^iPr$ | H | H | H | SOMe | 0 |
| $SCF_3$ | $^iPr$ | H | H | H | SOMe | 1 |
| $SCF_3$ | $^iPr$ | H | H | H | SOMe | 2 |
| $SCF_3$ | $^iPr$ | H | H | H | $SO_2Me$ | 0 |
| $SCF_3$ | $^iPr$ | H | H | H | $SO_2Me$ | 1 |
| $SCF_3$ | $^iPr$ | H | H | H | $SO_2Me$ | 2 |
| $SCF_3$ | $^iPr$ | H | H | H | OMe | 0 |
| $SCF_3$ | $^iPr$ | H | H | H | OMe | 1 |
| $SCF_3$ | $^iPr$ | H | H | H | OMe | 2 |
| $SCF_3$ | $^iPr$ | H | H | H | $OCF_3$ | 0 |
| $SCF_3$ | $^iPr$ | H | H | H | $OCF_3$ | 1 |
| $SCF_3$ | $^iPr$ | H | H | H | $OCF_3$ | 2 |
| $SCF_3$ | $^iPr$ | H | H | H | $NO_2$ | 0 |
| $SCF_3$ | $^iPr$ | H | H | H | $NO_2$ | 1 |
| $SCF_3$ | $^iPr$ | H | H | H | $NO_2$ | 2 |
| $SCF_3$ | $^iPr$ | H | H | H | CN | 0 |
| $SCF_3$ | $^iPr$ | H | H | H | CN | 1 |
| $SCF_3$ | $^iPr$ | H | H | H | CN | 2 |
| $SCF_3$ | $^iPr$ | H | F | H | F | 0 |
| $SCF_3$ | $^iPr$ | H | F | H | F | 1 |
| $SCF_3$ | $^iPr$ | H | F | H | F | 2 |
| $SCF_3$ | $^iPr$ | H | Cl | H | Cl | 0 |
| $SCF_3$ | $^iPr$ | H | Cl | H | Cl | 1 |
| $SCF_3$ | $^iPr$ | H | Cl | H | Cl | 2 |
| $SCF_3$ | $^iPr$ | H | Br | H | Br | 0 |
| $SCF_3$ | $^iPr$ | H | Br | H | Br | 1 |
| $SCF_3$ | $^iPr$ | H | Br | H | Br | 2 |
| $SCF_3$ | $^iPr$ | H | I | H | I | 0 |
| $SCF_3$ | $^iPr$ | H | I | H | I | 1 |
| $SCF_3$ | $^iPr$ | H | I | H | I | 2 |
| $SCF_3$ | $^iPr$ | H | F | H | Cl | 0 |
| $SCF_3$ | $^iPr$ | H | F | H | Cl | 1 |
| $SCF_3$ | $^iPr$ | H | F | H | Cl | 2 |
| $SCF_3$ | $^iPr$ | H | F | H | Br | 0 |
| $SCF_3$ | $^iPr$ | H | F | H | Br | 1 |
| $SCF_3$ | $^iPr$ | H | F | H | Br | 2 |
| $SCF_3$ | $^iPr$ | H | F | H | I | 0 |
| $SCF_3$ | $^iPr$ | H | F | H | I | 1 |
| $SCF_3$ | $^iPr$ | H | F | H | I | 2 |
| $SCF_3$ | $^iPr$ | H | Cl | H | F | 0 |
| $SCF_3$ | $^iPr$ | H | Cl | H | F | 1 |
| $SCF_3$ | $^iPr$ | H | Cl | H | F | 2 |
| $SCF_3$ | $^iPr$ | H | Cl | H | Br | 0 |
| $SCF_3$ | $^iPr$ | H | Cl | H | Br | 1 |
| $SCF_3$ | $^iPr$ | H | Cl | H | Br | 2 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SCF_3$ | $^iPr$ | H | Cl | H | I | 0 |
| $SCF_3$ | $^iPr$ | H | Cl | H | I | 1 |
| $SCF_3$ | $^iPr$ | H | Cl | H | I | 2 |
| $SCF_3$ | $^iPr$ | H | Br | H | F | 0 |
| $SCF_3$ | $^iPr$ | H | Br | H | F | 1 |
| $SCF_3$ | $^iPr$ | H | Br | H | F | 2 |
| $SCF_3$ | $^iPr$ | H | Br | H | Cl | 0 |
| $SCF_3$ | $^iPr$ | H | Br | H | Cl | 1 |
| $SCF_3$ | $^iPr$ | H | Br | H | Cl | 2 |
| $SCF_3$ | $^iPr$ | H | Br | H | I | 0 |
| $SCF_3$ | $^iPr$ | H | Br | H | I | 1 |
| $SCF_3$ | $^iPr$ | H | Br | H | I | 2 |
| $SCF_3$ | $^iPr$ | H | I | H | F | 0 |
| $SCF_3$ | $^iPr$ | H | I | H | F | 1 |
| $SCF_3$ | $^iPr$ | H | I | H | F | 2 |
| $SCF_3$ | $^iPr$ | H | I | H | Cl | 0 |
| $SCF_3$ | $^iPr$ | H | I | H | Cl | 1 |
| $SCF_3$ | $^iPr$ | H | I | H | Cl | 2 |
| $SCF_3$ | $^iPr$ | H | I | H | Br | 0 |
| $SCF_3$ | $^iPr$ | H | I | H | Br | 1 |
| $SCF_3$ | $^iPr$ | H | I | H | Br | 2 |
| $SCF_3$ | $^iPr$ | H | F | H | CN | 0 |
| $SCF_3$ | $^iPr$ | H | F | H | CN | 1 |
| $SCF_3$ | $^iPr$ | H | F | H | CN | 2 |
| $SCF_3$ | $^iPr$ | H | Cl | H | CN | 0 |
| $SCF_3$ | $^iPr$ | H | Cl | H | CN | 1 |
| $SCF_3$ | $^iPr$ | H | Cl | H | CN | 2 |
| $SCF_3$ | $^iPr$ | H | Br | H | CN | 0 |
| $SCF_3$ | $^iPr$ | H | Br | H | CN | 1 |
| $SCF_3$ | $^iPr$ | H | Br | H | CN | 2 |
| $SCF_3$ | $^iPr$ | H | I | H | CN | 0 |
| $SCF_3$ | $^iPr$ | H | I | H | CN | 1 |
| $SCF_3$ | $^iPr$ | H | I | H | CN | 2 |
| $SCF_3$ | $^iPr$ | H | $CF_3$ | H | F | 0 |
| $SCF_3$ | $^iPr$ | H | $CF_3$ | H | F | 1 |
| $SCF_3$ | $^iPr$ | H | $CF_3$ | H | F | 2 |
| $SCF_3$ | $^iPr$ | H | $CF_3$ | H | Cl | 0 |
| $SCF_3$ | $^iPr$ | H | $CF_3$ | H | Cl | 1 |
| $SCF_3$ | $^iPr$ | H | $CF_3$ | H | Cl | 2 |
| $SCF_3$ | $^iPr$ | H | $CF_3$ | H | Br | 0 |
| $SCF_3$ | $^iPr$ | H | $CF_3$ | H | Br | 1 |
| $SCF_3$ | $^iPr$ | H | $CF_3$ | H | Br | 2 |
| $SCF_3$ | $^iPr$ | H | $CF_3$ | H | I | 0 |
| $SCF_3$ | $^iPr$ | H | $CF_3$ | H | I | 1 |
| $SCF_3$ | $^iPr$ | H | $CF_3$ | H | I | 2 |
| $SCF_3$ | $^iPr$ | H | $CF_3$ | H | CN | 0 |
| $SCF_3$ | $^iPr$ | H | $CF_3$ | H | CN | 1 |
| $SCF_3$ | $^iPr$ | H | $CF_3$ | H | CN | 2 |
| $SCF_3$ | $^iPr$ | H | F | F | H | 0 |
| $SCF_3$ | $^iPr$ | H | F | F | H | 1 |
| $SCF_3$ | $^iPr$ | H | F | F | H | 2 |
| $SCF_3$ | $^iPr$ | H | Cl | Cl | H | 0 |
| $SCF_3$ | $^iPr$ | H | Cl | Cl | H | 1 |
| $SCF_3$ | $^iPr$ | H | Cl | Cl | H | 2 |
| $SCF_3$ | $^iPr$ | H | Br | Br | H | 0 |
| $SCF_3$ | $^iPr$ | H | Br | Br | H | 1 |
| $SCF_3$ | $^iPr$ | H | Br | Br | H | 2 |
| $SCF_3$ | $^iPr$ | H | I | I | H | 0 |
| $SCF_3$ | $^iPr$ | H | I | I | H | 1 |
| $SCF_3$ | $^iPr$ | H | I | I | H | 2 |
| $SCF_3$ | $^iPr$ | H | F | Cl | H | 0 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SCF_3$ | $^iPr$ | H | F | Cl | H | 1 |
| $SCF_3$ | $^iPr$ | H | F | Cl | H | 2 |
| $SCF_3$ | $^iPr$ | H | F | Br | H | 0 |
| $SCF_3$ | $^iPr$ | H | F | Br | H | 1 |
| $SCF_3$ | $^iPr$ | H | F | Br | H | 2 |
| $SCF_3$ | $^iPr$ | H | F | I | H | 0 |
| $SCF_3$ | $^iPr$ | H | F | I | H | 1 |
| $SCF_3$ | $^iPr$ | H | F | I | H | 2 |
| $SCF_3$ | $^iPr$ | H | Cl | F | H | 0 |
| $SCF_3$ | $^iPr$ | H | Cl | F | H | 1 |
| $SCF_3$ | $^iPr$ | H | Cl | F | H | 2 |
| $SCF_3$ | $^iPr$ | H | Cl | Br | H | 0 |
| $SCF_3$ | $^iPr$ | H | Cl | Br | H | 1 |
| $SCF_3$ | $^iPr$ | H | Cl | Br | H | 2 |
| $SCF_3$ | $^iPr$ | H | Cl | I | H | 0 |
| $SCF_3$ | $^iPr$ | H | Cl | I | H | 1 |
| $SCF_3$ | $^iPr$ | H | Cl | I | H | 2 |
| $SCF_3$ | $^iPr$ | H | Br | F | H | 0 |
| $SCF_3$ | $^iPr$ | H | Br | F | H | 1 |
| $SCF_3$ | $^iPr$ | H | Br | F | H | 2 |
| $SCF_3$ | $^iPr$ | H | Br | Cl | H | 0 |
| $SCF_3$ | $^iPr$ | H | Br | Cl | H | 1 |
| $SCF_3$ | $^iPr$ | H | Br | Cl | H | 2 |
| $SCF_3$ | $^iPr$ | H | Br | I | H | 0 |
| $SCF_3$ | $^iPr$ | H | Br | I | H | 1 |
| $SCF_3$ | $^iPr$ | H | Br | I | H | 2 |
| $SCF_3$ | $^iPr$ | H | I | F | H | 0 |
| $SCF_3$ | $^iPr$ | H | I | F | H | 1 |
| $SCF_3$ | $^iPr$ | H | I | F | H | 2 |
| $SCF_3$ | $^iPr$ | H | I | Cl | H | 0 |
| $SCF_3$ | $^iPr$ | H | I | Cl | H | 1 |
| $SCF_3$ | $^iPr$ | H | I | Cl | H | 2 |
| $SCF_3$ | $^iPr$ | H | I | Br | H | 0 |
| $SCF_3$ | $^iPr$ | H | I | Br | H | 1 |
| $SCF_3$ | $^iPr$ | H | I | Br | H | 2 |
| $SCF_3$ | $^iPr$ | H | F | CN | H | 0 |
| $SCF_3$ | $^iPr$ | H | F | CN | H | 1 |
| $SCF_3$ | $^iPr$ | H | F | CN | H | 2 |
| $SCF_3$ | $^iPr$ | H | Cl | CN | H | 0 |
| $SCF_3$ | $^iPr$ | H | Cl | CN | H | 1 |
| $SCF_3$ | $^iPr$ | H | Cl | CN | H | 2 |
| $SCF_3$ | $^iPr$ | H | Br | CN | H | 0 |
| $SCF_3$ | $^iPr$ | H | Br | CN | H | 1 |
| $SCF_3$ | $^iPr$ | H | Br | CN | H | 2 |
| $SCF_3$ | $^iPr$ | H | I | CN | H | 0 |
| $SCF_3$ | $^iPr$ | H | I | CN | H | 1 |
| $SCF_3$ | $^iPr$ | H | I | CN | H | 2 |
| $SCF_3$ | $^iPr$ | H | $CF_3$ | F | H | 0 |
| $SCF_3$ | $^iPr$ | H | $CF_3$ | F | H | 1 |
| $SCF_3$ | $^iPr$ | H | $CF_3$ | F | H | 2 |
| $SCF_3$ | $^iPr$ | H | $CF_3$ | Cl | H | 0 |
| $SCF_3$ | $^iPr$ | H | $CF_3$ | Cl | H | 1 |
| $SCF_3$ | $^iPr$ | H | $CF_3$ | Cl | H | 2 |
| $SCF_3$ | $^iPr$ | H | $CF_3$ | Br | H | 0 |
| $SCF_3$ | $^iPr$ | H | $CF_3$ | Br | H | 1 |
| $SCF_3$ | $^iPr$ | H | $CF_3$ | Br | H | 2 |
| $SCF_3$ | $^iPr$ | H | $CF_3$ | I | H | 0 |
| $SCF_3$ | $^iPr$ | H | $CF_3$ | I | H | 1 |
| $SCF_3$ | $^iPr$ | H | $CF_3$ | I | H | 2 |
| $SCF_3$ | $^iPr$ | H | $CF_3$ | CN | H | 0 |
| $SCF_3$ | $^iPr$ | H | $CF_3$ | CN | H | 1 |
| $SCF_3$ | $^iPr$ | H | $CF_3$ | CN | H | 2 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SCF_3$ | $CH_2CF_3$ | H | H | H | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | H | H | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | H | H | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | F | H | H | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | F | H | H | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | F | H | H | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | Cl | H | H | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | Cl | H | H | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | Cl | H | H | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | Br | H | H | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | Br | H | H | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | Br | H | H | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | I | H | H | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | I | H | H | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | I | H | H | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | Me | H | H | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | Me | H | H | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | Me | H | H | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | $CF_3$ | H | H | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | $CF_3$ | H | H | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | $CF_3$ | H | H | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | F | H | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | F | H | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | F | H | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | Cl | H | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | Cl | H | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | Cl | H | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | Br | H | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | Br | H | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | Br | H | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | I | H | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | I | H | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | I | H | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | Me | H | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | Me | H | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | Me | H | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | $CF_2CF_3$ | H | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | $CF_2CF_3$ | H | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | $CF_2CF_3$ | H | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | $CF(CF_3)_2$ | H | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | $CF(CF_3)_2$ | H | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | $CF(CF_3)_2$ | H | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | SMe | H | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | SMe | H | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | SMe | H | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | SOMe | H | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | SOMe | H | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | SOMe | H | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | $SO_2Me$ | H | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | $SO_2Me$ | H | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | $SO_2Me$ | H | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | OMe | H | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | OMe | H | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | OMe | H | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | $OCF_3$ | H | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | $OCF_3$ | H | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | $OCF_3$ | H | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | $NO_2$ | H | H | 0 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SCF_3$ | $CH_2CF_3$ | H | $NO_2$ | H | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | $NO_2$ | H | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | CN | H | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | CN | H | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | CN | H | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | H | F | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | H | F | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | H | F | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | H | Cl | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | H | Cl | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | H | Cl | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | H | Br | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | H | Br | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | H | Br | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | H | I | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | H | I | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | H | I | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | H | Me | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | H | Me | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | H | Me | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | H | $CF_3$ | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | H | $CF_3$ | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | H | $CF_3$ | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | H | $CF_2CF_3$ | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | H | $CF_2CF_3$ | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | H | $CF_2CF_3$ | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | H | $CF(CF_3)_2$ | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | H | $CF(CF_3)_2$ | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | H | $CF(CF_3)_2$ | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | H | SMe | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | H | SMe | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | H | SMe | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | H | SOMe | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | H | SOMe | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | H | SOMe | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | H | $SO_2Me$ | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | H | $SO_2Me$ | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | H | $SO_2Me$ | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | H | OMe | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | H | OMe | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | H | OMe | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | H | $OCF_3$ | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | H | $OCF_3$ | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | H | $OCF_3$ | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | H | $NO_2$ | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | H | $NO_2$ | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | H | $NO_2$ | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | H | CN | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | H | CN | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | H | CN | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | H | H | F | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | H | H | F | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | H | H | F | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | H | H | Cl | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | H | H | Cl | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | H | H | Cl | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | H | H | Br | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | H | H | Br | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | H | H | Br | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | H | H | I | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | H | H | I | 1 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SCF_3$ | $CH_2CF_3$ | H | H | H | I | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | H | H | Me | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | H | H | Me | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | H | H | Me | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | H | H | $CF_3$ | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | H | H | $CF_3$ | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | H | H | $CF_3$ | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | H | H | $CF_2CF_3$ | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | H | H | $CF_2CF_3$ | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | H | H | $CF_2CF_3$ | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | H | H | $CF(CF_3)_2$ | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | H | H | $CF(CF_3)_2$ | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | H | H | $CF(CF_3)_2$ | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | H | H | SMe | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | H | H | SMe | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | H | H | SMe | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | H | H | SOMe | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | H | H | SOMe | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | H | H | SOMe | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | H | H | $SO_2Me$ | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | H | H | $SO_2Me$ | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | H | H | $SO_2Me$ | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | H | H | OMe | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | H | H | OMe | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | H | H | OMe | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | H | H | $OCF_3$ | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | H | H | $OCF_3$ | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | H | H | $OCF_3$ | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | H | H | $NO_2$ | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | H | H | $NO_2$ | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | H | H | $NO_2$ | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | H | H | CN | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | H | H | CN | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | H | H | CN | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | F | H | F | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | F | H | F | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | F | H | F | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | Cl | H | Cl | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | Cl | H | Cl | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | Cl | H | Cl | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | Br | H | Br | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | Br | H | Br | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | Br | H | Br | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | I | H | I | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | I | H | I | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | I | H | I | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | F | H | Cl | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | F | H | Cl | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | F | H | Cl | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | F | H | Br | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | F | H | Br | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | F | H | Br | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | F | H | I | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | F | H | I | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | F | H | I | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | Cl | H | F | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | Cl | H | F | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | Cl | H | F | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | Cl | H | Br | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | Cl | H | Br | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | Cl | H | Br | 2 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SCF_3$ | $CH_2CF_3$ | H | Cl | H | I | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | Cl | H | I | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | Cl | H | I | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | Br | H | F | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | Br | H | F | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | Br | H | F | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | Br | H | Cl | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | Br | H | Cl | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | Br | H | Cl | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | Br | H | I | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | Br | H | I | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | Br | H | I | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | I | H | F | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | I | H | F | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | I | H | F | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | I | H | Cl | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | I | H | Cl | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | I | H | Cl | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | I | H | Br | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | I | H | Br | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | I | H | Br | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | F | H | CN | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | F | H | CN | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | F | H | CN | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | Cl | H | CN | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | Cl | H | CN | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | Cl | H | CN | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | Br | H | CN | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | Br | H | CN | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | Br | H | CN | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | I | H | CN | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | I | H | CN | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | I | H | CN | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | F | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | F | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | F | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | Cl | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | Cl | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | Cl | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | Br | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | Br | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | Br | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | I | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | I | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | I | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | CN | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | CN | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | CN | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | F | F | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | F | F | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | F | F | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | Cl | Cl | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | Cl | Cl | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | Cl | Cl | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | Br | Br | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | Br | Br | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | Br | Br | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | I | I | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | I | I | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | I | I | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | F | Cl | H | 0 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SCF_3$ | $CH_2CF_3$ | H | F | Cl | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | F | Cl | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | F | Br | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | F | Br | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | F | Br | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | F | I | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | F | I | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | F | I | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | Cl | F | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | Cl | F | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | Cl | F | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | Cl | Br | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | Cl | Br | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | Cl | Br | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | Cl | I | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | Cl | I | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | Cl | I | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | Br | F | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | Br | F | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | Br | F | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | Br | Cl | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | Br | Cl | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | Br | Cl | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | Br | I | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | Br | I | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | Br | I | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | I | F | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | I | F | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | I | F | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | I | Cl | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | I | Cl | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | I | Cl | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | I | Br | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | I | Br | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | I | Br | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | F | CN | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | F | CN | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | F | CN | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | Cl | CN | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | Cl | CN | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | Cl | CN | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | Br | CN | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | Br | CN | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | Br | CN | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | I | CN | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | I | CN | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | I | CN | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | $CF_3$ | F | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | $CF_3$ | F | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | $CF_3$ | F | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | $CF_3$ | Cl | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | $CF_3$ | Cl | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | $CF_3$ | Cl | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | $CF_3$ | Br | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | $CF_3$ | Br | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | $CF_3$ | Br | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | $CF_3$ | I | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | $CF_3$ | I | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | $CF_3$ | I | H | 2 |
| $SCF_3$ | $CH_2CF_3$ | H | $CF_3$ | CN | H | 0 |
| $SCF_3$ | $CH_2CF_3$ | H | $CF_3$ | CN | H | 1 |
| $SCF_3$ | $CH_2CF_3$ | H | $CF_3$ | CN | H | 2 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SOCF_3$ | Me | H | H | H | H | 0 |
| $SOCF_3$ | Me | H | H | H | H | 1 |
| $SOCF_3$ | Me | H | H | H | H | 2 |
| $SOCF_3$ | Me | F | H | H | H | 0 |
| $SOCF_3$ | Me | F | H | H | H | 1 |
| $SOCF_3$ | Me | F | H | H | H | 2 |
| $SOCF_3$ | Me | Cl | H | H | H | 0 |
| $SOCF_3$ | Me | Cl | H | H | H | 1 |
| $SOCF_3$ | Me | Cl | H | H | H | 2 |
| $SOCF_3$ | Me | Br | H | H | H | 0 |
| $SOCF_3$ | Me | Br | H | H | H | 1 |
| $SOCF_3$ | Me | Br | H | H | H | 2 |
| $SOCF_3$ | Me | I | H | H | H | 0 |
| $SOCF_3$ | Me | I | H | H | H | 1 |
| $SOCF_3$ | Me | I | H | H | H | 2 |
| $SOCF_3$ | Me | Me | H | H | H | 0 |
| $SOCF_3$ | Me | Me | H | H | H | 1 |
| $SOCF_3$ | Me | Me | H | H | H | 2 |
| $SOCF_3$ | Me | $CF_3$ | H | H | H | 0 |
| $SOCF_3$ | Me | $CF_3$ | H | H | H | 1 |
| $SOCF_3$ | Me | $CF_3$ | H | H | H | 2 |
| $SOCF_3$ | Me | H | F | H | H | 0 |
| $SOCF_3$ | Me | H | F | H | H | 1 |
| $SOCF_3$ | Me | H | F | H | H | 2 |
| $SOCF_3$ | Me | H | Cl | H | H | 0 |
| $SOCF_3$ | Me | H | Cl | H | H | 1 |
| $SOCF_3$ | Me | H | Cl | H | H | 2 |
| $SOCF_3$ | Me | H | Br | H | H | 0 |
| $SOCF_3$ | Me | H | Br | H | H | 1 |
| $SOCF_3$ | Me | H | Br | H | H | 2 |
| $SOCF_3$ | Me | H | I | H | H | 0 |
| $SOCF_3$ | Me | H | I | H | H | 1 |
| $SOCF_3$ | Me | H | I | H | H | 2 |
| $SOCF_3$ | Me | H | Me | H | H | 0 |
| $SOCF_3$ | Me | H | Me | H | H | 1 |
| $SOCF_3$ | Me | H | Me | H | H | 2 |
| $SOCF_3$ | Me | H | $CF_3$ | H | H | 0 |
| $SOCF_3$ | Me | H | $CF_3$ | H | H | 1 |
| $SOCF_3$ | Me | H | $CF_3$ | H | H | 2 |
| $SOCF_3$ | Me | H | $CF_2CF_3$ | H | H | 0 |
| $SOCF_3$ | Me | H | $CF_2CF_3$ | H | H | 1 |
| $SOCF_3$ | Me | H | $CF_2CF_3$ | H | H | 2 |
| $SOCF_3$ | Me | H | $CF(CF_3)_2$ | H | H | 0 |
| $SOCF_3$ | Me | H | $CF(CF_3)_2$ | H | H | 1 |
| $SOCF_3$ | Me | H | $CF(CF_3)_2$ | H | H | 2 |
| $SOCF_3$ | Me | H | SMe | H | H | 0 |
| $SOCF_3$ | Me | H | SMe | H | H | 1 |
| $SOCF_3$ | Me | H | SMe | H | H | 2 |
| $SOCF_3$ | Me | H | SOMe | H | H | 0 |
| $SOCF_3$ | Me | H | SOMe | H | H | 1 |
| $SOCF_3$ | Me | H | SOMe | H | H | 2 |
| $SOCF_3$ | Me | H | $SO_2Me$ | H | H | 0 |
| $SOCF_3$ | Me | H | $SO_2Me$ | H | H | 1 |
| $SOCF_3$ | Me | H | $SO_2Me$ | H | H | 2 |
| $SOCF_3$ | Me | H | OMe | H | H | 0 |
| $SOCF_3$ | Me | H | OMe | H | H | 1 |
| $SOCF_3$ | Me | H | OMe | H | H | 2 |
| $SOCF_3$ | Me | H | $OCF_3$ | H | H | 0 |
| $SOCF_3$ | Me | H | $OCF_3$ | H | H | 1 |
| $SOCF_3$ | Me | H | $OCF_3$ | H | H | 2 |
| $SOCF_3$ | Me | H | $NO_2$ | H | H | 0 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SOCF_3$ | Me | H | $NO_2$ | H | H | 1 |
| $SOCF_3$ | Me | H | $NO_2$ | H | H | 2 |
| $SOCF_3$ | Me | H | CN | H | H | 0 |
| $SOCF_3$ | Me | H | CN | H | H | 1 |
| $SOCF_3$ | Me | H | CN | H | H | 2 |
| $SOCF_3$ | Me | H | H | F | H | 0 |
| $SOCF_3$ | Me | H | H | F | H | 1 |
| $SOCF_3$ | Me | H | H | F | H | 2 |
| $SOCF_3$ | Me | H | H | Cl | H | 0 |
| $SOCF_3$ | Me | H | H | Cl | H | 1 |
| $SOCF_3$ | Me | H | H | Cl | H | 2 |
| $SOCF_3$ | Me | H | H | Br | H | 0 |
| $SOCF_3$ | Me | H | H | Br | H | 1 |
| $SOCF_3$ | Me | H | H | Br | H | 2 |
| $SOCF_3$ | Me | H | H | I | H | 0 |
| $SOCF_3$ | Me | H | H | I | H | 1 |
| $SOCF_3$ | Me | H | H | I | H | 2 |
| $SOCF_3$ | Me | H | H | Me | H | 0 |
| $SOCF_3$ | Me | H | H | Me | H | 1 |
| $SOCF_3$ | Me | H | H | Me | H | 2 |
| $SOCF_3$ | Me | H | H | $CF_3$ | H | 0 |
| $SOCF_3$ | Me | H | H | $CF_3$ | H | 1 |
| $SOCF_3$ | Me | H | H | $CF_3$ | H | 2 |
| $SOCF_3$ | Me | H | H | $CF_2CF_3$ | H | 0 |
| $SOCF_3$ | Me | H | H | $CF_2CF_3$ | H | 1 |
| $SOCF_3$ | Me | H | H | $CF_2CF_3$ | H | 2 |
| $SOCF_3$ | Me | H | H | $CF(CF_3)_2$ | H | 0 |
| $SOCF_3$ | Me | H | H | $CF(CF_3)_2$ | H | 1 |
| $SOCF_3$ | Me | H | H | $CF(CF_3)_2$ | H | 2 |
| $SOCF_3$ | Me | H | H | SMe | H | 0 |
| $SOCF_3$ | Me | H | H | SMe | H | 1 |
| $SOCF_3$ | Me | H | H | SMe | H | 2 |
| $SOCF_3$ | Me | H | H | SOMe | H | 0 |
| $SOCF_3$ | Me | H | H | SOMe | H | 1 |
| $SOCF_3$ | Me | H | H | SOMe | H | 2 |
| $SOCF_3$ | Me | H | H | $SO_2Me$ | H | 0 |
| $SOCF_3$ | Me | H | H | $SO_2Me$ | H | 1 |
| $SOCF_3$ | Me | H | H | $SO_2Me$ | H | 2 |
| $SOCF_3$ | Me | H | H | OMe | H | 0 |
| $SOCF_3$ | Me | H | H | OMe | H | 1 |
| $SOCF_3$ | Me | H | H | OMe | H | 2 |
| $SOCF_3$ | Me | H | H | $OCF_3$ | H | 0 |
| $SOCF_3$ | Me | H | H | $OCF_3$ | H | 1 |
| $SOCF_3$ | Me | H | H | $OCF_3$ | H | 2 |
| $SOCF_3$ | Me | H | H | $NO_2$ | H | 0 |
| $SOCF_3$ | Me | H | H | $NO_2$ | H | 1 |
| $SOCF_3$ | Me | H | H | $NO_2$ | H | 2 |
| $SOCF_3$ | Me | H | H | CN | H | 0 |
| $SOCF_3$ | Me | H | H | CN | H | 1 |
| $SOCF_3$ | Me | H | H | CN | H | 2 |
| $SOCF_3$ | Me | H | H | H | F | 0 |
| $SOCF_3$ | Me | H | H | H | F | 1 |
| $SOCF_3$ | Me | H | H | H | F | 2 |
| $SOCF_3$ | Me | H | H | H | Cl | 0 |
| $SOCF_3$ | Me | H | H | H | Cl | 1 |
| $SOCF_3$ | Me | H | H | H | Cl | 2 |
| $SOCF_3$ | Me | H | H | H | Br | 0 |
| $SOCF_3$ | Me | H | H | H | Br | 1 |
| $SOCF_3$ | Me | H | H | H | Br | 2 |
| $SOCF_3$ | Me | H | H | H | I | 0 |
| $SOCF_3$ | Me | H | H | H | I | 1 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SOCF_3$ | Me | H | H | H | I | 2 |
| $SOCF_3$ | Me | H | H | H | Me | 0 |
| $SOCF_3$ | Me | H | H | H | Me | 1 |
| $SOCF_3$ | Me | H | H | H | Me | 2 |
| $SOCF_3$ | Me | H | H | H | $CF_3$ | 0 |
| $SOCF_3$ | Me | H | H | H | $CF_3$ | 1 |
| $SOCF_3$ | Me | H | H | H | $CF_3$ | 2 |
| $SOCF_3$ | Me | H | H | H | $CF_2CF_3$ | 0 |
| $SOCF_3$ | Me | H | H | H | $CF_2CF_3$ | 1 |
| $SOCF_3$ | Me | H | H | H | $CF_2CF_3$ | 2 |
| $SOCF_3$ | Me | H | H | H | $CF(CF_3)_2$ | 0 |
| $SOCF_3$ | Me | H | H | H | $CF(CF_3)_2$ | 1 |
| $SOCF_3$ | Me | H | H | H | $CF(CF_3)_2$ | 2 |
| $SOCF_3$ | Me | H | H | H | SMe | 0 |
| $SOCF_3$ | Me | H | H | H | SMe | 1 |
| $SOCF_3$ | Me | H | H | H | SMe | 2 |
| $SOCF_3$ | Me | H | H | H | SOMe | 0 |
| $SOCF_3$ | Me | H | H | H | SOMe | 1 |
| $SOCF_3$ | Me | H | H | H | SOMe | 2 |
| $SOCF_3$ | Me | H | H | H | $SO_2Me$ | 0 |
| $SOCF_3$ | Me | H | H | H | $SO_2Me$ | 1 |
| $SOCF_3$ | Me | H | H | H | $SO_2Me$ | 2 |
| $SOCF_3$ | Me | H | H | H | OMe | 0 |
| $SOCF_3$ | Me | H | H | H | OMe | 1 |
| $SOCF_3$ | Me | H | H | H | OMe | 2 |
| $SOCF_3$ | Me | H | H | H | $OCF_3$ | 0 |
| $SOCF_3$ | Me | H | H | H | $OCF_3$ | 1 |
| $SOCF_3$ | Me | H | H | H | $OCF_3$ | 2 |
| $SOCF_3$ | Me | H | H | H | $NO_2$ | 0 |
| $SOCF_3$ | Me | H | H | H | $NO_2$ | 1 |
| $SOCF_3$ | Me | H | H | H | $NO_2$ | 2 |
| $SOCF_3$ | Me | H | H | H | CN | 0 |
| $SOCF_3$ | Me | H | H | H | CN | 1 |
| $SOCF_3$ | Me | H | H | H | CN | 2 |
| $SOCF_3$ | Me | H | F | H | F | 0 |
| $SOCF_3$ | Me | H | F | H | F | 1 |
| $SOCF_3$ | Me | H | F | H | F | 2 |
| $SOCF_3$ | Me | H | Cl | H | Cl | 0 |
| $SOCF_3$ | Me | H | Cl | H | Cl | 1 |
| $SOCF_3$ | Me | H | Cl | H | Cl | 2 |
| $SOCF_3$ | Me | H | Br | H | Br | 0 |
| $SOCF_3$ | Me | H | Br | H | Br | 1 |
| $SOCF_3$ | Me | H | Br | H | Br | 2 |
| $SOCF_3$ | Me | H | I | H | I | 0 |
| $SOCF_3$ | Me | H | I | H | I | 1 |
| $SOCF_3$ | Me | H | I | H | I | 2 |
| $SOCF_3$ | Me | H | F | H | Cl | 0 |
| $SOCF_3$ | Me | H | F | H | Cl | 1 |
| $SOCF_3$ | Me | H | F | H | Cl | 2 |
| $SOCF_3$ | Me | H | F | H | Br | 0 |
| $SOCF_3$ | Me | H | F | H | Br | 1 |
| $SOCF_3$ | Me | H | F | H | Br | 2 |
| $SOCF_3$ | Me | H | F | H | I | 0 |
| $SOCF_3$ | Me | H | F | H | I | 1 |
| $SOCF_3$ | Me | H | F | H | I | 2 |
| $SOCF_3$ | Me | H | Cl | H | F | 0 |
| $SOCF_3$ | Me | H | Cl | H | F | 1 |
| $SOCF_3$ | Me | H | Cl | H | F | 2 |
| $SOCF_3$ | Me | H | Cl | H | Br | 0 |
| $SOCF_3$ | Me | H | Cl | H | Br | 1 |
| $SOCF_3$ | Me | H | Cl | H | Br | 2 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SOCF_3$ | Me | H | Cl | H | I | 0 |
| $SOCF_3$ | Me | H | Cl | H | I | 1 |
| $SOCF_3$ | Me | H | Cl | H | I | 2 |
| $SOCF_3$ | Me | H | Br | H | F | 0 |
| $SOCF_3$ | Me | H | Br | H | F | 1 |
| $SOCF_3$ | Me | H | Br | H | F | 2 |
| $SOCF_3$ | Me | H | Br | H | Cl | 0 |
| $SOCF_3$ | Me | H | Br | H | Cl | 1 |
| $SOCF_3$ | Me | H | Br | H | Cl | 2 |
| $SOCF_3$ | Me | H | Br | H | I | 0 |
| $SOCF_3$ | Me | H | Br | H | I | 1 |
| $SOCF_3$ | Me | H | Br | H | I | 2 |
| $SOCF_3$ | Me | H | I | H | F | 0 |
| $SOCF_3$ | Me | H | I | H | F | 1 |
| $SOCF_3$ | Me | H | I | H | F | 2 |
| $SOCF_3$ | Me | H | I | H | Cl | 0 |
| $SOCF_3$ | Me | H | I | H | Cl | 1 |
| $SOCF_3$ | Me | H | I | H | Cl | 2 |
| $SOCF_3$ | Me | H | I | H | Br | 0 |
| $SOCF_3$ | Me | H | I | H | Br | 1 |
| $SOCF_3$ | Me | H | I | H | Br | 2 |
| $SOCF_3$ | Me | H | F | H | CN | 0 |
| $SOCF_3$ | Me | H | F | H | CN | 1 |
| $SOCF_3$ | Me | H | F | H | CN | 2 |
| $SOCF_3$ | Me | H | Cl | H | CN | 0 |
| $SOCF_3$ | Me | H | Cl | H | CN | 1 |
| $SOCF_3$ | Me | H | Cl | H | CN | 2 |
| $SOCF_3$ | Me | H | Br | H | CN | 0 |
| $SOCF_3$ | Me | H | Br | H | CN | 1 |
| $SOCF_3$ | Me | H | Br | H | CN | 2 |
| $SOCF_3$ | Me | H | I | H | CN | 0 |
| $SOCF_3$ | Me | H | I | H | CN | 1 |
| $SOCF_3$ | Me | H | I | H | CN | 2 |
| $SOCF_3$ | Me | H | $CF_3$ | H | F | 0 |
| $SOCF_3$ | Me | H | $CF_3$ | H | F | 1 |
| $SOCF_3$ | Me | H | $CF_3$ | H | F | 2 |
| $SOCF_3$ | Me | H | $CF_3$ | H | Cl | 0 |
| $SOCF_3$ | Me | H | $CF_3$ | H | Cl | 1 |
| $SOCF_3$ | Me | H | $CF_3$ | H | Cl | 2 |
| $SOCF_3$ | Me | H | $CF_3$ | H | Br | 0 |
| $SOCF_3$ | Me | H | $CF_3$ | H | Br | 1 |
| $SOCF_3$ | Me | H | $CF_3$ | H | Br | 2 |
| $SOCF_3$ | Me | H | $CF_3$ | H | I | 0 |
| $SOCF_3$ | Me | H | $CF_3$ | H | I | 1 |
| $SOCF_3$ | Me | H | $CF_3$ | H | I | 2 |
| $SOCF_3$ | Me | H | $CF_3$ | H | CN | 0 |
| $SOCF_3$ | Me | H | $CF_3$ | H | CN | 1 |
| $SOCF_3$ | Me | H | $CF_3$ | H | CN | 2 |
| $SOCF_3$ | Me | H | F | F | H | 0 |
| $SOCF_3$ | Me | H | F | F | H | 1 |
| $SOCF_3$ | Me | H | F | F | H | 2 |
| $SOCF_3$ | Me | H | Cl | Cl | H | 0 |
| $SOCF_3$ | Me | H | Cl | Cl | H | 1 |
| $SOCF_3$ | Me | H | Cl | Cl | H | 2 |
| $SOCF_3$ | Me | H | Br | Br | H | 0 |
| $SOCF_3$ | Me | H | Br | Br | H | 1 |
| $SOCF_3$ | Me | H | Br | Br | H | 2 |
| $SOCF_3$ | Me | H | I | I | H | 0 |
| $SOCF_3$ | Me | H | I | I | H | 1 |
| $SOCF_3$ | Me | H | I | I | H | 2 |
| $SOCF_3$ | Me | H | F | Cl | H | 0 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SOCF_3$ | Me | H | F | Cl | H | 1 |
| $SOCF_3$ | Me | H | F | Cl | H | 2 |
| $SOCF_3$ | Me | H | F | Br | H | 0 |
| $SOCF_3$ | Me | H | F | Br | H | 1 |
| $SOCF_3$ | Me | H | F | Br | H | 2 |
| $SOCF_3$ | Me | H | F | I | H | 0 |
| $SOCF_3$ | Me | H | F | I | H | 1 |
| $SOCF_3$ | Me | H | F | I | H | 2 |
| $SOCF_3$ | Me | H | Cl | F | H | 0 |
| $SOCF_3$ | Me | H | Cl | F | H | 1 |
| $SOCF_3$ | Me | H | Cl | F | H | 2 |
| $SOCF_3$ | Me | H | Cl | Br | H | 0 |
| $SOCF_3$ | Me | H | Cl | Br | H | 1 |
| $SOCF_3$ | Me | H | Cl | Br | H | 2 |
| $SOCF_3$ | Me | H | Cl | I | H | 0 |
| $SOCF_3$ | Me | H | Cl | I | H | 1 |
| $SOCF_3$ | Me | H | Cl | I | H | 2 |
| $SOCF_3$ | Me | H | Br | F | H | 0 |
| $SOCF_3$ | Me | H | Br | F | H | 1 |
| $SOCF_3$ | Me | H | Br | F | H | 2 |
| $SOCF_3$ | Me | H | Br | Cl | H | 0 |
| $SOCF_3$ | Me | H | Br | Cl | H | 1 |
| $SOCF_3$ | Me | H | Br | Cl | H | 2 |
| $SOCF_3$ | Me | H | Br | I | H | 0 |
| $SOCF_3$ | Me | H | Br | I | H | 1 |
| $SOCF_3$ | Me | H | Br | I | H | 2 |
| $SOCF_3$ | Me | H | I | F | H | 0 |
| $SOCF_3$ | Me | H | I | F | H | 1 |
| $SOCF_3$ | Me | H | I | F | H | 2 |
| $SOCF_3$ | Me | H | I | Cl | H | 0 |
| $SOCF_3$ | Me | H | I | Cl | H | 1 |
| $SOCF_3$ | Me | H | I | Cl | H | 2 |
| $SOCF_3$ | Me | H | I | Br | H | 0 |
| $SOCF_3$ | Me | H | I | Br | H | 1 |
| $SOCF_3$ | Me | H | I | Br | H | 2 |
| $SOCF_3$ | Me | H | F | CN | H | 0 |
| $SOCF_3$ | Me | H | F | CN | H | 1 |
| $SOCF_3$ | Me | H | F | CN | H | 2 |
| $SOCF_3$ | Me | H | Cl | CN | H | 0 |
| $SOCF_3$ | Me | H | Cl | CN | H | 1 |
| $SOCF_3$ | Me | H | Cl | CN | H | 2 |
| $SOCF_3$ | Me | H | Br | CN | H | 0 |
| $SOCF_3$ | Me | H | Br | CN | H | 1 |
| $SOCF_3$ | Me | H | Br | CN | H | 2 |
| $SOCF_3$ | Me | H | I | CN | H | 0 |
| $SOCF_3$ | Me | H | I | CN | H | 1 |
| $SOCF_3$ | Me | H | I | CN | H | 2 |
| $SOCF_3$ | Me | H | $CF_3$ | F | H | 0 |
| $SOCF_3$ | Me | H | $CF_3$ | F | H | 1 |
| $SOCF_3$ | Me | H | $CF_3$ | F | H | 2 |
| $SOCF_3$ | Me | H | $CF_3$ | Cl | H | 0 |
| $SOCF_3$ | Me | H | $CF_3$ | Cl | H | 1 |
| $SOCF_3$ | Me | H | $CF_3$ | Cl | H | 2 |
| $SOCF_3$ | Me | H | $CF_3$ | Br | H | 0 |
| $SOCF_3$ | Me | H | $CF_3$ | Br | H | 1 |
| $SOCF_3$ | Me | H | $CF_3$ | Br | H | 2 |
| $SOCF_3$ | Me | H | $CF_3$ | I | H | 0 |
| $SOCF_3$ | Me | H | $CF_3$ | I | H | 1 |
| $SOCF_3$ | Me | H | $CF_3$ | I | H | 2 |
| $SOCF_3$ | Me | H | $CF_3$ | CN | H | 0 |
| $SOCF_3$ | Me | H | $CF_3$ | CN | H | 1 |
| $SOCF_3$ | Me | H | $CF_3$ | CN | H | 2 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SOCF_3$ | Et | H | H | H | H | 0 |
| $SOCF_3$ | Et | H | H | H | H | 1 |
| $SOCF_3$ | Et | H | H | H | H | 2 |
| $SOCF_3$ | Et | F | H | H | H | 0 |
| $SOCF_3$ | Et | F | H | H | H | 1 |
| $SOCF_3$ | Et | F | H | H | H | 2 |
| $SOCF_3$ | Et | Cl | H | H | H | 0 |
| $SOCF_3$ | Et | Cl | H | H | H | 1 |
| $SOCF_3$ | Et | Cl | H | H | H | 2 |
| $SOCF_3$ | Et | Br | H | H | H | 0 |
| $SOCF_3$ | Et | Br | H | H | H | 1 |
| $SOCF_3$ | Et | Br | H | H | H | 2 |
| $SOCF_3$ | Et | I | H | H | H | 0 |
| $SOCF_3$ | Et | I | H | H | H | 1 |
| $SOCF_3$ | Et | I | H | H | H | 2 |
| $SOCF_3$ | Et | Me | H | H | H | 0 |
| $SOCF_3$ | Et | Me | H | H | H | 1 |
| $SOCF_3$ | Et | Me | H | H | H | 2 |
| $SOCF_3$ | Et | $CF_3$ | H | H | H | 0 |
| $SOCF_3$ | Et | $CF_3$ | H | H | H | 1 |
| $SOCF_3$ | Et | $CF_3$ | H | H | H | 2 |
| $SOCF_3$ | Et | H | F | H | H | 0 |
| $SOCF_3$ | Et | H | F | H | H | 1 |
| $SOCF_3$ | Et | H | F | H | H | 2 |
| $SOCF_3$ | Et | H | Cl | H | H | 0 |
| $SOCF_3$ | Et | H | Cl | H | H | 1 |
| $SOCF_3$ | Et | H | Cl | H | H | 2 |
| $SOCF_3$ | Et | H | Br | H | H | 0 |
| $SOCF_3$ | Et | H | Br | H | H | 1 |
| $SOCF_3$ | Et | H | Br | H | H | 2 |
| $SOCF_3$ | Et | H | I | H | H | 0 |
| $SOCF_3$ | Et | H | I | H | H | 1 |
| $SOCF_3$ | Et | H | I | H | H | 2 |
| $SOCF_3$ | Et | H | Me | H | H | 0 |
| $SOCF_3$ | Et | H | Me | H | H | 1 |
| $SOCF_3$ | Et | H | Me | H | H | 2 |
| $SOCF_3$ | Et | H | $CF_3$ | H | H | 0 |
| $SOCF_3$ | Et | H | $CF_3$ | H | H | 1 |
| $SOCF_3$ | Et | H | $CF_3$ | H | H | 2 |
| $SOCF_3$ | Et | H | $CF_2CF_3$ | H | H | 0 |
| $SOCF_3$ | Et | H | $CF_2CF_3$ | H | H | 1 |
| $SOCF_3$ | Et | H | $CF_2CF_3$ | H | H | 2 |
| $SOCF_3$ | Et | H | $CF(CF_3)_2$ | H | H | 0 |
| $SOCF_3$ | Et | H | $CF(CF_3)_2$ | H | H | 1 |
| $SOCF_3$ | Et | H | $CF(CF_3)_2$ | H | H | 2 |
| $SOCF_3$ | Et | H | SMe | H | H | 0 |
| $SOCF_3$ | Et | H | SMe | H | H | 1 |
| $SOCF_3$ | Et | H | SMe | H | H | 2 |
| $SOCF_3$ | Et | H | SOMe | H | H | 0 |
| $SOCF_3$ | Et | H | SOMe | H | H | 1 |
| $SOCF_3$ | Et | H | SOMe | H | H | 2 |
| $SOCF_3$ | Et | H | $SO_2Me$ | H | H | 0 |
| $SOCF_3$ | Et | H | $SO_2Me$ | H | H | 1 |
| $SOCF_3$ | Et | H | $SO_2Me$ | H | H | 2 |
| $SOCF_3$ | Et | H | OMe | H | H | 0 |
| $SOCF_3$ | Et | H | OMe | H | H | 1 |
| $SOCF_3$ | Et | H | OMe | H | H | 2 |
| $SOCF_3$ | Et | H | $OCF_3$ | H | H | 0 |
| $SOCF_3$ | Et | H | $OCF_3$ | H | H | 1 |
| $SOCF_3$ | Et | H | $OCF_3$ | H | H | 2 |
| $SOCF_3$ | Et | H | $NO_2$ | H | H | 0 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SOCF_3$ | Et | H | $NO_2$ | H | H | 1 |
| $SOCF_3$ | Et | H | $NO_2$ | H | H | 2 |
| $SOCF_3$ | Et | H | CN | H | H | 0 |
| $SOCF_3$ | Et | H | CN | H | H | 1 |
| $SOCF_3$ | Et | H | CN | H | H | 2 |
| $SOCF_3$ | Et | H | H | F | H | 0 |
| $SOCF_3$ | Et | H | H | F | H | 1 |
| $SOCF_3$ | Et | H | H | F | H | 2 |
| $SOCF_3$ | Et | H | H | Cl | H | 0 |
| $SOCF_3$ | Et | H | H | Cl | H | 1 |
| $SOCF_3$ | Et | H | H | Cl | H | 2 |
| $SOCF_3$ | Et | H | H | Br | H | 0 |
| $SOCF_3$ | Et | H | H | Br | H | 1 |
| $SOCF_3$ | Et | H | H | Br | H | 2 |
| $SOCF_3$ | Et | H | H | I | H | 0 |
| $SOCF_3$ | Et | H | H | I | H | 1 |
| $SOCF_3$ | Et | H | H | I | H | 2 |
| $SOCF_3$ | Et | H | H | Me | H | 0 |
| $SOCF_3$ | Et | H | H | Me | H | 1 |
| $SOCF_3$ | Et | H | H | Me | H | 2 |
| $SOCF_3$ | Et | H | H | $CF_3$ | H | 0 |
| $SOCF_3$ | Et | H | H | $CF_3$ | H | 1 |
| $SOCF_3$ | Et | H | H | $CF_3$ | H | 2 |
| $SOCF_3$ | Et | H | H | $CF_2CF_3$ | H | 0 |
| $SOCF_3$ | Et | H | H | $CF_2CF_3$ | H | 1 |
| $SOCF_3$ | Et | H | H | $CF_2CF_3$ | H | 2 |
| $SOCF_3$ | Et | H | H | $CF(CF_3)_2$ | H | 0 |
| $SOCF_3$ | Et | H | H | $CF(CF_3)_2$ | H | 1 |
| $SOCF_3$ | Et | H | H | $CF(CF_3)_2$ | H | 2 |
| $SOCF_3$ | Et | H | H | SMe | H | 0 |
| $SOCF_3$ | Et | H | H | SMe | H | 1 |
| $SOCF_3$ | Et | H | H | SMe | H | 2 |
| $SOCF_3$ | Et | H | H | SOMe | H | 0 |
| $SOCF_3$ | Et | H | H | SOMe | H | 1 |
| $SOCF_3$ | Et | H | H | SOMe | H | 2 |
| $SOCF_3$ | Et | H | H | $SO_2Me$ | H | 0 |
| $SOCF_3$ | Et | H | H | $SO_2Me$ | H | 1 |
| $SOCF_3$ | Et | H | H | $SO_2Me$ | H | 2 |
| $SOCF_3$ | Et | H | H | OMe | H | 0 |
| $SOCF_3$ | Et | H | H | OMe | H | 1 |
| $SOCF_3$ | Et | H | H | OMe | H | 2 |
| $SOCF_3$ | Et | H | H | $OCF_3$ | H | 0 |
| $SOCF_3$ | Et | H | H | $OCF_3$ | H | 1 |
| $SOCF_3$ | Et | H | H | $OCF_3$ | H | 2 |
| $SOCF_3$ | Et | H | H | $NO_2$ | H | 0 |
| $SOCF_3$ | Et | H | H | $NO_2$ | H | 1 |
| $SOCF_3$ | Et | H | H | $NO_2$ | H | 2 |
| $SOCF_3$ | Et | H | H | CN | H | 0 |
| $SOCF_3$ | Et | H | H | CN | H | 1 |
| $SOCF_3$ | Et | H | H | CN | H | 2 |
| $SOCF_3$ | Et | H | H | H | F | 0 |
| $SOCF_3$ | Et | H | H | H | F | 1 |
| $SOCF_3$ | Et | H | H | H | F | 2 |
| $SOCF_3$ | Et | H | H | H | Cl | 0 |
| $SOCF_3$ | Et | H | H | H | Cl | 1 |
| $SOCF_3$ | Et | H | H | H | Cl | 2 |
| $SOCF_3$ | Et | H | H | H | Br | 0 |
| $SOCF_3$ | Et | H | H | H | Br | 1 |
| $SOCF_3$ | Et | H | H | H | Br | 2 |
| $SOCF_3$ | Et | H | H | H | I | 0 |
| $SOCF_3$ | Et | H | H | H | I | 1 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SOCF_3$ | Et | H | H | H | I | 2 |
| $SOCF_3$ | Et | H | H | H | Me | 0 |
| $SOCF_3$ | Et | H | H | H | Me | 1 |
| $SOCF_3$ | Et | H | H | H | Me | 2 |
| $SOCF_3$ | Et | H | H | H | $CF_3$ | 0 |
| $SOCF_3$ | Et | H | H | H | $CF_3$ | 1 |
| $SOCF_3$ | Et | H | H | H | $CF_3$ | 2 |
| $SOCF_3$ | Et | H | H | H | $CF_2CF_3$ | 0 |
| $SOCF_3$ | Et | H | H | H | $CF_2CF_3$ | 1 |
| $SOCF_3$ | Et | H | H | H | $CF_2CF_3$ | 2 |
| $SOCF_3$ | Et | H | H | H | $CF(CF_3)_2$ | 0 |
| $SOCF_3$ | Et | H | H | H | $CF(CF_3)_2$ | 1 |
| $SOCF_3$ | Et | H | H | H | $CF(CF_3)_2$ | 2 |
| $SOCF_3$ | Et | H | H | H | SMe | 0 |
| $SOCF_3$ | Et | H | H | H | SMe | 1 |
| $SOCF_3$ | Et | H | H | H | SMe | 2 |
| $SOCF_3$ | Et | H | H | H | SOMe | 0 |
| $SOCF_3$ | Et | H | H | H | SOMe | 1 |
| $SOCF_3$ | Et | H | H | H | SOMe | 2 |
| $SOCF_3$ | Et | H | H | H | $SO_2Me$ | 0 |
| $SOCF_3$ | Et | H | H | H | $SO_2Me$ | 1 |
| $SOCF_3$ | Et | H | H | H | $SO_2Me$ | 2 |
| $SOCF_3$ | Et | H | H | H | OMe | 0 |
| $SOCF_3$ | Et | H | H | H | OMe | 1 |
| $SOCF_3$ | Et | H | H | H | OMe | 2 |
| $SOCF_3$ | Et | H | H | H | $OCF_3$ | 0 |
| $SOCF_3$ | Et | H | H | H | $OCF_3$ | 1 |
| $SOCF_3$ | Et | H | H | H | $OCF_3$ | 2 |
| $SOCF_3$ | Et | H | H | H | $NO_2$ | 0 |
| $SOCF_3$ | Et | H | H | H | $NO_2$ | 1 |
| $SOCF_3$ | Et | H | H | H | $NO_2$ | 2 |
| $SOCF_3$ | Et | H | H | H | CN | 0 |
| $SOCF_3$ | Et | H | H | H | CN | 1 |
| $SOCF_3$ | Et | H | H | H | CN | 2 |
| $SOCF_3$ | Et | H | F | H | F | 0 |
| $SOCF_3$ | Et | H | F | H | F | 1 |
| $SOCF_3$ | Et | H | F | H | F | 2 |
| $SOCF_3$ | Et | H | Cl | H | Cl | 0 |
| $SOCF_3$ | Et | H | Cl | H | Cl | 1 |
| $SOCF_3$ | Et | H | Cl | H | Cl | 2 |
| $SOCF_3$ | Et | H | Br | H | Br | 0 |
| $SOCF_3$ | Et | H | Br | H | Br | 1 |
| $SOCF_3$ | Et | H | Br | H | Br | 2 |
| $SOCF_3$ | Et | H | I | H | I | 0 |
| $SOCF_3$ | Et | H | I | H | I | 1 |
| $SOCF_3$ | Et | H | I | H | I | 2 |
| $SOCF_3$ | Et | H | F | H | Cl | 0 |
| $SOCF_3$ | Et | H | F | H | Cl | 1 |
| $SOCF_3$ | Et | H | F | H | Cl | 2 |
| $SOCF_3$ | Et | H | F | H | Br | 0 |
| $SOCF_3$ | Et | H | F | H | Br | 1 |
| $SOCF_3$ | Et | H | F | H | Br | 2 |
| $SOCF_3$ | Et | H | F | H | I | 0 |
| $SOCF_3$ | Et | H | F | H | I | 1 |
| $SOCF_3$ | Et | H | F | H | I | 2 |
| $SOCF_3$ | Et | H | Cl | H | F | 0 |
| $SOCF_3$ | Et | H | Cl | H | F | 1 |
| $SOCF_3$ | Et | H | Cl | H | F | 2 |
| $SOCF_3$ | Et | H | Cl | H | Br | 0 |
| $SOCF_3$ | Et | H | Cl | H | Br | 1 |
| $SOCF_3$ | Et | H | Cl | H | Br | 2 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SOCF_3$ | Et | H | Cl | H | I | 0 |
| $SOCF_3$ | Et | H | Cl | H | I | 1 |
| $SOCF_3$ | Et | H | Cl | H | I | 2 |
| $SOCF_3$ | Et | H | Br | H | F | 0 |
| $SOCF_3$ | Et | H | Br | H | F | 1 |
| $SOCF_3$ | Et | H | Br | H | F | 2 |
| $SOCF_3$ | Et | H | Br | H | Cl | 0 |
| $SOCF_3$ | Et | H | Br | H | Cl | 1 |
| $SOCF_3$ | Et | H | Br | H | Cl | 2 |
| $SOCF_3$ | Et | H | Br | H | I | 0 |
| $SOCF_3$ | Et | H | Br | H | I | 1 |
| $SOCF_3$ | Et | H | Br | H | I | 2 |
| $SOCF_3$ | Et | H | I | H | F | 0 |
| $SOCF_3$ | Et | H | I | H | F | 1 |
| $SOCF_3$ | Et | H | I | H | F | 2 |
| $SOCF_3$ | Et | H | I | H | Cl | 0 |
| $SOCF_3$ | Et | H | I | H | Cl | 1 |
| $SOCF_3$ | Et | H | I | H | Cl | 2 |
| $SOCF_3$ | Et | H | I | H | Br | 0 |
| $SOCF_3$ | Et | H | I | H | Br | 1 |
| $SOCF_3$ | Et | H | I | H | Br | 2 |
| $SOCF_3$ | Et | H | F | H | CN | 0 |
| $SOCF_3$ | Et | H | F | H | CN | 1 |
| $SOCF_3$ | Et | H | F | H | CN | 2 |
| $SOCF_3$ | Et | H | Cl | H | CN | 0 |
| $SOCF_3$ | Et | H | Cl | H | CN | 1 |
| $SOCF_3$ | Et | H | Cl | H | CN | 2 |
| $SOCF_3$ | Et | H | Br | H | CN | 0 |
| $SOCF_3$ | Et | H | Br | H | CN | 1 |
| $SOCF_3$ | Et | H | Br | H | CN | 2 |
| $SOCF_3$ | Et | H | I | H | CN | 0 |
| $SOCF_3$ | Et | H | I | H | CN | 1 |
| $SOCF_3$ | Et | H | I | H | CN | 2 |
| $SOCF_3$ | Et | H | $CF_3$ | H | F | 0 |
| $SOCF_3$ | Et | H | $CF_3$ | H | F | 1 |
| $SOCF_3$ | Et | H | $CF_3$ | H | F | 2 |
| $SOCF_3$ | Et | H | $CF_3$ | H | Cl | 0 |
| $SOCF_3$ | Et | H | $CF_3$ | H | Cl | 1 |
| $SOCF_3$ | Et | H | $CF_3$ | H | Cl | 2 |
| $SOCF_3$ | Et | H | $CF_3$ | H | Br | 0 |
| $SOCF_3$ | Et | H | $CF_3$ | H | Br | 1 |
| $SOCF_3$ | Et | H | $CF_3$ | H | Br | 2 |
| $SOCF_3$ | Et | H | $CF_3$ | H | I | 0 |
| $SOCF_3$ | Et | H | $CF_3$ | H | I | 1 |
| $SOCF_3$ | Et | H | $CF_3$ | H | I | 2 |
| $SOCF_3$ | Et | H | $CF_3$ | H | CN | 0 |
| $SOCF_3$ | Et | H | $CF_3$ | H | CN | 1 |
| $SOCF_3$ | Et | H | $CF_3$ | H | CN | 2 |
| $SOCF_3$ | Et | H | F | F | H | 0 |
| $SOCF_3$ | Et | H | F | F | H | 1 |
| $SOCF_3$ | Et | H | F | F | H | 2 |
| $SOCF_3$ | Et | H | Cl | Cl | H | 0 |
| $SOCF_3$ | Et | H | Cl | Cl | H | 1 |
| $SOCF_3$ | Et | H | Cl | Cl | H | 2 |
| $SOCF_3$ | Et | H | Br | Br | H | 0 |
| $SOCF_3$ | Et | H | Br | Br | H | 1 |
| $SOCF_3$ | Et | H | Br | Br | H | 2 |
| $SOCF_3$ | Et | H | I | I | H | 0 |
| $SOCF_3$ | Et | H | I | I | H | 1 |
| $SOCF_3$ | Et | H | I | I | H | 2 |
| $SOCF_3$ | Et | H | F | Cl | H | 0 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SOCF_3$ | Et | H | F | Cl | H | 1 |
| $SOCF_3$ | Et | H | F | Cl | H | 2 |
| $SOCF_3$ | Et | H | F | Br | H | 0 |
| $SOCF_3$ | Et | H | F | Br | H | 1 |
| $SOCF_3$ | Et | H | F | Br | H | 2 |
| $SOCF_3$ | Et | H | F | I | H | 0 |
| $SOCF_3$ | Et | H | F | I | H | 1 |
| $SOCF_3$ | Et | H | F | I | H | 2 |
| $SOCF_3$ | Et | H | Cl | F | H | 0 |
| $SOCF_3$ | Et | H | Cl | F | H | 1 |
| $SOCF_3$ | Et | H | Cl | F | H | 2 |
| $SOCF_3$ | Et | H | Cl | Br | H | 0 |
| $SOCF_3$ | Et | H | Cl | Br | H | 1 |
| $SOCF_3$ | Et | H | Cl | Br | H | 2 |
| $SOCF_3$ | Et | H | Cl | I | H | 0 |
| $SOCF_3$ | Et | H | Cl | I | H | 1 |
| $SOCF_3$ | Et | H | Cl | I | H | 2 |
| $SOCF_3$ | Et | H | Br | F | H | 0 |
| $SOCF_3$ | Et | H | Br | F | H | 1 |
| $SOCF_3$ | Et | H | Br | F | H | 2 |
| $SOCF_3$ | Et | H | Br | Cl | H | 0 |
| $SOCF_3$ | Et | H | Br | Cl | H | 1 |
| $SOCF_3$ | Et | H | Br | Cl | H | 2 |
| $SOCF_3$ | Et | H | Br | I | H | 0 |
| $SOCF_3$ | Et | H | Br | I | H | 1 |
| $SOCF_3$ | Et | H | Br | I | H | 2 |
| $SOCF_3$ | Et | H | I | F | H | 0 |
| $SOCF_3$ | Et | H | I | F | H | 1 |
| $SOCF_3$ | Et | H | I | F | H | 2 |
| $SOCF_3$ | Et | H | I | Cl | H | 0 |
| $SOCF_3$ | Et | H | I | Cl | H | 1 |
| $SOCF_3$ | Et | H | I | Cl | H | 2 |
| $SOCF_3$ | Et | H | I | Br | H | 0 |
| $SOCF_3$ | Et | H | I | Br | H | 1 |
| $SOCF_3$ | Et | H | I | Br | H | 2 |
| $SOCF_3$ | Et | H | F | CN | H | 0 |
| $SOCF_3$ | Et | H | F | CN | H | 1 |
| $SOCF_3$ | Et | H | F | CN | H | 2 |
| $SOCF_3$ | Et | H | Cl | CN | H | 0 |
| $SOCF_3$ | Et | H | Cl | CN | H | 1 |
| $SOCF_3$ | Et | H | Cl | CN | H | 2 |
| $SOCF_3$ | Et | H | Br | CN | H | 0 |
| $SOCF_3$ | Et | H | Br | CN | H | 1 |
| $SOCF_3$ | Et | H | Br | CN | H | 2 |
| $SOCF_3$ | Et | H | I | CN | H | 0 |
| $SOCF_3$ | Et | H | I | CN | H | 1 |
| $SOCF_3$ | Et | H | I | CN | H | 2 |
| $SOCF_3$ | Et | H | $CF_3$ | F | H | 0 |
| $SOCF_3$ | Et | H | $CF_3$ | F | H | 1 |
| $SOCF_3$ | Et | H | $CF_3$ | F | H | 2 |
| $SOCF_3$ | Et | H | $CF_3$ | Cl | H | 0 |
| $SOCF_3$ | Et | H | $CF_3$ | Cl | H | 1 |
| $SOCF_3$ | Et | H | $CF_3$ | Cl | H | 2 |
| $SOCF_3$ | Et | H | $CF_3$ | Br | H | 0 |
| $SOCF_3$ | Et | H | $CF_3$ | Br | H | 1 |
| $SOCF_3$ | Et | H | $CF_3$ | Br | H | 2 |
| $SOCF_3$ | Et | H | $CF_3$ | I | H | 0 |
| $SOCF_3$ | Et | H | $CF_3$ | I | H | 1 |
| $SOCF_3$ | Et | H | $CF_3$ | I | H | 2 |
| $SOCF_3$ | Et | H | $CF_3$ | CN | H | 0 |
| $SOCF_3$ | Et | H | $CF_3$ | CN | H | 1 |
| $SOCF_3$ | Et | H | $CF_3$ | CN | H | 2 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SOCF_3$ | $^n$Pr | H | H | H | H | 0 |
| $SOCF_3$ | $^n$Pr | H | H | H | H | 1 |
| $SOCF_3$ | $^n$Pr | H | H | H | H | 2 |
| $SOCF_3$ | $^n$Pr | F | H | H | H | 0 |
| $SOCF_3$ | $^n$Pr | F | H | H | H | 1 |
| $SOCF_3$ | $^n$Pr | F | H | H | H | 2 |
| $SOCF_3$ | $^n$Pr | Cl | H | H | H | 0 |
| $SOCF_3$ | $^n$Pr | Cl | H | H | H | 1 |
| $SOCF_3$ | $^n$Pr | Cl | H | H | H | 2 |
| $SOCF_3$ | $^n$Pr | Br | H | H | H | 0 |
| $SOCF_3$ | $^n$Pr | Br | H | H | H | 1 |
| $SOCF_3$ | $^n$Pr | Br | H | H | H | 2 |
| $SOCF_3$ | $^n$Pr | I | H | H | H | 0 |
| $SOCF_3$ | $^n$Pr | I | H | H | H | 1 |
| $SOCF_3$ | $^n$Pr | I | H | H | H | 2 |
| $SOCF_3$ | $^n$Pr | Me | H | H | H | 0 |
| $SOCF_3$ | $^n$Pr | Me | H | H | H | 1 |
| $SOCF_3$ | $^n$Pr | Me | H | H | H | 2 |
| $SOCF_3$ | $^n$Pr | $CF_3$ | H | H | H | 0 |
| $SOCF_3$ | $^n$Pr | $CF_3$ | H | H | H | 1 |
| $SOCF_3$ | $^n$Pr | $CF_3$ | H | H | H | 2 |
| $SOCF_3$ | $^n$Pr | H | F | H | H | 0 |
| $SOCF_3$ | $^n$Pr | H | F | H | H | 1 |
| $SOCF_3$ | $^n$Pr | H | F | H | H | 2 |
| $SOCF_3$ | $^n$Pr | H | Cl | H | H | 0 |
| $SOCF_3$ | $^n$Pr | H | Cl | H | H | 1 |
| $SOCF_3$ | $^n$Pr | H | Cl | H | H | 2 |
| $SOCF_3$ | $^n$Pr | H | Br | H | H | 0 |
| $SOCF_3$ | $^n$Pr | H | Br | H | H | 1 |
| $SOCF_3$ | $^n$Pr | H | Br | H | H | 2 |
| $SOCF_3$ | $^n$Pr | H | I | H | H | 0 |
| $SOCF_3$ | $^n$Pr | H | I | H | H | 1 |
| $SOCF_3$ | $^n$Pr | H | I | H | H | 2 |
| $SOCF_3$ | $^n$Pr | H | Me | H | H | 0 |
| $SOCF_3$ | $^n$Pr | H | Me | H | H | 1 |
| $SOCF_3$ | $^n$Pr | H | Me | H | H | 2 |
| $SOCF_3$ | $^n$Pr | H | $CF_3$ | H | H | 0 |
| $SOCF_3$ | $^n$Pr | H | $CF_3$ | H | H | 1 |
| $SOCF_3$ | $^n$Pr | H | $CF_3$ | H | H | 2 |
| $SOCF_3$ | $^n$Pr | H | $CF_2CF_3$ | H | H | 0 |
| $SOCF_3$ | $^n$Pr | H | $CF_2CF_3$ | H | H | 1 |
| $SOCF_3$ | $^n$Pr | H | $CF_2CF_3$ | H | H | 2 |
| $SOCF_3$ | $^n$Pr | H | $CF(CF_3)_2$ | H | H | 0 |
| $SOCF_3$ | $^n$Pr | H | $CF(CF_3)_2$ | H | H | 1 |
| $SOCF_3$ | $^n$Pr | H | $CF(CF_3)_2$ | H | H | 2 |
| $SOCF_3$ | $^n$Pr | H | SMe | H | H | 0 |
| $SOCF_3$ | $^n$Pr | H | SMe | H | H | 1 |
| $SOCF_3$ | $^n$Pr | H | SMe | H | H | 2 |
| $SOCF_3$ | $^n$Pr | H | SOMe | H | H | 0 |
| $SOCF_3$ | $^n$Pr | H | SOMe | H | H | 1 |
| $SOCF_3$ | $^n$Pr | H | SOMe | H | H | 2 |
| $SOCF_3$ | $^n$Pr | H | $SO_2Me$ | H | H | 0 |
| $SOCF_3$ | $^n$Pr | H | $SO_2Me$ | H | H | 1 |
| $SOCF_3$ | $^n$Pr | H | $SO_2Me$ | H | H | 2 |
| $SOCF_3$ | $^n$Pr | H | OMe | H | H | 0 |
| $SOCF_3$ | $^n$Pr | H | OMe | H | H | 1 |
| $SOCF_3$ | $^n$Pr | H | OMe | H | H | 2 |
| $SOCF_3$ | $^n$Pr | H | $OCF_3$ | H | H | 0 |
| $SOCF_3$ | $^n$Pr | H | $OCF_3$ | H | H | 1 |
| $SOCF_3$ | $^n$Pr | H | $OCF_3$ | H | H | 2 |
| $SOCF_3$ | $^n$Pr | H | $NO_2$ | H | H | 0 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SOCF_3$ | $^nPr$ | H | $NO_2$ | H | H | 1 |
| $SOCF_3$ | $^nPr$ | H | $NO_2$ | H | H | 2 |
| $SOCF_3$ | $^nPr$ | H | CN | H | H | 0 |
| $SOCF_3$ | $^nPr$ | H | CN | H | H | 1 |
| $SOCF_3$ | $^nPr$ | H | CN | H | H | 2 |
| $SOCF_3$ | $^nPr$ | H | H | F | H | 0 |
| $SOCF_3$ | $^nPr$ | H | H | F | H | 1 |
| $SOCF_3$ | $^nPr$ | H | H | F | H | 2 |
| $SOCF_3$ | $^nPr$ | H | H | Cl | H | 0 |
| $SOCF_3$ | $^nPr$ | H | H | Cl | H | 1 |
| $SOCF_3$ | $^nPr$ | H | H | Cl | H | 2 |
| $SOCF_3$ | $^nPr$ | H | H | Br | H | 0 |
| $SOCF_3$ | $^nPr$ | H | H | Br | H | 1 |
| $SOCF_3$ | $^nPr$ | H | H | Br | H | 2 |
| $SOCF_3$ | $^nPr$ | H | H | I | H | 0 |
| $SOCF_3$ | $^nPr$ | H | H | I | H | 1 |
| $SOCF_3$ | $^nPr$ | H | H | I | H | 2 |
| $SOCF_3$ | $^nPr$ | H | H | Me | H | 0 |
| $SOCF_3$ | $^nPr$ | H | H | Me | H | 1 |
| $SOCF_3$ | $^nPr$ | H | H | Me | H | 2 |
| $SOCF_3$ | $^nPr$ | H | H | $CF_3$ | H | 0 |
| $SOCF_3$ | $^nPr$ | H | H | $CF_3$ | H | 1 |
| $SOCF_3$ | $^nPr$ | H | H | $CF_3$ | H | 2 |
| $SOCF_3$ | $^nPr$ | H | H | $CF_2CF_3$ | H | 0 |
| $SOCF_3$ | $^nPr$ | H | H | $CF_2CF_3$ | H | 1 |
| $SOCF_3$ | $^nPr$ | H | H | $CF_2CF_3$ | H | 2 |
| $SOCF_3$ | $^nPr$ | H | H | $CF(CF_3)_2$ | H | 0 |
| $SOCF_3$ | $^nPr$ | H | H | $CF(CF_3)_2$ | H | 1 |
| $SOCF_3$ | $^nPr$ | H | H | $CF(CF_3)_2$ | H | 2 |
| $SOCF_3$ | $^nPr$ | H | H | SMe | H | 0 |
| $SOCF_3$ | $^nPr$ | H | H | SMe | H | 1 |
| $SOCF_3$ | $^nPr$ | H | H | SMe | H | 2 |
| $SOCF_3$ | $^nPr$ | H | H | SOMe | H | 0 |
| $SOCF_3$ | $^nPr$ | H | H | SOMe | H | 1 |
| $SOCF_3$ | $^nPr$ | H | H | SOMe | H | 2 |
| $SOCF_3$ | $^nPr$ | H | H | $SO_2Me$ | H | 0 |
| $SOCF_3$ | $^nPr$ | H | H | $SO_2Me$ | H | 1 |
| $SOCF_3$ | $^nPr$ | H | H | $SO_2Me$ | H | 2 |
| $SOCF_3$ | $^nPr$ | H | H | OMe | H | 0 |
| $SOCF_3$ | $^nPr$ | H | H | OMe | H | 1 |
| $SOCF_3$ | $^nPr$ | H | H | OMe | H | 2 |
| $SOCF_3$ | $^nPr$ | H | H | $OCF_3$ | H | 0 |
| $SOCF_3$ | $^nPr$ | H | H | $OCF_3$ | H | 1 |
| $SOCF_3$ | $^nPr$ | H | H | $OCF_3$ | H | 2 |
| $SOCF_3$ | $^nPr$ | H | H | $NO_2$ | H | 0 |
| $SOCF_3$ | $^nPr$ | H | H | $NO_2$ | H | 1 |
| $SOCF_3$ | $^nPr$ | H | H | $NO_2$ | H | 2 |
| $SOCF_3$ | $^nPr$ | H | H | CN | H | 0 |
| $SOCF_3$ | $^nPr$ | H | H | CN | H | 1 |
| $SOCF_3$ | $^nPr$ | H | H | CN | H | 2 |
| $SOCF_3$ | $^nPr$ | H | H | H | F | 0 |
| $SOCF_3$ | $^nPr$ | H | H | H | F | 1 |
| $SOCF_3$ | $^nPr$ | H | H | H | F | 2 |
| $SOCF_3$ | $^nPr$ | H | H | H | Cl | 0 |
| $SOCF_3$ | $^nPr$ | H | H | H | Cl | 1 |
| $SOCF_3$ | $^nPr$ | H | H | H | Cl | 2 |
| $SOCF_3$ | $^nPr$ | H | H | H | Br | 0 |
| $SOCF_3$ | $^nPr$ | H | H | H | Br | 1 |
| $SOCF_3$ | $^nPr$ | H | H | H | Br | 2 |
| $SOCF_3$ | $^nPr$ | H | H | H | I | 0 |
| $SOCF_3$ | $^nPr$ | H | H | H | I | 1 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SOCF_3$ | $^nPr$ | H | H | H | I | 2 |
| $SOCF_3$ | $^nPr$ | H | H | H | Me | 0 |
| $SOCF_3$ | $^nPr$ | H | H | H | Me | 1 |
| $SOCF_3$ | $^nPr$ | H | H | H | Me | 2 |
| $SOCF_3$ | $^nPr$ | H | H | H | $CF_3$ | 0 |
| $SOCF_3$ | $^nPr$ | H | H | H | $CF_3$ | 1 |
| $SOCF_3$ | $^nPr$ | H | H | H | $CF_3$ | 2 |
| $SOCF_3$ | $^nPr$ | H | H | H | $CF_2CF_3$ | 0 |
| $SOCF_3$ | $^nPr$ | H | H | H | $CF_2CF_3$ | 1 |
| $SOCF_3$ | $^nPr$ | H | H | H | $CF_2CF_3$ | 2 |
| $SOCF_3$ | $^nPr$ | H | H | H | $CF(CF_3)_2$ | 0 |
| $SOCF_3$ | $^nPr$ | H | H | H | $CF(CF_3)_2$ | 1 |
| $SOCF_3$ | $^nPr$ | H | H | H | $CF(CF_3)_2$ | 2 |
| $SOCF_3$ | $^nPr$ | H | H | H | SMe | 0 |
| $SOCF_3$ | $^nPr$ | H | H | H | SMe | 1 |
| $SOCF_3$ | $^nPr$ | H | H | H | SMe | 2 |
| $SOCF_3$ | $^nPr$ | H | H | H | SOMe | 0 |
| $SOCF_3$ | $^nPr$ | H | H | H | SOMe | 1 |
| $SOCF_3$ | $^nPr$ | H | H | H | SOMe | 2 |
| $SOCF_3$ | $^nPr$ | H | H | H | $SO_2Me$ | 0 |
| $SOCF_3$ | $^nPr$ | H | H | H | $SO_2Me$ | 1 |
| $SOCF_3$ | $^nPr$ | H | H | H | $SO_2Me$ | 2 |
| $SOCF_3$ | $^nPr$ | H | H | H | OMe | 0 |
| $SOCF_3$ | $^nPr$ | H | H | H | OMe | 1 |
| $SOCF_3$ | $^nPr$ | H | H | H | OMe | 2 |
| $SOCF_3$ | $^nPr$ | H | H | H | $OCF_3$ | 0 |
| $SOCF_3$ | $^nPr$ | H | H | H | $OCF_3$ | 1 |
| $SOCF_3$ | $^nPr$ | H | H | H | $OCF_3$ | 2 |
| $SOCF_3$ | $^nPr$ | H | H | H | $NO_2$ | 0 |
| $SOCF_3$ | $^nPr$ | H | H | H | $NO_2$ | 1 |
| $SOCF_3$ | $^nPr$ | H | H | H | $NO_2$ | 2 |
| $SOCF_3$ | $^nPr$ | H | H | H | CN | 0 |
| $SOCF_3$ | $^nPr$ | H | H | H | CN | 1 |
| $SOCF_3$ | $^nPr$ | H | H | H | CN | 2 |
| $SOCF_3$ | $^nPr$ | H | F | H | F | 0 |
| $SOCF_3$ | $^nPr$ | H | F | H | F | 1 |
| $SOCF_3$ | $^nPr$ | H | F | H | F | 2 |
| $SOCF_3$ | $^nPr$ | H | Cl | H | Cl | 0 |
| $SOCF_3$ | $^nPr$ | H | Cl | H | Cl | 1 |
| $SOCF_3$ | $^nPr$ | H | Cl | H | Cl | 2 |
| $SOCF_3$ | $^nPr$ | H | Br | H | Br | 0 |
| $SOCF_3$ | $^nPr$ | H | Br | H | Br | 1 |
| $SOCF_3$ | $^nPr$ | H | Br | H | Br | 2 |
| $SOCF_3$ | $^nPr$ | H | I | H | I | 0 |
| $SOCF_3$ | $^nPr$ | H | I | H | I | 1 |
| $SOCF_3$ | $^nPr$ | H | I | H | I | 2 |
| $SOCF_3$ | $^nPr$ | H | F | H | Cl | 0 |
| $SOCF_3$ | $^nPr$ | H | F | H | Cl | 1 |
| $SOCF_3$ | $^nPr$ | H | F | H | Cl | 2 |
| $SOCF_3$ | $^nPr$ | H | F | H | Br | 0 |
| $SOCF_3$ | $^nPr$ | H | F | H | Br | 1 |
| $SOCF_3$ | $^nPr$ | H | F | H | Br | 2 |
| $SOCF_3$ | $^nPr$ | H | F | H | I | 0 |
| $SOCF_3$ | $^nPr$ | H | F | H | I | 1 |
| $SOCF_3$ | $^nPr$ | H | F | H | I | 2 |
| $SOCF_3$ | $^nPr$ | H | Cl | H | F | 0 |
| $SOCF_3$ | $^nPr$ | H | Cl | H | F | 1 |
| $SOCF_3$ | $^nPr$ | H | Cl | H | F | 2 |
| $SOCF_3$ | $^nPr$ | H | Cl | H | Br | 0 |
| $SOCF_3$ | $^nPr$ | H | Cl | H | Br | 1 |
| $SOCF_3$ | $^nPr$ | H | Cl | H | Br | 2 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SOCF_3$ | $^nPr$ | H | Cl | H | I | 0 |
| $SOCF_3$ | $^nPr$ | H | Cl | H | I | 1 |
| $SOCF_3$ | $^nPr$ | H | Cl | H | I | 2 |
| $SOCF_3$ | $^nPr$ | H | Br | H | F | 0 |
| $SOCF_3$ | $^nPr$ | H | Br | H | F | 1 |
| $SOCF_3$ | $^nPr$ | H | Br | H | F | 2 |
| $SOCF_3$ | $^nPr$ | H | Br | H | Cl | 0 |
| $SOCF_3$ | $^nPr$ | H | Br | H | Cl | 1 |
| $SOCF_3$ | $^nPr$ | H | Br | H | Cl | 2 |
| $SOCF_3$ | $^nPr$ | H | Br | H | I | 0 |
| $SOCF_3$ | $^nPr$ | H | Br | H | I | 1 |
| $SOCF_3$ | $^nPr$ | H | Br | H | I | 2 |
| $SOCF_3$ | $^nPr$ | H | I | H | F | 0 |
| $SOCF_3$ | $^nPr$ | H | I | H | F | 1 |
| $SOCF_3$ | $^nPr$ | H | I | H | F | 2 |
| $SOCF_3$ | $^nPr$ | H | I | H | Cl | 0 |
| $SOCF_3$ | $^nPr$ | H | I | H | Cl | 1 |
| $SOCF_3$ | $^nPr$ | H | I | H | Cl | 2 |
| $SOCF_3$ | $^nPr$ | H | I | H | Br | 0 |
| $SOCF_3$ | $^nPr$ | H | I | H | Br | 1 |
| $SOCF_3$ | $^nPr$ | H | I | H | Br | 2 |
| $SOCF_3$ | $^nPr$ | H | F | H | CN | 0 |
| $SOCF_3$ | $^nPr$ | H | F | H | CN | 1 |
| $SOCF_3$ | $^nPr$ | H | F | H | CN | 2 |
| $SOCF_3$ | $^nPr$ | H | Cl | H | CN | 0 |
| $SOCF_3$ | $^nPr$ | H | Cl | H | CN | 1 |
| $SOCF_3$ | $^nPr$ | H | Cl | H | CN | 2 |
| $SOCF_3$ | $^nPr$ | H | Br | H | CN | 0 |
| $SOCF_3$ | $^nPr$ | H | Br | H | CN | 1 |
| $SOCF_3$ | $^nPr$ | H | Br | H | CN | 2 |
| $SOCF_3$ | $^nPr$ | H | I | H | CN | 0 |
| $SOCF_3$ | $^nPr$ | H | I | H | CN | 1 |
| $SOCF_3$ | $^nPr$ | H | I | H | CN | 2 |
| $SOCF_3$ | $^nPr$ | H | $CF_3$ | H | F | 0 |
| $SOCF_3$ | $^nPr$ | H | $CF_3$ | H | F | 1 |
| $SOCF_3$ | $^nPr$ | H | $CF_3$ | H | F | 2 |
| $SOCF_3$ | $^nPr$ | H | $CF_3$ | H | Cl | 0 |
| $SOCF_3$ | $^nPr$ | H | $CF_3$ | H | Cl | 1 |
| $SOCF_3$ | $^nPr$ | H | $CF_3$ | H | Cl | 2 |
| $SOCF_3$ | $^nPr$ | H | $CF_3$ | H | Br | 0 |
| $SOCF_3$ | $^nPr$ | H | $CF_3$ | H | Br | 1 |
| $SOCF_3$ | $^nPr$ | H | $CF_3$ | H | Br | 2 |
| $SOCF_3$ | $^nPr$ | H | $CF_3$ | H | I | 0 |
| $SOCF_3$ | $^nPr$ | H | $CF_3$ | H | I | 1 |
| $SOCF_3$ | $^nPr$ | H | $CF_3$ | H | I | 2 |
| $SOCF_3$ | $^nPr$ | H | $CF_3$ | H | CN | 0 |
| $SOCF_3$ | $^nPr$ | H | $CF_3$ | H | CN | 1 |
| $SOCF_3$ | $^nPr$ | H | $CF_3$ | H | CN | 2 |
| $SOCF_3$ | $^nPr$ | H | F | F | H | 0 |
| $SOCF_3$ | $^nPr$ | H | F | F | H | 1 |
| $SOCF_3$ | $^nPr$ | H | F | F | H | 2 |
| $SOCF_3$ | $^nPr$ | H | Cl | Cl | H | 0 |
| $SOCF_3$ | $^nPr$ | H | Cl | Cl | H | 1 |
| $SOCF_3$ | $^nPr$ | H | Cl | Cl | H | 2 |
| $SOCF_3$ | $^nPr$ | H | Br | Br | H | 0 |
| $SOCF_3$ | $^nPr$ | H | Br | Br | H | 1 |
| $SOCF_3$ | $^nPr$ | H | Br | Br | H | 2 |
| $SOCF_3$ | $^nPr$ | H | I | I | H | 0 |
| $SOCF_3$ | $^nPr$ | H | I | I | H | 1 |
| $SOCF_3$ | $^nPr$ | H | I | I | H | 2 |
| $SOCF_3$ | $^nPr$ | H | F | Cl | H | 0 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SOCF_3$ | $^nPr$ | H | F | Cl | H | 1 |
| $SOCF_3$ | $^nPr$ | H | F | Cl | H | 2 |
| $SOCF_3$ | $^nPr$ | H | F | Br | H | 0 |
| $SOCF_3$ | $^nPr$ | H | F | Br | H | 1 |
| $SOCF_3$ | $^nPr$ | H | F | Br | H | 2 |
| $SOCF_3$ | $^nPr$ | H | F | I | H | 0 |
| $SOCF_3$ | $^nPr$ | H | F | I | H | 1 |
| $SOCF_3$ | $^nPr$ | H | F | I | H | 2 |
| $SOCF_3$ | $^nPr$ | H | Cl | F | H | 0 |
| $SOCF_3$ | $^nPr$ | H | Cl | F | H | 1 |
| $SOCF_3$ | $^nPr$ | H | Cl | F | H | 2 |
| $SOCF_3$ | $^nPr$ | H | Cl | Br | H | 0 |
| $SOCF_3$ | $^nPr$ | H | Cl | Br | H | 1 |
| $SOCF_3$ | $^nPr$ | H | Cl | Br | H | 2 |
| $SOCF_3$ | $^nPr$ | H | Cl | I | H | 0 |
| $SOCF_3$ | $^nPr$ | H | Cl | I | H | 1 |
| $SOCF_3$ | $^nPr$ | H | Cl | I | H | 2 |
| $SOCF_3$ | $^nPr$ | H | Br | F | H | 0 |
| $SOCF_3$ | $^nPr$ | H | Br | F | H | 1 |
| $SOCF_3$ | $^nPr$ | H | Br | F | H | 2 |
| $SOCF_3$ | $^nPr$ | H | Br | Cl | H | 0 |
| $SOCF_3$ | $^nPr$ | H | Br | Cl | H | 1 |
| $SOCF_3$ | $^nPr$ | H | Br | Cl | H | 2 |
| $SOCF_3$ | $^nPr$ | H | Br | I | H | 0 |
| $SOCF_3$ | $^nPr$ | H | Br | I | H | 1 |
| $SOCF_3$ | $^nPr$ | H | Br | I | H | 2 |
| $SOCF_3$ | $^nPr$ | H | I | F | H | 0 |
| $SOCF_3$ | $^nPr$ | H | I | F | H | 1 |
| $SOCF_3$ | $^nPr$ | H | I | F | H | 2 |
| $SOCF_3$ | $^nPr$ | H | I | Cl | H | 0 |
| $SOCF_3$ | $^nPr$ | H | I | Cl | H | 1 |
| $SOCF_3$ | $^nPr$ | H | I | Cl | H | 2 |
| $SOCF_3$ | $^nPr$ | H | I | Br | H | 0 |
| $SOCF_3$ | $^nPr$ | H | I | Br | H | 1 |
| $SOCF_3$ | $^nPr$ | H | I | Br | H | 2 |
| $SOCF_3$ | $^nPr$ | H | F | CN | H | 0 |
| $SOCF_3$ | $^nPr$ | H | F | CN | H | 1 |
| $SOCF_3$ | $^nPr$ | H | F | CN | H | 2 |
| $SOCF_3$ | $^nPr$ | H | Cl | CN | H | 0 |
| $SOCF_3$ | $^nPr$ | H | Cl | CN | H | 1 |
| $SOCF_3$ | $^nPr$ | H | Cl | CN | H | 2 |
| $SOCF_3$ | $^nPr$ | H | Br | CN | H | 0 |
| $SOCF_3$ | $^nPr$ | H | Br | CN | H | 1 |
| $SOCF_3$ | $^nPr$ | H | Br | CN | H | 2 |
| $SOCF_3$ | $^nPr$ | H | I | CN | H | 0 |
| $SOCF_3$ | $^nPr$ | H | I | CN | H | 1 |
| $SOCF_3$ | $^nPr$ | H | I | CN | H | 2 |
| $SOCF_3$ | $^nPr$ | H | $CF_3$ | F | H | 0 |
| $SOCF_3$ | $^nPr$ | H | $CF_3$ | F | H | 1 |
| $SOCF_3$ | $^nPr$ | H | $CF_3$ | F | H | 2 |
| $SOCF_3$ | $^nPr$ | H | $CF_3$ | Cl | H | 0 |
| $SOCF_3$ | $^nPr$ | H | $CF_3$ | Cl | H | 1 |
| $SOCF_3$ | $^nPr$ | H | $CF_3$ | Cl | H | 2 |
| $SOCF_3$ | $^nPr$ | H | $CF_3$ | Br | H | 0 |
| $SOCF_3$ | $^nPr$ | H | $CF_3$ | Br | H | 1 |
| $SOCF_3$ | $^nPr$ | H | $CF_3$ | Br | H | 2 |
| $SOCF_3$ | $^nPr$ | H | $CF_3$ | I | H | 0 |
| $SOCF_3$ | $^nPr$ | H | $CF_3$ | I | H | 1 |
| $SOCF_3$ | $^nPr$ | H | $CF_3$ | I | H | 2 |
| $SOCF_3$ | $^nPr$ | H | $CF_3$ | CN | H | 0 |
| $SOCF_3$ | $^nPr$ | H | $CF_3$ | CN | H | 1 |
| $SOCF_3$ | $^nPr$ | H | $CF_3$ | CN | H | 2 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SOCF_3$ | $^iPr$ | H | H | H | H | 0 |
| $SOCF_3$ | $^iPr$ | H | H | H | H | 1 |
| $SOCF_3$ | $^iPr$ | H | H | H | H | 2 |
| $SOCF_3$ | $^iPr$ | F | H | H | H | 0 |
| $SOCF_3$ | $^iPr$ | F | H | H | H | 1 |
| $SOCF_3$ | $^iPr$ | F | H | H | H | 2 |
| $SOCF_3$ | $^iPr$ | Cl | H | H | H | 0 |
| $SOCF_3$ | $^iPr$ | Cl | H | H | H | 1 |
| $SOCF_3$ | $^iPr$ | Cl | H | H | H | 2 |
| $SOCF_3$ | $^iPr$ | Br | H | H | H | 0 |
| $SOCF_3$ | $^iPr$ | Br | H | H | H | 1 |
| $SOCF_3$ | $^iPr$ | Br | H | H | H | 2 |
| $SOCF_3$ | $^iPr$ | I | H | H | H | 0 |
| $SOCF_3$ | $^iPr$ | I | H | H | H | 1 |
| $SOCF_3$ | $^iPr$ | I | H | H | H | 2 |
| $SOCF_3$ | $^iPr$ | Me | H | H | H | 0 |
| $SOCF_3$ | $^iPr$ | Me | H | H | H | 1 |
| $SOCF_3$ | $^iPr$ | Me | H | H | H | 2 |
| $SOCF_3$ | $^iPr$ | $CF_3$ | H | H | H | 0 |
| $SOCF_3$ | $^iPr$ | $CF_3$ | H | H | H | 1 |
| $SOCF_3$ | $^iPr$ | $CF_3$ | H | H | H | 2 |
| $SOCF_3$ | $^iPr$ | H | F | H | H | 0 |
| $SOCF_3$ | $^iPr$ | H | F | H | H | 1 |
| $SOCF_3$ | $^iPr$ | H | F | H | H | 2 |
| $SOCF_3$ | $^iPr$ | H | Cl | H | H | 0 |
| $SOCF_3$ | $^iPr$ | H | Cl | H | H | 1 |
| $SOCF_3$ | $^iPr$ | H | Cl | H | H | 2 |
| $SOCF_3$ | $^iPr$ | H | Br | H | H | 0 |
| $SOCF_3$ | $^iPr$ | H | Br | H | H | 1 |
| $SOCF_3$ | $^iPr$ | H | Br | H | H | 2 |
| $SOCF_3$ | $^iPr$ | H | I | H | H | 0 |
| $SOCF_3$ | $^iPr$ | H | I | H | H | 1 |
| $SOCF_3$ | $^iPr$ | H | I | H | H | 2 |
| $SOCF_3$ | $^iPr$ | H | Me | H | H | 0 |
| $SOCF_3$ | $^iPr$ | H | Me | H | H | 1 |
| $SOCF_3$ | $^iPr$ | H | Me | H | H | 2 |
| $SOCF_3$ | $^iPr$ | H | $CF_3$ | H | H | 0 |
| $SOCF_3$ | $^iPr$ | H | $CF_3$ | H | H | 1 |
| $SOCF_3$ | $^iPr$ | H | $CF_3$ | H | H | 2 |
| $SOCF_3$ | $^iPr$ | H | $CF_2CF_3$ | H | H | 0 |
| $SOCF_3$ | $^iPr$ | H | $CF_2CF_3$ | H | H | 1 |
| $SOCF_3$ | $^iPr$ | H | $CF_2CF_3$ | H | H | 2 |
| $SOCF_3$ | $^iPr$ | H | $CF(CF_3)_2$ | H | H | 0 |
| $SOCF_3$ | $^iPr$ | H | $CF(CF_3)_2$ | H | H | 1 |
| $SOCF_3$ | $^iPr$ | H | $CF(CF_3)_2$ | H | H | 2 |
| $SOCF_3$ | $^iPr$ | H | SMe | H | H | 0 |
| $SOCF_3$ | $^iPr$ | H | SMe | H | H | 1 |
| $SOCF_3$ | $^iPr$ | H | SMe | H | H | 2 |
| $SOCF_3$ | $^iPr$ | H | SOMe | H | H | 0 |
| $SOCF_3$ | $^iPr$ | H | SOMe | H | H | 1 |
| $SOCF_3$ | $^iPr$ | H | SOMe | H | H | 2 |
| $SOCF_3$ | $^iPr$ | H | $SO_2Me$ | H | H | 0 |
| $SOCF_3$ | $^iPr$ | H | $SO_2Me$ | H | H | 1 |
| $SOCF_3$ | $^iPr$ | H | $SO_2Me$ | H | H | 2 |
| $SOCF_3$ | $^iPr$ | H | OMe | H | H | 0 |
| $SOCF_3$ | $^iPr$ | H | OMe | H | H | 1 |
| $SOCF_3$ | $^iPr$ | H | OMe | H | H | 2 |
| $SOCF_3$ | $^iPr$ | H | $OCF_3$ | H | H | 0 |
| $SOCF_3$ | $^iPr$ | H | $OCF_3$ | H | H | 1 |
| $SOCF_3$ | $^iPr$ | H | $OCF_3$ | H | H | 2 |
| $SOCF_3$ | $^iPr$ | H | $NO_2$ | H | H | 0 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SOCF_3$ | $^iPr$ | H | $NO_2$ | H | H | 1 |
| $SOCF_3$ | $^iPr$ | H | $NO_2$ | H | H | 2 |
| $SOCF_3$ | $^iPr$ | H | CN | H | H | 0 |
| $SOCF_3$ | $^iPr$ | H | CN | H | H | 1 |
| $SOCF_3$ | $^iPr$ | H | CN | H | H | 2 |
| $SOCF_3$ | $^iPr$ | H | H | F | H | 0 |
| $SOCF_3$ | $^iPr$ | H | H | F | H | 1 |
| $SOCF_3$ | $^iPr$ | H | H | F | H | 2 |
| $SOCF_3$ | $^iPr$ | H | H | Cl | H | 0 |
| $SOCF_3$ | $^iPr$ | H | H | Cl | H | 1 |
| $SOCF_3$ | $^iPr$ | H | H | Cl | H | 2 |
| $SOCF_3$ | $^iPr$ | H | H | Br | H | 0 |
| $SOCF_3$ | $^iPr$ | H | H | Br | H | 1 |
| $SOCF_3$ | $^iPr$ | H | H | Br | H | 2 |
| $SOCF_3$ | $^iPr$ | H | H | I | H | 0 |
| $SOCF_3$ | $^iPr$ | H | H | I | H | 1 |
| $SOCF_3$ | $^iPr$ | H | H | I | H | 2 |
| $SOCF_3$ | $^iPr$ | H | H | Me | H | 0 |
| $SOCF_3$ | $^iPr$ | H | H | Me | H | 1 |
| $SOCF_3$ | $^iPr$ | H | H | Me | H | 2 |
| $SOCF_3$ | $^iPr$ | H | H | $CF_3$ | H | 0 |
| $SOCF_3$ | $^iPr$ | H | H | $CF_3$ | H | 1 |
| $SOCF_3$ | $^iPr$ | H | H | $CF_3$ | H | 2 |
| $SOCF_3$ | $^iPr$ | H | H | $CF_2CF_3$ | H | 0 |
| $SOCF_3$ | $^iPr$ | H | H | $CF_2CF_3$ | H | 1 |
| $SOCF_3$ | $^iPr$ | H | H | $CF_2CF_3$ | H | 2 |
| $SOCF_3$ | $^iPr$ | H | H | $CF(CF_3)_2$ | H | 0 |
| $SOCF_3$ | $^iPr$ | H | H | $CF(CF_3)_2$ | H | 1 |
| $SOCF_3$ | $^iPr$ | H | H | $CF(CF_3)_2$ | H | 2 |
| $SOCF_3$ | $^iPr$ | H | H | SMe | H | 0 |
| $SOCF_3$ | $^iPr$ | H | H | SMe | H | 1 |
| $SOCF_3$ | $^iPr$ | H | H | SMe | H | 2 |
| $SOCF_3$ | $^iPr$ | H | H | SOMe | H | 0 |
| $SOCF_3$ | $^iPr$ | H | H | SOMe | H | 1 |
| $SOCF_3$ | $^iPr$ | H | H | SOMe | H | 2 |
| $SOCF_3$ | $^iPr$ | H | H | $SO_2Me$ | H | 0 |
| $SOCF_3$ | $^iPr$ | H | H | $SO_2Me$ | H | 1 |
| $SOCF_3$ | $^iPr$ | H | H | $SO_2Me$ | H | 2 |
| $SOCF_3$ | $^iPr$ | H | H | OMe | H | 0 |
| $SOCF_3$ | $^iPr$ | H | H | OMe | H | 1 |
| $SOCF_3$ | $^iPr$ | H | H | OMe | H | 2 |
| $SOCF_3$ | $^iPr$ | H | H | $OCF_3$ | H | 0 |
| $SOCF_3$ | $^iPr$ | H | H | $OCF_3$ | H | 1 |
| $SOCF_3$ | $^iPr$ | H | H | $OCF_3$ | H | 2 |
| $SOCF_3$ | $^iPr$ | H | H | $NO_2$ | H | 0 |
| $SOCF_3$ | $^iPr$ | H | H | $NO_2$ | H | 1 |
| $SOCF_3$ | $^iPr$ | H | H | $NO_2$ | H | 2 |
| $SOCF_3$ | $^iPr$ | H | H | CN | H | 0 |
| $SOCF_3$ | $^iPr$ | H | H | CN | H | 1 |
| $SOCF_3$ | $^iPr$ | H | H | CN | H | 2 |
| $SOCF_3$ | $^iPr$ | H | H | H | F | 0 |
| $SOCF_3$ | $^iPr$ | H | H | H | F | 1 |
| $SOCF_3$ | $^iPr$ | H | H | H | F | 2 |
| $SOCF_3$ | $^iPr$ | H | H | H | Cl | 0 |
| $SOCF_3$ | $^iPr$ | H | H | H | Cl | 1 |
| $SOCF_3$ | $^iPr$ | H | H | H | Cl | 2 |
| $SOCF_3$ | $^iPr$ | H | H | H | Br | 0 |
| $SOCF_3$ | $^iPr$ | H | H | H | Br | 1 |
| $SOCF_3$ | $^iPr$ | H | H | H | Br | 2 |
| $SOCF_3$ | $^iPr$ | H | H | H | I | 0 |
| $SOCF_3$ | $^iPr$ | H | H | H | I | 1 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SOCF_3$ | $^iPr$ | H | H | H | I | 2 |
| $SOCF_3$ | $^iPr$ | H | H | H | Me | 0 |
| $SOCF_3$ | $^iPr$ | H | H | H | Me | 1 |
| $SOCF_3$ | $^iPr$ | H | H | H | Me | 2 |
| $SOCF_3$ | $^iPr$ | H | H | H | $CF_3$ | 0 |
| $SOCF_3$ | $^iPr$ | H | H | H | $CF_3$ | 1 |
| $SOCF_3$ | $^iPr$ | H | H | H | $CF_3$ | 2 |
| $SOCF_3$ | $^iPr$ | H | H | H | $CF_2CF_3$ | 0 |
| $SOCF_3$ | $^iPr$ | H | H | H | $CF_2CF_3$ | 1 |
| $SOCF_3$ | $^iPr$ | H | H | H | $CF_2CF_3$ | 2 |
| $SOCF_3$ | $^iPr$ | H | H | H | $CF(CF_3)_2$ | 0 |
| $SOCF_3$ | $^iPr$ | H | H | H | $CF(CF_3)_2$ | 1 |
| $SOCF_3$ | $^iPr$ | H | H | H | $CF(CF_3)_2$ | 2 |
| $SOCF_3$ | $^iPr$ | H | H | H | SMe | 0 |
| $SOCF_3$ | $^iPr$ | H | H | H | SMe | 1 |
| $SOCF_3$ | $^iPr$ | H | H | H | SMe | 2 |
| $SOCF_3$ | $^iPr$ | H | H | H | SOMe | 0 |
| $SOCF_3$ | $^iPr$ | H | H | H | SOMe | 1 |
| $SOCF_3$ | $^iPr$ | H | H | H | SOMe | 2 |
| $SOCF_3$ | $^iPr$ | H | H | H | $SO_2Me$ | 0 |
| $SOCF_3$ | $^iPr$ | H | H | H | $SO_2Me$ | 1 |
| $SOCF_3$ | $^iPr$ | H | H | H | $SO_2Me$ | 2 |
| $SOCF_3$ | $^iPr$ | H | H | H | OMe | 0 |
| $SOCF_3$ | $^iPr$ | H | H | H | OMe | 1 |
| $SOCF_3$ | $^iPr$ | H | H | H | OMe | 2 |
| $SOCF_3$ | $^iPr$ | H | H | H | $OCF_3$ | 0 |
| $SOCF_3$ | $^iPr$ | H | H | H | $OCF_3$ | 1 |
| $SOCF_3$ | $^iPr$ | H | H | H | $OCF_3$ | 2 |
| $SOCF_3$ | $^iPr$ | H | H | H | $NO_2$ | 0 |
| $SOCF_3$ | $^iPr$ | H | H | H | $NO_2$ | 1 |
| $SOCF_3$ | $^iPr$ | H | H | H | $NO_2$ | 2 |
| $SOCF_3$ | $^iPr$ | H | H | H | CN | 0 |
| $SOCF_3$ | $^iPr$ | H | H | H | CN | 1 |
| $SOCF_3$ | $^iPr$ | H | H | H | CN | 2 |
| $SOCF_3$ | $^iPr$ | H | F | H | F | 0 |
| $SOCF_3$ | $^iPr$ | H | F | H | F | 1 |
| $SOCF_3$ | $^iPr$ | H | F | H | F | 2 |
| $SOCF_3$ | $^iPr$ | H | Cl | H | Cl | 0 |
| $SOCF_3$ | $^iPr$ | H | Cl | H | Cl | 1 |
| $SOCF_3$ | $^iPr$ | H | Cl | H | Cl | 2 |
| $SOCF_3$ | $^iPr$ | H | Br | H | Br | 0 |
| $SOCF_3$ | $^iPr$ | H | Br | H | Br | 1 |
| $SOCF_3$ | $^iPr$ | H | Br | H | Br | 2 |
| $SOCF_3$ | $^iPr$ | H | I | H | I | 0 |
| $SOCF_3$ | $^iPr$ | H | I | H | I | 1 |
| $SOCF_3$ | $^iPr$ | H | I | H | I | 2 |
| $SOCF_3$ | $^iPr$ | H | F | H | Cl | 0 |
| $SOCF_3$ | $^iPr$ | H | F | H | Cl | 1 |
| $SOCF_3$ | $^iPr$ | H | F | H | Cl | 2 |
| $SOCF_3$ | $^iPr$ | H | F | H | Br | 0 |
| $SOCF_3$ | $^iPr$ | H | F | H | Br | 1 |
| $SOCF_3$ | $^iPr$ | H | F | H | Br | 2 |
| $SOCF_3$ | $^iPr$ | H | F | H | I | 0 |
| $SOCF_3$ | $^iPr$ | H | F | H | I | 1 |
| $SOCF_3$ | $^iPr$ | H | F | H | I | 2 |
| $SOCF_3$ | $^iPr$ | H | Cl | H | F | 0 |
| $SOCF_3$ | $^iPr$ | H | Cl | H | F | 1 |
| $SOCF_3$ | $^iPr$ | H | Cl | H | F | 2 |
| $SOCF_3$ | $^iPr$ | H | Cl | H | Br | 0 |
| $SOCF_3$ | $^iPr$ | H | Cl | H | Br | 1 |
| $SOCF_3$ | $^iPr$ | H | Cl | H | Br | 2 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SOCF_3$ | $^iPr$ | H | Cl | H | I | 0 |
| $SOCF_3$ | $^iPr$ | H | Cl | H | I | 1 |
| $SOCF_3$ | $^iPr$ | H | Cl | H | I | 2 |
| $SOCF_3$ | $^iPr$ | H | Br | H | F | 0 |
| $SOCF_3$ | $^iPr$ | H | Br | H | F | 1 |
| $SOCF_3$ | $^iPr$ | H | Br | H | F | 2 |
| $SOCF_3$ | $^iPr$ | H | Br | H | Cl | 0 |
| $SOCF_3$ | $^iPr$ | H | Br | H | Cl | 1 |
| $SOCF_3$ | $^iPr$ | H | Br | H | Cl | 2 |
| $SOCF_3$ | $^iPr$ | H | Br | H | I | 0 |
| $SOCF_3$ | $^iPr$ | H | Br | H | I | 1 |
| $SOCF_3$ | $^iPr$ | H | Br | H | I | 2 |
| $SOCF_3$ | $^iPr$ | H | I | H | F | 0 |
| $SOCF_3$ | $^iPr$ | H | I | H | F | 1 |
| $SOCF_3$ | $^iPr$ | H | I | H | F | 2 |
| $SOCF_3$ | $^iPr$ | H | I | H | Cl | 0 |
| $SOCF_3$ | $^iPr$ | H | I | H | Cl | 1 |
| $SOCF_3$ | $^iPr$ | H | I | H | Cl | 2 |
| $SOCF_3$ | $^iPr$ | H | I | H | Br | 0 |
| $SOCF_3$ | $^iPr$ | H | I | H | Br | 1 |
| $SOCF_3$ | $^iPr$ | H | I | H | Br | 2 |
| $SOCF_3$ | $^iPr$ | H | F | H | CN | 0 |
| $SOCF_3$ | $^iPr$ | H | F | H | CN | 1 |
| $SOCF_3$ | $^iPr$ | H | F | H | CN | 2 |
| $SOCF_3$ | $^iPr$ | H | Cl | H | CN | 0 |
| $SOCF_3$ | $^iPr$ | H | Cl | H | CN | 1 |
| $SOCF_3$ | $^iPr$ | H | Cl | H | CN | 2 |
| $SOCF_3$ | $^iPr$ | H | Br | H | CN | 0 |
| $SOCF_3$ | $^iPr$ | H | Br | H | CN | 1 |
| $SOCF_3$ | $^iPr$ | H | Br | H | CN | 2 |
| $SOCF_3$ | $^iPr$ | H | I | H | CN | 0 |
| $SOCF_3$ | $^iPr$ | H | I | H | CN | 1 |
| $SOCF_3$ | $^iPr$ | H | I | H | CN | 2 |
| $SOCF_3$ | $^iPr$ | H | $CF_3$ | H | F | 0 |
| $SOCF_3$ | $^iPr$ | H | $CF_3$ | H | F | 1 |
| $SOCF_3$ | $^iPr$ | H | $CF_3$ | H | F | 2 |
| $SOCF_3$ | $^iPr$ | H | $CF_3$ | H | Cl | 0 |
| $SOCF_3$ | $^iPr$ | H | $CF_3$ | H | Cl | 1 |
| $SOCF_3$ | $^iPr$ | H | $CF_3$ | H | Cl | 2 |
| $SOCF_3$ | $^iPr$ | H | $CF_3$ | H | Br | 0 |
| $SOCF_3$ | $^iPr$ | H | $CF_3$ | H | Br | 1 |
| $SOCF_3$ | $^iPr$ | H | $CF_3$ | H | Br | 2 |
| $SOCF_3$ | $^iPr$ | H | $CF_3$ | H | I | 0 |
| $SOCF_3$ | $^iPr$ | H | $CF_3$ | H | I | 1 |
| $SOCF_3$ | $^iPr$ | H | $CF_3$ | H | I | 2 |
| $SOCF_3$ | $^iPr$ | H | $CF_3$ | H | CN | 0 |
| $SOCF_3$ | $^iPr$ | H | $CF_3$ | H | CN | 1 |
| $SOCF_3$ | $^iPr$ | H | $CF_3$ | H | CN | 2 |
| $SOCF_3$ | $^iPr$ | H | F | F | H | 0 |
| $SOCF_3$ | $^iPr$ | H | F | F | H | 1 |
| $SOCF_3$ | $^iPr$ | H | F | F | H | 2 |
| $SOCF_3$ | $^iPr$ | H | Cl | Cl | H | 0 |
| $SOCF_3$ | $^iPr$ | H | Cl | Cl | H | 1 |
| $SOCF_3$ | $^iPr$ | H | Cl | Cl | H | 2 |
| $SOCF_3$ | $^iPr$ | H | Br | Br | H | 0 |
| $SOCF_3$ | $^iPr$ | H | Br | Br | H | 1 |
| $SOCF_3$ | $^iPr$ | H | Br | Br | H | 2 |
| $SOCF_3$ | $^iPr$ | H | I | I | H | 0 |
| $SOCF_3$ | $^iPr$ | H | I | I | H | 1 |
| $SOCF_3$ | $^iPr$ | H | I | I | H | 2 |
| $SOCF_3$ | $^iPr$ | H | F | Cl | H | 0 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SOCF_3$ | $^iPr$ | H | F | Cl | H | 1 |
| $SOCF_3$ | $^iPr$ | H | F | Cl | H | 2 |
| $SOCF_3$ | $^iPr$ | H | F | Br | H | 0 |
| $SOCF_3$ | $^iPr$ | H | F | Br | H | 1 |
| $SOCF_3$ | $^iPr$ | H | F | Br | H | 2 |
| $SOCF_3$ | $^iPr$ | H | F | I | H | 0 |
| $SOCF_3$ | $^iPr$ | H | F | I | H | 1 |
| $SOCF_3$ | $^iPr$ | H | F | I | H | 2 |
| $SOCF_3$ | $^iPr$ | H | Cl | F | H | 0 |
| $SOCF_3$ | $^iPr$ | H | Cl | F | H | 1 |
| $SOCF_3$ | $^iPr$ | H | Cl | F | H | 2 |
| $SOCF_3$ | $^iPr$ | H | Cl | Br | H | 0 |
| $SOCF_3$ | $^iPr$ | H | Cl | Br | H | 1 |
| $SOCF_3$ | $^iPr$ | H | Cl | Br | H | 2 |
| $SOCF_3$ | $^iPr$ | H | Cl | I | H | 0 |
| $SOCF_3$ | $^iPr$ | H | Cl | I | H | 1 |
| $SOCF_3$ | $^iPr$ | H | Cl | I | H | 2 |
| $SOCF_3$ | $^iPr$ | H | Br | F | H | 0 |
| $SOCF_3$ | $^iPr$ | H | Br | F | H | 1 |
| $SOCF_3$ | $^iPr$ | H | Br | F | H | 2 |
| $SOCF_3$ | $^iPr$ | H | Br | Cl | H | 0 |
| $SOCF_3$ | $^iPr$ | H | Br | Cl | H | 1 |
| $SOCF_3$ | $^iPr$ | H | Br | Cl | H | 2 |
| $SOCF_3$ | $^iPr$ | H | Br | I | H | 0 |
| $SOCF_3$ | $^iPr$ | H | Br | I | H | 1 |
| $SOCF_3$ | $^iPr$ | H | Br | I | H | 2 |
| $SOCF_3$ | $^iPr$ | H | I | F | H | 0 |
| $SOCF_3$ | $^iPr$ | H | I | F | H | 1 |
| $SOCF_3$ | $^iPr$ | H | I | F | H | 2 |
| $SOCF_3$ | $^iPr$ | H | I | Cl | H | 0 |
| $SOCF_3$ | $^iPr$ | H | I | Cl | H | 1 |
| $SOCF_3$ | $^iPr$ | H | I | Cl | H | 2 |
| $SOCF_3$ | $^iPr$ | H | I | Br | H | 0 |
| $SOCF_3$ | $^iPr$ | H | I | Br | H | 1 |
| $SOCF_3$ | $^iPr$ | H | I | Br | H | 2 |
| $SOCF_3$ | $^iPr$ | H | F | CN | H | 0 |
| $SOCF_3$ | $^iPr$ | H | F | CN | H | 1 |
| $SOCF_3$ | $^iPr$ | H | F | CN | H | 2 |
| $SOCF_3$ | $^iPr$ | H | Cl | CN | H | 0 |
| $SOCF_3$ | $^iPr$ | H | Cl | CN | H | 1 |
| $SOCF_3$ | $^iPr$ | H | Cl | CN | H | 2 |
| $SOCF_3$ | $^iPr$ | H | Br | CN | H | 0 |
| $SOCF_3$ | $^iPr$ | H | Br | CN | H | 1 |
| $SOCF_3$ | $^iPr$ | H | Br | CN | H | 2 |
| $SOCF_3$ | $^iPr$ | H | I | CN | H | 0 |
| $SOCF_3$ | $^iPr$ | H | I | CN | H | 1 |
| $SOCF_3$ | $^iPr$ | H | I | CN | H | 2 |
| $SOCF_3$ | $^iPr$ | H | $CF_3$ | F | H | 0 |
| $SOCF_3$ | $^iPr$ | H | $CF_3$ | F | H | 1 |
| $SOCF_3$ | $^iPr$ | H | $CF_3$ | F | H | 2 |
| $SOCF_3$ | $^iPr$ | H | $CF_3$ | Cl | H | 0 |
| $SOCF_3$ | $^iPr$ | H | $CF_3$ | Cl | H | 1 |
| $SOCF_3$ | $^iPr$ | H | $CF_3$ | Cl | H | 2 |
| $SOCF_3$ | $^iPr$ | H | $CF_3$ | Br | H | 0 |
| $SOCF_3$ | $^iPr$ | H | $CF_3$ | Br | H | 1 |
| $SOCF_3$ | $^iPr$ | H | $CF_3$ | Br | H | 2 |
| $SOCF_3$ | $^iPr$ | H | $CF_3$ | I | H | 0 |
| $SOCF_3$ | $^iPr$ | H | $CF_3$ | I | H | 1 |
| $SOCF_3$ | $^iPr$ | H | $CF_3$ | I | H | 2 |
| $SOCF_3$ | $^iPr$ | H | $CF_3$ | CN | H | 0 |
| $SOCF_3$ | $^iPr$ | H | $CF_3$ | CN | H | 1 |
| $SOCF_3$ | $^iPr$ | H | $CF_3$ | CN | H | 2 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SOCF_3$ | $CH_2CF_3$ | H | H | H | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | H | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | H | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | F | H | H | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | F | H | H | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | F | H | H | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | Cl | H | H | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | Cl | H | H | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | Cl | H | H | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | Br | H | H | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | Br | H | H | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | Br | H | H | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | I | H | H | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | I | H | H | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | I | H | H | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | Me | H | H | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | Me | H | H | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | Me | H | H | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | $CF_3$ | H | H | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | $CF_3$ | H | H | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | $CF_3$ | H | H | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | F | H | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | F | H | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | F | H | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | Cl | H | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | Cl | H | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | Cl | H | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | Br | H | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | Br | H | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | Br | H | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | I | H | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | I | H | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | I | H | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | Me | H | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | Me | H | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | Me | H | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | $CF_2CF_3$ | H | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | $CF_2CF_3$ | H | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | $CF_2CF_3$ | H | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | $CF(CF_3)_2$ | H | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | $CF(CF_3)_2$ | H | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | $CF(CF_3)_2$ | H | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | SMe | H | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | SMe | H | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | SMe | H | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | SOMe | H | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | SOMe | H | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | SOMe | H | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | $SO_2Me$ | H | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | $SO_2Me$ | H | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | $SO_2Me$ | H | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | OMe | H | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | OMe | H | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | OMe | H | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | $OCF_3$ | H | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | $OCF_3$ | H | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | $OCF_3$ | H | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | $NO_2$ | H | H | 0 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SOCF_3$ | $CH_2CF_3$ | H | $NO_2$ | H | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | $NO_2$ | H | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | CN | H | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | CN | H | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | CN | H | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | F | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | F | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | F | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | Cl | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | Cl | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | Cl | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | Br | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | Br | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | Br | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | I | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | I | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | I | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | Me | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | Me | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | Me | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | $CF_3$ | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | $CF_3$ | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | $CF_3$ | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | $CF_2CF_3$ | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | $CF_2CF_3$ | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | $CF_2CF_3$ | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | $CF(CF_3)_2$ | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | $CF(CF_3)_2$ | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | $CF(CF_3)_2$ | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | SMe | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | SMe | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | SMe | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | SOMe | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | SOMe | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | SOMe | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | $SO_2Me$ | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | $SO_2Me$ | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | $SO_2Me$ | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | OMe | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | OMe | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | OMe | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | $OCF_3$ | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | $OCF_3$ | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | $OCF_3$ | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | $NO_2$ | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | $NO_2$ | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | $NO_2$ | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | CN | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | CN | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | CN | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | H | F | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | H | F | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | H | F | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | H | Cl | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | H | Cl | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | H | Cl | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | H | Br | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | H | Br | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | H | Br | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | H | I | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | H | I | 1 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SOCF_3$ | $CH_2CF_3$ | H | H | H | I | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | H | Me | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | H | Me | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | H | Me | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | H | $CF_3$ | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | H | $CF_3$ | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | H | $CF_3$ | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | H | $CF_2CF_3$ | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | H | $CF_2CF_3$ | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | H | $CF_2CF_3$ | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | H | $CF(CF_3)_2$ | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | H | $CF(CF_3)_2$ | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | H | $CF(CF_3)_2$ | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | H | SMe | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | H | SMe | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | H | SMe | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | H | SOMe | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | H | SOMe | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | H | SOMe | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | H | $SO_2Me$ | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | H | $SO_2Me$ | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | H | $SO_2Me$ | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | H | OMe | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | H | OMe | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | H | OMe | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | H | $OCF_3$ | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | H | $OCF_3$ | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | H | $OCF_3$ | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | H | $NO_2$ | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | H | $NO_2$ | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | H | $NO_2$ | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | H | CN | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | H | CN | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | H | H | CN | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | F | H | F | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | F | H | F | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | F | H | F | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | Cl | H | Cl | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | Cl | H | Cl | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | Cl | H | Cl | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | Br | H | Br | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | Br | H | Br | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | Br | H | Br | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | I | H | I | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | I | H | I | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | I | H | I | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | F | H | Cl | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | F | H | Cl | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | F | H | Cl | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | F | H | Br | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | F | H | Br | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | F | H | Br | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | F | H | I | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | F | H | I | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | F | H | I | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | Cl | H | F | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | Cl | H | F | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | Cl | H | F | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | Cl | H | Br | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | Cl | H | Br | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | Cl | H | Br | 2 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SOCF_3$ | $CH_2CF_3$ | H | Cl | H | I | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | Cl | H | I | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | Cl | H | I | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | Br | H | F | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | Br | H | F | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | Br | H | F | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | Br | H | Cl | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | Br | H | Cl | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | Br | H | Cl | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | Br | H | I | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | Br | H | I | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | Br | H | I | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | I | H | F | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | I | H | F | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | I | H | F | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | I | H | Cl | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | I | H | Cl | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | I | H | Cl | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | I | H | Br | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | I | H | Br | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | I | H | Br | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | F | H | CN | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | F | H | CN | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | F | H | CN | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | Cl | H | CN | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | Cl | H | CN | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | Cl | H | CN | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | Br | H | CN | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | Br | H | CN | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | Br | H | CN | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | I | H | CN | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | I | H | CN | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | I | H | CN | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | F | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | F | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | F | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | Cl | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | Cl | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | Cl | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | Br | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | Br | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | Br | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | I | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | I | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | I | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | CN | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | CN | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | CN | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | F | F | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | F | F | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | F | F | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | Cl | Cl | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | Cl | Cl | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | Cl | Cl | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | Br | Br | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | Br | Br | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | Br | Br | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | I | I | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | I | I | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | I | I | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | F | Cl | H | 0 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SOCF_3$ | $CH_2CF_3$ | H | F | Cl | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | F | Cl | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | F | Br | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | F | Br | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | F | Br | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | F | I | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | F | I | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | F | I | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | Cl | F | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | Cl | F | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | Cl | F | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | Cl | Br | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | Cl | Br | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | Cl | Br | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | Cl | I | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | Cl | I | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | Cl | I | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | Br | F | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | Br | F | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | Br | F | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | Br | Cl | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | Br | Cl | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | Br | Cl | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | Br | I | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | Br | I | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | Br | I | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | I | F | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | I | F | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | I | F | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | I | Cl | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | I | Cl | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | I | Cl | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | I | Br | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | I | Br | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | I | Br | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | F | CN | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | F | CN | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | F | CN | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | Cl | CN | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | Cl | CN | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | Cl | CN | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | Br | CN | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | Br | CN | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | Br | CN | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | I | CN | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | I | CN | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | I | CN | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | $CF_3$ | F | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | $CF_3$ | F | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | $CF_3$ | F | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | $CF_3$ | Cl | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | $CF_3$ | Cl | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | $CF_3$ | Cl | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | $CF_3$ | Br | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | $CF_3$ | Br | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | $CF_3$ | Br | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | $CF_3$ | I | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | $CF_3$ | I | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | $CF_3$ | I | H | 2 |
| $SOCF_3$ | $CH_2CF_3$ | H | $CF_3$ | CN | H | 0 |
| $SOCF_3$ | $CH_2CF_3$ | H | $CF_3$ | CN | H | 1 |
| $SOCF_3$ | $CH_2CF_3$ | H | $CF_3$ | CN | H | 2 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SO_2CF_3$ | Me | H | H | H | H | 0 |
| $SO_2CF_3$ | Me | H | H | H | H | 1 |
| $SO_2CF_3$ | Me | H | H | H | H | 2 |
| $SO_2CF_3$ | Me | F | H | H | H | 0 |
| $SO_2CF_3$ | Me | F | H | H | H | 1 |
| $SO_2CF_3$ | Me | F | H | H | H | 2 |
| $SO_2CF_3$ | Me | Cl | H | H | H | 0 |
| $SO_2CF_3$ | Me | Cl | H | H | H | 1 |
| $SO_2CF_3$ | Me | Cl | H | H | H | 2 |
| $SO_2CF_3$ | Me | Br | H | H | H | 0 |
| $SO_2CF_3$ | Me | Br | H | H | H | 1 |
| $SO_2CF_3$ | Me | Br | H | H | H | 2 |
| $SO_2CF_3$ | Me | I | H | H | H | 0 |
| $SO_2CF_3$ | Me | I | H | H | H | 1 |
| $SO_2CF_3$ | Me | I | H | H | H | 2 |
| $SO_2CF_3$ | Me | Me | H | H | H | 0 |
| $SO_2CF_3$ | Me | Me | H | H | H | 1 |
| $SO_2CF_3$ | Me | Me | H | H | H | 2 |
| $SO_2CF_3$ | Me | $CF_3$ | H | H | H | 0 |
| $SO_2CF_3$ | Me | $CF_3$ | H | H | H | 1 |
| $SO_2CF_3$ | Me | $CF_3$ | H | H | H | 2 |
| $SO_2CF_3$ | Me | H | F | H | H | 0 |
| $SO_2CF_3$ | Me | H | F | H | H | 1 |
| $SO_2CF_3$ | Me | H | F | H | H | 2 |
| $SO_2CF_3$ | Me | H | Cl | H | H | 0 |
| $SO_2CF_3$ | Me | H | Cl | H | H | 1 |
| $SO_2CF_3$ | Me | H | Cl | H | H | 2 |
| $SO_2CF_3$ | Me | H | Br | H | H | 0 |
| $SO_2CF_3$ | Me | H | Br | H | H | 1 |
| $SO_2CF_3$ | Me | H | Br | H | H | 2 |
| $SO_2CF_3$ | Me | H | I | H | H | 0 |
| $SO_2CF_3$ | Me | H | I | H | H | 1 |
| $SO_2CF_3$ | Me | H | I | H | H | 2 |
| $SO_2CF_3$ | Me | H | Me | H | H | 0 |
| $SO_2CF_3$ | Me | H | Me | H | H | 1 |
| $SO_2CF_3$ | Me | H | Me | H | H | 2 |
| $SO_2CF_3$ | Me | H | $CF_3$ | H | H | 0 |
| $SO_2CF_3$ | Me | H | $CF_3$ | H | H | 1 |
| $SO_2CF_3$ | Me | H | $CF_3$ | H | H | 2 |
| $SO_2CF_3$ | Me | H | $CF_2CF_3$ | H | H | 0 |
| $SO_2CF_3$ | Me | H | $CF_2CF_3$ | H | H | 1 |
| $SO_2CF_3$ | Me | H | $CF_2CF_3$ | H | H | 2 |
| $SO_2CF_3$ | Me | H | $CF(CF_3)_2$ | H | H | 0 |
| $SO_2CF_3$ | Me | H | $CF(CF_3)_2$ | H | H | 1 |
| $SO_2CF_3$ | Me | H | $CF(CF_3)_2$ | H | H | 2 |
| $SO_2CF_3$ | Me | H | SMe | H | H | 0 |
| $SO_2CF_3$ | Me | H | SMe | H | H | 1 |
| $SO_2CF_3$ | Me | H | SMe | H | H | 2 |
| $SO_2CF_3$ | Me | H | SOMe | H | H | 0 |
| $SO_2CF_3$ | Me | H | SOMe | H | H | 1 |
| $SO_2CF_3$ | Me | H | SOMe | H | H | 2 |
| $SO_2CF_3$ | Me | H | $SO_2Me$ | H | H | 0 |
| $SO_2CF_3$ | Me | H | $SO_2Me$ | H | H | 1 |
| $SO_2CF_3$ | Me | H | $SO_2Me$ | H | H | 2 |
| $SO_2CF_3$ | Me | H | OMe | H | H | 0 |
| $SO_2CF_3$ | Me | H | OMe | H | H | 1 |
| $SO_2CF_3$ | Me | H | OMe | H | H | 2 |
| $SO_2CF_3$ | Me | H | $OCF_3$ | H | H | 0 |
| $SO_2CF_3$ | Me | H | $OCF_3$ | H | H | 1 |
| $SO_2CF_3$ | Me | H | $OCF_3$ | H | H | 2 |
| $SO_2CF_3$ | Me | H | $NO_2$ | H | H | 0 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SO_2CF_3$ | Me | H | $NO_2$ | H | H | 1 |
| $SO_2CF_3$ | Me | H | $NO_2$ | H | H | 2 |
| $SO_2CF_3$ | Me | H | CN | H | H | 0 |
| $SO_2CF_3$ | Me | H | CN | H | H | 1 |
| $SO_2CF_3$ | Me | H | CN | H | H | 2 |
| $SO_2CF_3$ | Me | H | H | F | H | 0 |
| $SO_2CF_3$ | Me | H | H | F | H | 1 |
| $SO_2CF_3$ | Me | H | H | F | H | 2 |
| $SO_2CF_3$ | Me | H | H | Cl | H | 0 |
| $SO_2CF_3$ | Me | H | H | Cl | H | 1 |
| $SO_2CF_3$ | Me | H | H | Cl | H | 2 |
| $SO_2CF_3$ | Me | H | H | Br | H | 0 |
| $SO_2CF_3$ | Me | H | H | Br | H | 1 |
| $SO_2CF_3$ | Me | H | H | Br | H | 2 |
| $SO_2CF_3$ | Me | H | H | I | H | 0 |
| $SO_2CF_3$ | Me | H | H | I | H | 1 |
| $SO_2CF_3$ | Me | H | H | I | H | 2 |
| $SO_2CF_3$ | Me | H | H | Me | H | 0 |
| $SO_2CF_3$ | Me | H | H | Me | H | 1 |
| $SO_2CF_3$ | Me | H | H | Me | H | 2 |
| $SO_2CF_3$ | Me | H | H | $CF_3$ | H | 0 |
| $SO_2CF_3$ | Me | H | H | $CF_3$ | H | 1 |
| $SO_2CF_3$ | Me | H | H | $CF_3$ | H | 2 |
| $SO_2CF_3$ | Me | H | H | $CF_2CF_3$ | H | 0 |
| $SO_2CF_3$ | Me | H | H | $CF_2CF_3$ | H | 1 |
| $SO_2CF_3$ | Me | H | H | $CF_2CF_3$ | H | 2 |
| $SO_2CF_3$ | Me | H | H | $CF(CF_3)_2$ | H | 0 |
| $SO_2CF_3$ | Me | H | H | $CF(CF_3)_2$ | H | 1 |
| $SO_2CF_3$ | Me | H | H | $CF(CF_3)_2$ | H | 2 |
| $SO_2CF_3$ | Me | H | H | SMe | H | 0 |
| $SO_2CF_3$ | Me | H | H | SMe | H | 1 |
| $SO_2CF_3$ | Me | H | H | SMe | H | 2 |
| $SO_2CF_3$ | Me | H | H | SOMe | H | 0 |
| $SO_2CF_3$ | Me | H | H | SOMe | H | 1 |
| $SO_2CF_3$ | Me | H | H | SOMe | H | 2 |
| $SO_2CF_3$ | Me | H | H | $SO_2Me$ | H | 0 |
| $SO_2CF_3$ | Me | H | H | $SO_2Me$ | H | 1 |
| $SO_2CF_3$ | Me | H | H | $SO_2Me$ | H | 2 |
| $SO_2CF_3$ | Me | H | H | OMe | H | 0 |
| $SO_2CF_3$ | Me | H | H | OMe | H | 1 |
| $SO_2CF_3$ | Me | H | H | OMe | H | 2 |
| $SO_2CF_3$ | Me | H | H | $OCF_3$ | H | 0 |
| $SO_2CF_3$ | Me | H | H | $OCF_3$ | H | 1 |
| $SO_2CF_3$ | Me | H | H | $OCF_3$ | H | 2 |
| $SO_2CF_3$ | Me | H | H | $NO_2$ | H | 0 |
| $SO_2CF_3$ | Me | H | H | $NO_2$ | H | 1 |
| $SO_2CF_3$ | Me | H | H | $NO_2$ | H | 2 |
| $SO_2CF_3$ | Me | H | H | CN | H | 0 |
| $SO_2CF_3$ | Me | H | H | CN | H | 1 |
| $SO_2CF_3$ | Me | H | H | CN | H | 2 |
| $SO_2CF_3$ | Me | H | H | H | F | 0 |
| $SO_2CF_3$ | Me | H | H | H | F | 1 |
| $SO_2CF_3$ | Me | H | H | H | F | 2 |
| $SO_2CF_3$ | Me | H | H | H | Cl | 0 |
| $SO_2CF_3$ | Me | H | H | H | Cl | 1 |
| $SO_2CF_3$ | Me | H | H | H | Cl | 2 |
| $SO_2CF_3$ | Me | H | H | H | Br | 0 |
| $SO_2CF_3$ | Me | H | H | H | Br | 1 |
| $SO_2CF_3$ | Me | H | H | H | Br | 2 |
| $SO_2CF_3$ | Me | H | H | H | I | 0 |
| $SO_2CF_3$ | Me | H | H | H | I | 1 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SO_2CF_3$ | Me | H | H | H | I | 2 |
| $SO_2CF_3$ | Me | H | H | H | Me | 0 |
| $SO_2CF_3$ | Me | H | H | H | Me | 1 |
| $SO_2CF_3$ | Me | H | H | H | Me | 2 |
| $SO_2CF_3$ | Me | H | H | H | $CF_3$ | 0 |
| $SO_2CF_3$ | Me | H | H | H | $CF_3$ | 1 |
| $SO_2CF_3$ | Me | H | H | H | $CF_3$ | 2 |
| $SO_2CF_3$ | Me | H | H | H | $CF_2CF_3$ | 0 |
| $SO_2CF_3$ | Me | H | H | H | $CF_2CF_3$ | 1 |
| $SO_2CF_3$ | Me | H | H | H | $CF_2CF_3$ | 2 |
| $SO_2CF_3$ | Me | H | H | H | $CF(CF_3)_2$ | 0 |
| $SO_2CF_3$ | Me | H | H | H | $CF(CF_3)_2$ | 1 |
| $SO_2CF_3$ | Me | H | H | H | $CF(CF_3)_2$ | 2 |
| $SO_2CF_3$ | Me | H | H | H | SMe | 0 |
| $SO_2CF_3$ | Me | H | H | H | SMe | 1 |
| $SO_2CF_3$ | Me | H | H | H | SMe | 2 |
| $SO_2CF_3$ | Me | H | H | H | SOMe | 0 |
| $SO_2CF_3$ | Me | H | H | H | SOMe | 1 |
| $SO_2CF_3$ | Me | H | H | H | SOMe | 2 |
| $SO_2CF_3$ | Me | H | H | H | $SO_2Me$ | 0 |
| $SO_2CF_3$ | Me | H | H | H | $SO_2Me$ | 1 |
| $SO_2CF_3$ | Me | H | H | H | $SO_2Me$ | 2 |
| $SO_2CF_3$ | Me | H | H | H | OMe | 0 |
| $SO_2CF_3$ | Me | H | H | H | OMe | 1 |
| $SO_2CF_3$ | Me | H | H | H | OMe | 2 |
| $SO_2CF_3$ | Me | H | H | H | $OCF_3$ | 0 |
| $SO_2CF_3$ | Me | H | H | H | $OCF_3$ | 1 |
| $SO_2CF_3$ | Me | H | H | H | $OCF_3$ | 2 |
| $SO_2CF_3$ | Me | H | H | H | $NO_2$ | 0 |
| $SO_2CF_3$ | Me | H | H | H | $NO_2$ | 1 |
| $SO_2CF_3$ | Me | H | H | H | $NO_2$ | 2 |
| $SO_2CF_3$ | Me | H | H | H | CN | 0 |
| $SO_2CF_3$ | Me | H | H | H | CN | 1 |
| $SO_2CF_3$ | Me | H | H | H | CN | 2 |
| $SO_2CF_3$ | Me | H | F | H | F | 0 |
| $SO_2CF_3$ | Me | H | F | H | F | 1 |
| $SO_2CF_3$ | Me | H | F | H | F | 2 |
| $SO_2CF_3$ | Me | H | Cl | H | Cl | 0 |
| $SO_2CF_3$ | Me | H | Cl | H | Cl | 1 |
| $SO_2CF_3$ | Me | H | Cl | H | Cl | 2 |
| $SO_2CF_3$ | Me | H | Br | H | Br | 0 |
| $SO_2CF_3$ | Me | H | Br | H | Br | 1 |
| $SO_2CF_3$ | Me | H | Br | H | Br | 2 |
| $SO_2CF_3$ | Me | H | I | H | I | 0 |
| $SO_2CF_3$ | Me | H | I | H | I | 1 |
| $SO_2CF_3$ | Me | H | I | H | I | 2 |
| $SO_2CF_3$ | Me | H | F | H | Cl | 0 |
| $SO_2CF_3$ | Me | H | F | H | Cl | 1 |
| $SO_2CF_3$ | Me | H | F | H | Cl | 2 |
| $SO_2CF_3$ | Me | H | F | H | Br | 0 |
| $SO_2CF_3$ | Me | H | F | H | Br | 1 |
| $SO_2CF_3$ | Me | H | F | H | Br | 2 |
| $SO_2CF_3$ | Me | H | F | H | I | 0 |
| $SO_2CF_3$ | Me | H | F | H | I | 1 |
| $SO_2CF_3$ | Me | H | F | H | I | 2 |
| $SO_2CF_3$ | Me | H | Cl | H | F | 0 |
| $SO_2CF_3$ | Me | H | Cl | H | F | 1 |
| $SO_2CF_3$ | Me | H | Cl | H | F | 2 |
| $SO_2CF_3$ | Me | H | Cl | H | Br | 0 |
| $SO_2CF_3$ | Me | H | Cl | H | Br | 1 |
| $SO_2CF_3$ | Me | H | Cl | H | Br | 2 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SO_2CF_3$ | Me | H | Cl | H | I | 0 |
| $SO_2CF_3$ | Me | H | Cl | H | I | 1 |
| $SO_2CF_3$ | Me | H | Cl | H | I | 2 |
| $SO_2CF_3$ | Me | H | Br | H | F | 0 |
| $SO_2CF_3$ | Me | H | Br | H | F | 1 |
| $SO_2CF_3$ | Me | H | Br | H | F | 2 |
| $SO_2CF_3$ | Me | H | Br | H | Cl | 0 |
| $SO_2CF_3$ | Me | H | Br | H | Cl | 1 |
| $SO_2CF_3$ | Me | H | Br | H | Cl | 2 |
| $SO_2CF_3$ | Me | H | Br | H | I | 0 |
| $SO_2CF_3$ | Me | H | Br | H | I | 1 |
| $SO_2CF_3$ | Me | H | Br | H | I | 2 |
| $SO_2CF_3$ | Me | H | I | H | F | 0 |
| $SO_2CF_3$ | Me | H | I | H | F | 1 |
| $SO_2CF_3$ | Me | H | I | H | F | 2 |
| $SO_2CF_3$ | Me | H | I | H | Cl | 0 |
| $SO_2CF_3$ | Me | H | I | H | Cl | 1 |
| $SO_2CF_3$ | Me | H | I | H | Cl | 2 |
| $SO_2CF_3$ | Me | H | I | H | Br | 0 |
| $SO_2CF_3$ | Me | H | I | H | Br | 1 |
| $SO_2CF_3$ | Me | H | I | H | Br | 2 |
| $SO_2CF_3$ | Me | H | F | H | CN | 0 |
| $SO_2CF_3$ | Me | H | F | H | CN | 1 |
| $SO_2CF_3$ | Me | H | F | H | CN | 2 |
| $SO_2CF_3$ | Me | H | Cl | H | CN | 0 |
| $SO_2CF_3$ | Me | H | Cl | H | CN | 1 |
| $SO_2CF_3$ | Me | H | Cl | H | CN | 2 |
| $SO_2CF_3$ | Me | H | Br | H | CN | 0 |
| $SO_2CF_3$ | Me | H | Br | H | CN | 1 |
| $SO_2CF_3$ | Me | H | Br | H | CN | 2 |
| $SO_2CF_3$ | Me | H | I | H | CN | 0 |
| $SO_2CF_3$ | Me | H | I | H | CN | 1 |
| $SO_2CF_3$ | Me | H | I | H | CN | 2 |
| $SO_2CF_3$ | Me | H | $CF_3$ | H | F | 0 |
| $SO_2CF_3$ | Me | H | $CF_3$ | H | F | 1 |
| $SO_2CF_3$ | Me | H | $CF_3$ | H | F | 2 |
| $SO_2CF_3$ | Me | H | $CF_3$ | H | Cl | 0 |
| $SO_2CF_3$ | Me | H | $CF_3$ | H | Cl | 1 |
| $SO_2CF_3$ | Me | H | $CF_3$ | H | Cl | 2 |
| $SO_2CF_3$ | Me | H | $CF_3$ | H | Br | 0 |
| $SO_2CF_3$ | Me | H | $CF_3$ | H | Br | 1 |
| $SO_2CF_3$ | Me | H | $CF_3$ | H | Br | 2 |
| $SO_2CF_3$ | Me | H | $CF_3$ | H | I | 0 |
| $SO_2CF_3$ | Me | H | $CF_3$ | H | I | 1 |
| $SO_2CF_3$ | Me | H | $CF_3$ | H | I | 2 |
| $SO_2CF_3$ | Me | H | $CF_3$ | H | CN | 0 |
| $SO_2CF_3$ | Me | H | $CF_3$ | H | CN | 1 |
| $SO_2CF_3$ | Me | H | $CF_3$ | H | CN | 2 |
| $SO_2CF_3$ | Me | H | F | F | H | 0 |
| $SO_2CF_3$ | Me | H | F | F | H | 1 |
| $SO_2CF_3$ | Me | H | F | F | H | 2 |
| $SO_2CF_3$ | Me | H | Cl | Cl | H | 0 |
| $SO_2CF_3$ | Me | H | Cl | Cl | H | 1 |
| $SO_2CF_3$ | Me | H | Cl | Cl | H | 2 |
| $SO_2CF_3$ | Me | H | Br | Br | H | 0 |
| $SO_2CF_3$ | Me | H | Br | Br | H | 1 |
| $SO_2CF_3$ | Me | H | Br | Br | H | 2 |
| $SO_2CF_3$ | Me | H | I | I | H | 0 |
| $SO_2CF_3$ | Me | H | I | I | H | 1 |
| $SO_2CF_3$ | Me | H | I | I | H | 2 |
| $SO_2CF_3$ | Me | H | F | Cl | H | 0 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SO_2CF_3$ | Me | H | F | Cl | H | 1 |
| $SO_2CF_3$ | Me | H | F | Cl | H | 2 |
| $SO_2CF_3$ | Me | H | F | Br | H | 0 |
| $SO_2CF_3$ | Me | H | F | Br | H | 1 |
| $SO_2CF_3$ | Me | H | F | Br | H | 2 |
| $SO_2CF_3$ | Me | H | F | I | H | 0 |
| $SO_2CF_3$ | Me | H | F | I | H | 1 |
| $SO_2CF_3$ | Me | H | F | I | H | 2 |
| $SO_2CF_3$ | Me | H | Cl | F | H | 0 |
| $SO_2CF_3$ | Me | H | Cl | F | H | 1 |
| $SO_2CF_3$ | Me | H | Cl | F | H | 2 |
| $SO_2CF_3$ | Me | H | Cl | Br | H | 0 |
| $SO_2CF_3$ | Me | H | Cl | Br | H | 1 |
| $SO_2CF_3$ | Me | H | Cl | Br | H | 2 |
| $SO_2CF_3$ | Me | H | Cl | I | H | 0 |
| $SO_2CF_3$ | Me | H | Cl | I | H | 1 |
| $SO_2CF_3$ | Me | H | Cl | I | H | 2 |
| $SO_2CF_3$ | Me | H | Br | F | H | 0 |
| $SO_2CF_3$ | Me | H | Br | F | H | 1 |
| $SO_2CF_3$ | Me | H | Br | F | H | 2 |
| $SO_2CF_3$ | Me | H | Br | Cl | H | 0 |
| $SO_2CF_3$ | Me | H | Br | Cl | H | 1 |
| $SO_2CF_3$ | Me | H | Br | Cl | H | 2 |
| $SO_2CF_3$ | Me | H | Br | I | H | 0 |
| $SO_2CF_3$ | Me | H | Br | I | H | 1 |
| $SO_2CF_3$ | Me | H | Br | I | H | 2 |
| $SO_2CF_3$ | Me | H | I | F | H | 0 |
| $SO_2CF_3$ | Me | H | I | F | H | 1 |
| $SO_2CF_3$ | Me | H | I | F | H | 2 |
| $SO_2CF_3$ | Me | H | I | Cl | H | 0 |
| $SO_2CF_3$ | Me | H | I | Cl | H | 1 |
| $SO_2CF_3$ | Me | H | I | Cl | H | 2 |
| $SO_2CF_3$ | Me | H | I | Br | H | 0 |
| $SO_2CF_3$ | Me | H | I | Br | H | 1 |
| $SO_2CF_3$ | Me | H | I | Br | H | 2 |
| $SO_2CF_3$ | Me | H | F | CN | H | 0 |
| $SO_2CF_3$ | Me | H | F | CN | H | 1 |
| $SO_2CF_3$ | Me | H | F | CN | H | 2 |
| $SO_2CF_3$ | Me | H | Cl | CN | H | 0 |
| $SO_2CF_3$ | Me | H | Cl | CN | H | 1 |
| $SO_2CF_3$ | Me | H | Cl | CN | H | 2 |
| $SO_2CF_3$ | Me | H | Br | CN | H | 0 |
| $SO_2CF_3$ | Me | H | Br | CN | H | 1 |
| $SO_2CF_3$ | Me | H | Br | CN | H | 2 |
| $SO_2CF_3$ | Me | H | I | CN | H | 0 |
| $SO_2CF_3$ | Me | H | I | CN | H | 1 |
| $SO_2CF_3$ | Me | H | I | CN | H | 2 |
| $SO_2CF_3$ | Me | H | $CF_3$ | F | H | 0 |
| $SO_2CF_3$ | Me | H | $CF_3$ | F | H | 1 |
| $SO_2CF_3$ | Me | H | $CF_3$ | F | H | 2 |
| $SO_2CF_3$ | Me | H | $CF_3$ | Cl | H | 0 |
| $SO_2CF_3$ | Me | H | $CF_3$ | Cl | H | 1 |
| $SO_2CF_3$ | Me | H | $CF_3$ | Cl | H | 2 |
| $SO_2CF_3$ | Me | H | $CF_3$ | Br | H | 0 |
| $SO_2CF_3$ | Me | H | $CF_3$ | Br | H | 1 |
| $SO_2CF_3$ | Me | H | $CF_3$ | Br | H | 2 |
| $SO_2CF_3$ | Me | H | $CF_3$ | I | H | 0 |
| $SO_2CF_3$ | Me | H | $CF_3$ | I | H | 1 |
| $SO_2CF_3$ | Me | H | $CF_3$ | I | H | 2 |
| $SO_2CF_3$ | Me | H | $CF_3$ | CN | H | 0 |
| $SO_2CF_3$ | Me | H | $CF_3$ | CN | H | 1 |
| $SO_2CF_3$ | Me | H | $CF_3$ | CN | H | 2 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SO_2CF_3$ | Et | H | H | H | H | 0 |
| $SO_2CF_3$ | Et | H | H | H | H | 1 |
| $SO_2CF_3$ | Et | H | H | H | H | 2 |
| $SO_2CF_3$ | Et | F | H | H | H | 0 |
| $SO_2CF_3$ | Et | F | H | H | H | 1 |
| $SO_2CF_3$ | Et | F | H | H | H | 2 |
| $SO_2CF_3$ | Et | Cl | H | H | H | 0 |
| $SO_2CF_3$ | Et | Cl | H | H | H | 1 |
| $SO_2CF_3$ | Et | Cl | H | H | H | 2 |
| $SO_2CF_3$ | Et | Br | H | H | H | 0 |
| $SO_2CF_3$ | Et | Br | H | H | H | 1 |
| $SO_2CF_3$ | Et | Br | H | H | H | 2 |
| $SO_2CF_3$ | Et | I | H | H | H | 0 |
| $SO_2CF_3$ | Et | I | H | H | H | 1 |
| $SO_2CF_3$ | Et | I | H | H | H | 2 |
| $SO_2CF_3$ | Et | Me | H | H | H | 0 |
| $SO_2CF_3$ | Et | Me | H | H | H | 1 |
| $SO_2CF_3$ | Et | Me | H | H | H | 2 |
| $SO_2CF_3$ | Et | $CF_3$ | H | H | H | 0 |
| $SO_2CF_3$ | Et | $CF_3$ | H | H | H | 1 |
| $SO_2CF_3$ | Et | $CF_3$ | H | H | H | 2 |
| $SO_2CF_3$ | Et | H | F | H | H | 0 |
| $SO_2CF_3$ | Et | H | F | H | H | 1 |
| $SO_2CF_3$ | Et | H | F | H | H | 2 |
| $SO_2CF_3$ | Et | H | Cl | H | H | 0 |
| $SO_2CF_3$ | Et | H | Cl | H | H | 1 |
| $SO_2CF_3$ | Et | H | Cl | H | H | 2 |
| $SO_2CF_3$ | Et | H | Br | H | H | 0 |
| $SO_2CF_3$ | Et | H | Br | H | H | 1 |
| $SO_2CF_3$ | Et | H | Br | H | H | 2 |
| $SO_2CF_3$ | Et | H | I | H | H | 0 |
| $SO_2CF_3$ | Et | H | I | H | H | 1 |
| $SO_2CF_3$ | Et | H | I | H | H | 2 |
| $SO_2CF_3$ | Et | H | Me | H | H | 0 |
| $SO_2CF_3$ | Et | H | Me | H | H | 1 |
| $SO_2CF_3$ | Et | H | Me | H | H | 2 |
| $SO_2CF_3$ | Et | H | $CF_3$ | H | H | 0 |
| $SO_2CF_3$ | Et | H | $CF_3$ | H | H | 1 |
| $SO_2CF_3$ | Et | H | $CF_3$ | H | H | 2 |
| $SO_2CF_3$ | Et | H | $CF_2CF_3$ | H | H | 0 |
| $SO_2CF_3$ | Et | H | $CF_2CF_3$ | H | H | 1 |
| $SO_2CF_3$ | Et | H | $CF_2CF_3$ | H | H | 2 |
| $SO_2CF_3$ | Et | H | $CF(CF_3)_2$ | H | H | 0 |
| $SO_2CF_3$ | Et | H | $CF(CF_3)_2$ | H | H | 1 |
| $SO_2CF_3$ | Et | H | $CF(CF_3)_2$ | H | H | 2 |
| $SO_2CF_3$ | Et | H | SMe | H | H | 0 |
| $SO_2CF_3$ | Et | H | SMe | H | H | 1 |
| $SO_2CF_3$ | Et | H | SMe | H | H | 2 |
| $SO_2CF_3$ | Et | H | SOMe | H | H | 0 |
| $SO_2CF_3$ | Et | H | SOMe | H | H | 1 |
| $SO_2CF_3$ | Et | H | SOMe | H | H | 2 |
| $SO_2CF_3$ | Et | H | $SO_2Me$ | H | H | 0 |
| $SO_2CF_3$ | Et | H | $SO_2Me$ | H | H | 1 |
| $SO_2CF_3$ | Et | H | $SO_2Me$ | H | H | 2 |
| $SO_2CF_3$ | Et | H | OMe | H | H | 0 |
| $SO_2CF_3$ | Et | H | OMe | H | H | 1 |
| $SO_2CF_3$ | Et | H | OMe | H | H | 2 |
| $SO_2CF_3$ | Et | H | $OCF_3$ | H | H | 0 |
| $SO_2CF_3$ | Et | H | $OCF_3$ | H | H | 1 |
| $SO_2CF_3$ | Et | H | $OCF_3$ | H | H | 2 |
| $SO_2CF_3$ | Et | H | $NO_2$ | H | H | 0 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SO_2CF_3$ | Et | H | $NO_2$ | H | H | 1 |
| $SO_2CF_3$ | Et | H | $NO_2$ | H | H | 2 |
| $SO_2CF_3$ | Et | H | CN | H | H | 0 |
| $SO_2CF_3$ | Et | H | CN | H | H | 1 |
| $SO_2CF_3$ | Et | H | CN | H | H | 2 |
| $SO_2CF_3$ | Et | H | H | F | H | 0 |
| $SO_2CF_3$ | Et | H | H | F | H | 1 |
| $SO_2CF_3$ | Et | H | H | F | H | 2 |
| $SO_2CF_3$ | Et | H | H | Cl | H | 0 |
| $SO_2CF_3$ | Et | H | H | Cl | H | 1 |
| $SO_2CF_3$ | Et | H | H | Cl | H | 2 |
| $SO_2CF_3$ | Et | H | H | Br | H | 0 |
| $SO_2CF_3$ | Et | H | H | Br | H | 1 |
| $SO_2CF_3$ | Et | H | H | Br | H | 2 |
| $SO_2CF_3$ | Et | H | H | I | H | 0 |
| $SO_2CF_3$ | Et | H | H | I | H | 1 |
| $SO_2CF_3$ | Et | H | H | I | H | 2 |
| $SO_2CF_3$ | Et | H | H | Me | H | 0 |
| $SO_2CF_3$ | Et | H | H | Me | H | 1 |
| $SO_2CF_3$ | Et | H | H | Me | H | 2 |
| $SO_2CF_3$ | Et | H | H | $CF_3$ | H | 0 |
| $SO_2CF_3$ | Et | H | H | $CF_3$ | H | 1 |
| $SO_2CF_3$ | Et | H | H | $CF_3$ | H | 2 |
| $SO_2CF_3$ | Et | H | H | $CF_2CF_3$ | H | 0 |
| $SO_2CF_3$ | Et | H | H | $CF_2CF_3$ | H | 1 |
| $SO_2CF_3$ | Et | H | H | $CF_2CF_3$ | H | 2 |
| $SO_2CF_3$ | Et | H | H | $CF(CF_3)_2$ | H | 0 |
| $SO_2CF_3$ | Et | H | H | $CF(CF_3)_2$ | H | 1 |
| $SO_2CF_3$ | Et | H | H | $CF(CF_3)_2$ | H | 2 |
| $SO_2CF_3$ | Et | H | H | SMe | H | 0 |
| $SO_2CF_3$ | Et | H | H | SMe | H | 1 |
| $SO_2CF_3$ | Et | H | H | SMe | H | 2 |
| $SO_2CF_3$ | Et | H | H | SOMe | H | 0 |
| $SO_2CF_3$ | Et | H | H | SOMe | H | 1 |
| $SO_2CF_3$ | Et | H | H | SOMe | H | 2 |
| $SO_2CF_3$ | Et | H | H | $SO_2Me$ | H | 0 |
| $SO_2CF_3$ | Et | H | H | $SO_2Me$ | H | 1 |
| $SO_2CF_3$ | Et | H | H | $SO_2Me$ | H | 2 |
| $SO_2CF_3$ | Et | H | H | OMe | H | 0 |
| $SO_2CF_3$ | Et | H | H | OMe | H | 1 |
| $SO_2CF_3$ | Et | H | H | OMe | H | 2 |
| $SO_2CF_3$ | Et | H | H | $OCF_3$ | H | 0 |
| $SO_2CF_3$ | Et | H | H | $OCF_3$ | H | 1 |
| $SO_2CF_3$ | Et | H | H | $OCF_3$ | H | 2 |
| $SO_2CF_3$ | Et | H | H | $NO_2$ | H | 0 |
| $SO_2CF_3$ | Et | H | H | $NO_2$ | H | 1 |
| $SO_2CF_3$ | Et | H | H | $NO_2$ | H | 2 |
| $SO_2CF_3$ | Et | H | H | CN | H | 0 |
| $SO_2CF_3$ | Et | H | H | CN | H | 1 |
| $SO_2CF_3$ | Et | H | H | CN | H | 2 |
| $SO_2CF_3$ | Et | H | H | H | F | 0 |
| $SO_2CF_3$ | Et | H | H | H | F | 1 |
| $SO_2CF_3$ | Et | H | H | H | F | 2 |
| $SO_2CF_3$ | Et | H | H | H | Cl | 0 |
| $SO_2CF_3$ | Et | H | H | H | Cl | 1 |
| $SO_2CF_3$ | Et | H | H | H | Cl | 2 |
| $SO_2CF_3$ | Et | H | H | H | Br | 0 |
| $SO_2CF_3$ | Et | H | H | H | Br | 1 |
| $SO_2CF_3$ | Et | H | H | H | Br | 2 |
| $SO_2CF_3$ | Et | H | H | H | I | 0 |
| $SO_2CF_3$ | Et | H | H | H | I | 1 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SO_2CF_3$ | Et | H | H | H | I | 2 |
| $SO_2CF_3$ | Et | H | H | H | Me | 0 |
| $SO_2CF_3$ | Et | H | H | H | Me | 1 |
| $SO_2CF_3$ | Et | H | H | H | Me | 2 |
| $SO_2CF_3$ | Et | H | H | H | $CF_3$ | 0 |
| $SO_2CF_3$ | Et | H | H | H | $CF_3$ | 1 |
| $SO_2CF_3$ | Et | H | H | H | $CF_3$ | 2 |
| $SO_2CF_3$ | Et | H | H | H | $CF_2CF_3$ | 0 |
| $SO_2CF_3$ | Et | H | H | H | $CF_2CF_3$ | 1 |
| $SO_2CF_3$ | Et | H | H | H | $CF_2CF_3$ | 2 |
| $SO_2CF_3$ | Et | H | H | H | $CF(CF_3)_2$ | 0 |
| $SO_2CF_3$ | Et | H | H | H | $CF(CF_3)_2$ | 1 |
| $SO_2CF_3$ | Et | H | H | H | $CF(CF_3)_2$ | 2 |
| $SO_2CF_3$ | Et | H | H | H | SMe | 0 |
| $SO_2CF_3$ | Et | H | H | H | SMe | 1 |
| $SO_2CF_3$ | Et | H | H | H | SMe | 2 |
| $SO_2CF_3$ | Et | H | H | H | SOMe | 0 |
| $SO_2CF_3$ | Et | H | H | H | SOMe | 1 |
| $SO_2CF_3$ | Et | H | H | H | SOMe | 2 |
| $SO_2CF_3$ | Et | H | H | H | $SO_2Me$ | 0 |
| $SO_2CF_3$ | Et | H | H | H | $SO_2Me$ | 1 |
| $SO_2CF_3$ | Et | H | H | H | $SO_2Me$ | 2 |
| $SO_2CF_3$ | Et | H | H | H | OMe | 0 |
| $SO_2CF_3$ | Et | H | H | H | OMe | 1 |
| $SO_2CF_3$ | Et | H | H | H | OMe | 2 |
| $SO_2CF_3$ | Et | H | H | H | $OCF_3$ | 0 |
| $SO_2CF_3$ | Et | H | H | H | $OCF_3$ | 1 |
| $SO_2CF_3$ | Et | H | H | H | $OCF_3$ | 2 |
| $SO_2CF_3$ | Et | H | H | H | $NO_2$ | 0 |
| $SO_2CF_3$ | Et | H | H | H | $NO_2$ | 1 |
| $SO_2CF_3$ | Et | H | H | H | $NO_2$ | 2 |
| $SO_2CF_3$ | Et | H | H | H | CN | 0 |
| $SO_2CF_3$ | Et | H | H | H | CN | 1 |
| $SO_2CF_3$ | Et | H | H | H | CN | 2 |
| $SO_2CF_3$ | Et | H | F | H | F | 0 |
| $SO_2CF_3$ | Et | H | F | H | F | 1 |
| $SO_2CF_3$ | Et | H | F | H | F | 2 |
| $SO_2CF_3$ | Et | H | Cl | H | Cl | 0 |
| $SO_2CF_3$ | Et | H | Cl | H | Cl | 1 |
| $SO_2CF_3$ | Et | H | Cl | H | Cl | 2 |
| $SO_2CF_3$ | Et | H | Br | H | Br | 0 |
| $SO_2CF_3$ | Et | H | Br | H | Br | 1 |
| $SO_2CF_3$ | Et | H | Br | H | Br | 2 |
| $SO_2CF_3$ | Et | H | I | H | I | 0 |
| $SO_2CF_3$ | Et | H | I | H | I | 1 |
| $SO_2CF_3$ | Et | H | I | H | I | 2 |
| $SO_2CF_3$ | Et | H | F | H | Cl | 0 |
| $SO_2CF_3$ | Et | H | F | H | Cl | 1 |
| $SO_2CF_3$ | Et | H | F | H | Cl | 2 |
| $SO_2CF_3$ | Et | H | F | H | Br | 0 |
| $SO_2CF_3$ | Et | H | F | H | Br | 1 |
| $SO_2CF_3$ | Et | H | F | H | Br | 2 |
| $SO_2CF_3$ | Et | H | F | H | I | 0 |
| $SO_2CF_3$ | Et | H | F | H | I | 1 |
| $SO_2CF_3$ | Et | H | F | H | I | 2 |
| $SO_2CF_3$ | Et | H | Cl | H | F | 0 |
| $SO_2CF_3$ | Et | H | Cl | H | F | 1 |
| $SO_2CF_3$ | Et | H | Cl | H | F | 2 |
| $SO_2CF_3$ | Et | H | Cl | H | Br | 0 |
| $SO_2CF_3$ | Et | H | Cl | H | Br | 1 |
| $SO_2CF_3$ | Et | H | Cl | H | Br | 2 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SO_2CF_3$ | Et | H | Cl | H | I | 0 |
| $SO_2CF_3$ | Et | H | Cl | H | I | 1 |
| $SO_2CF_3$ | Et | H | Cl | H | I | 2 |
| $SO_2CF_3$ | Et | H | Br | H | F | 0 |
| $SO_2CF_3$ | Et | H | Br | H | F | 1 |
| $SO_2CF_3$ | Et | H | Br | H | F | 2 |
| $SO_2CF_3$ | Et | H | Br | H | Cl | 0 |
| $SO_2CF_3$ | Et | H | Br | H | Cl | 1 |
| $SO_2CF_3$ | Et | H | Br | H | Cl | 2 |
| $SO_2CF_3$ | Et | H | Br | H | I | 0 |
| $SO_2CF_3$ | Et | H | Br | H | I | 1 |
| $SO_2CF_3$ | Et | H | Br | H | I | 2 |
| $SO_2CF_3$ | Et | H | I | H | F | 0 |
| $SO_2CF_3$ | Et | H | I | H | F | 1 |
| $SO_2CF_3$ | Et | H | I | H | F | 2 |
| $SO_2CF_3$ | Et | H | I | H | Cl | 0 |
| $SO_2CF_3$ | Et | H | I | H | Cl | 1 |
| $SO_2CF_3$ | Et | H | I | H | Cl | 2 |
| $SO_2CF_3$ | Et | H | I | H | Br | 0 |
| $SO_2CF_3$ | Et | H | I | H | Br | 1 |
| $SO_2CF_3$ | Et | H | I | H | Br | 2 |
| $SO_2CF_3$ | Et | H | F | H | CN | 0 |
| $SO_2CF_3$ | Et | H | F | H | CN | 1 |
| $SO_2CF_3$ | Et | H | F | H | CN | 2 |
| $SO_2CF_3$ | Et | H | Cl | H | CN | 0 |
| $SO_2CF_3$ | Et | H | Cl | H | CN | 1 |
| $SO_2CF_3$ | Et | H | Cl | H | CN | 2 |
| $SO_2CF_3$ | Et | H | Br | H | CN | 0 |
| $SO_2CF_3$ | Et | H | Br | H | CN | 1 |
| $SO_2CF_3$ | Et | H | Br | H | CN | 2 |
| $SO_2CF_3$ | Et | H | I | H | CN | 0 |
| $SO_2CF_3$ | Et | H | I | H | CN | 1 |
| $SO_2CF_3$ | Et | H | I | H | CN | 2 |
| $SO_2CF_3$ | Et | H | $CF_3$ | H | F | 0 |
| $SO_2CF_3$ | Et | H | $CF_3$ | H | F | 1 |
| $SO_2CF_3$ | Et | H | $CF_3$ | H | F | 2 |
| $SO_2CF_3$ | Et | H | $CF_3$ | H | Cl | 0 |
| $SO_2CF_3$ | Et | H | $CF_3$ | H | Cl | 1 |
| $SO_2CF_3$ | Et | H | $CF_3$ | H | Cl | 2 |
| $SO_2CF_3$ | Et | H | $CF_3$ | H | Br | 0 |
| $SO_2CF_3$ | Et | H | $CF_3$ | H | Br | 1 |
| $SO_2CF_3$ | Et | H | $CF_3$ | H | Br | 2 |
| $SO_2CF_3$ | Et | H | $CF_3$ | H | I | 0 |
| $SO_2CF_3$ | Et | H | $CF_3$ | H | I | 1 |
| $SO_2CF_3$ | Et | H | $CF_3$ | H | I | 2 |
| $SO_2CF_3$ | Et | H | $CF_3$ | H | CN | 0 |
| $SO_2CF_3$ | Et | H | $CF_3$ | H | CN | 1 |
| $SO_2CF_3$ | Et | H | $CF_3$ | H | CN | 2 |
| $SO_2CF_3$ | Et | H | F | F | H | 0 |
| $SO_2CF_3$ | Et | H | F | F | H | 1 |
| $SO_2CF_3$ | Et | H | F | F | H | 2 |
| $SO_2CF_3$ | Et | H | Cl | Cl | H | 0 |
| $SO_2CF_3$ | Et | H | Cl | Cl | H | 1 |
| $SO_2CF_3$ | Et | H | Cl | Cl | H | 2 |
| $SO_2CF_3$ | Et | H | Br | Br | H | 0 |
| $SO_2CF_3$ | Et | H | Br | Br | H | 1 |
| $SO_2CF_3$ | Et | H | Br | Br | H | 2 |
| $SO_2CF_3$ | Et | H | I | I | H | 0 |
| $SO_2CF_3$ | Et | H | I | I | H | 1 |
| $SO_2CF_3$ | Et | H | I | I | H | 2 |
| $SO_2CF_3$ | Et | H | F | Cl | H | 0 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SO_2CF_3$ | Et | H | F | Cl | H | 1 |
| $SO_2CF_3$ | Et | H | F | Cl | H | 2 |
| $SO_2CF_3$ | Et | H | F | Br | H | 0 |
| $SO_2CF_3$ | Et | H | F | Br | H | 1 |
| $SO_2CF_3$ | Et | H | F | Br | H | 2 |
| $SO_2CF_3$ | Et | H | F | I | H | 0 |
| $SO_2CF_3$ | Et | H | F | I | H | 1 |
| $SO_2CF_3$ | Et | H | F | I | H | 2 |
| $SO_2CF_3$ | Et | H | Cl | F | H | 0 |
| $SO_2CF_3$ | Et | H | Cl | F | H | 1 |
| $SO_2CF_3$ | Et | H | Cl | F | H | 2 |
| $SO_2CF_3$ | Et | H | Cl | Br | H | 0 |
| $SO_2CF_3$ | Et | H | Cl | Br | H | 1 |
| $SO_2CF_3$ | Et | H | Cl | Br | H | 2 |
| $SO_2CF_3$ | Et | H | Cl | I | H | 0 |
| $SO_2CF_3$ | Et | H | Cl | I | H | 1 |
| $SO_2CF_3$ | Et | H | Cl | I | H | 2 |
| $SO_2CF_3$ | Et | H | Br | F | H | 0 |
| $SO_2CF_3$ | Et | H | Br | F | H | 1 |
| $SO_2CF_3$ | Et | H | Br | F | H | 2 |
| $SO_2CF_3$ | Et | H | Br | Cl | H | 0 |
| $SO_2CF_3$ | Et | H | Br | Cl | H | 1 |
| $SO_2CF_3$ | Et | H | Br | Cl | H | 2 |
| $SO_2CF_3$ | Et | H | Br | I | H | 0 |
| $SO_2CF_3$ | Et | H | Br | I | H | 1 |
| $SO_2CF_3$ | Et | H | Br | I | H | 2 |
| $SO_2CF_3$ | Et | H | I | F | H | 0 |
| $SO_2CF_3$ | Et | H | I | F | H | 1 |
| $SO_2CF_3$ | Et | H | I | F | H | 2 |
| $SO_2CF_3$ | Et | H | I | Cl | H | 0 |
| $SO_2CF_3$ | Et | H | I | Cl | H | 1 |
| $SO_2CF_3$ | Et | H | I | Cl | H | 2 |
| $SO_2CF_3$ | Et | H | I | Br | H | 0 |
| $SO_2CF_3$ | Et | H | I | Br | H | 1 |
| $SO_2CF_3$ | Et | H | I | Br | H | 2 |
| $SO_2CF_3$ | Et | H | F | CN | H | 0 |
| $SO_2CF_3$ | Et | H | F | CN | H | 1 |
| $SO_2CF_3$ | Et | H | F | CN | H | 2 |
| $SO_2CF_3$ | Et | H | Cl | CN | H | 0 |
| $SO_2CF_3$ | Et | H | Cl | CN | H | 1 |
| $SO_2CF_3$ | Et | H | Cl | CN | H | 2 |
| $SO_2CF_3$ | Et | H | Br | CN | H | 0 |
| $SO_2CF_3$ | Et | H | Br | CN | H | 1 |
| $SO_2CF_3$ | Et | H | Br | CN | H | 2 |
| $SO_2CF_3$ | Et | H | I | CN | H | 0 |
| $SO_2CF_3$ | Et | H | I | CN | H | 1 |
| $SO_2CF_3$ | Et | H | I | CN | H | 2 |
| $SO_2CF_3$ | Et | H | $CF_3$ | F | H | 0 |
| $SO_2CF_3$ | Et | H | $CF_3$ | F | H | 1 |
| $SO_2CF_3$ | Et | H | $CF_3$ | F | H | 2 |
| $SO_2CF_3$ | Et | H | $CF_3$ | Cl | H | 0 |
| $SO_2CF_3$ | Et | H | $CF_3$ | Cl | H | 1 |
| $SO_2CF_3$ | Et | H | $CF_3$ | Cl | H | 2 |
| $SO_2CF_3$ | Et | H | $CF_3$ | Br | H | 0 |
| $SO_2CF_3$ | Et | H | $CF_3$ | Br | H | 1 |
| $SO_2CF_3$ | Et | H | $CF_3$ | Br | H | 2 |
| $SO_2CF_3$ | Et | H | $CF_3$ | I | H | 0 |
| $SO_2CF_3$ | Et | H | $CF_3$ | I | H | 1 |
| $SO_2CF_3$ | Et | H | $CF_3$ | I | H | 2 |
| $SO_2CF_3$ | Et | H | $CF_3$ | CN | H | 0 |
| $SO_2CF_3$ | Et | H | $CF_3$ | CN | H | 1 |
| $SO_2CF_3$ | Et | H | $CF_3$ | CN | H | 2 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SO_2CF_3$ | $^nPr$ | H | H | H | H | 0 |
| $SO_2CF_3$ | $^nPr$ | H | H | H | H | 1 |
| $SO_2CF_3$ | $^nPr$ | H | H | H | H | 2 |
| $SO_2CF_3$ | $^nPr$ | F | H | H | H | 0 |
| $SO_2CF_3$ | $^nPr$ | F | H | H | H | 1 |
| $SO_2CF_3$ | $^nPr$ | F | H | H | H | 2 |
| $SO_2CF_3$ | $^nPr$ | Cl | H | H | H | 0 |
| $SO_2CF_3$ | $^nPr$ | Cl | H | H | H | 1 |
| $SO_2CF_3$ | $^nPr$ | Cl | H | H | H | 2 |
| $SO_2CF_3$ | $^nPr$ | Br | H | H | H | 0 |
| $SO_2CF_3$ | $^nPr$ | Br | H | H | H | 1 |
| $SO_2CF_3$ | $^nPr$ | Br | H | H | H | 2 |
| $SO_2CF_3$ | $^nPr$ | I | H | H | H | 0 |
| $SO_2CF_3$ | $^nPr$ | I | H | H | H | 1 |
| $SO_2CF_3$ | $^nPr$ | I | H | H | H | 2 |
| $SO_2CF_3$ | $^nPr$ | Me | H | H | H | 0 |
| $SO_2CF_3$ | $^nPr$ | Me | H | H | H | 1 |
| $SO_2CF_3$ | $^nPr$ | Me | H | H | H | 2 |
| $SO_2CF_3$ | $^nPr$ | $CF_3$ | H | H | H | 0 |
| $SO_2CF_3$ | $^nPr$ | $CF_3$ | H | H | H | 1 |
| $SO_2CF_3$ | $^nPr$ | $CF_3$ | H | H | H | 2 |
| $SO_2CF_3$ | $^nPr$ | H | F | H | H | 0 |
| $SO_2CF_3$ | $^nPr$ | H | F | H | H | 1 |
| $SO_2CF_3$ | $^nPr$ | H | F | H | H | 2 |
| $SO_2CF_3$ | $^nPr$ | H | Cl | H | H | 0 |
| $SO_2CF_3$ | $^nPr$ | H | Cl | H | H | 1 |
| $SO_2CF_3$ | $^nPr$ | H | Cl | H | H | 2 |
| $SO_2CF_3$ | $^nPr$ | H | Br | H | H | 0 |
| $SO_2CF_3$ | $^nPr$ | H | Br | H | H | 1 |
| $SO_2CF_3$ | $^nPr$ | H | Br | H | H | 2 |
| $SO_2CF_3$ | $^nPr$ | H | I | H | H | 0 |
| $SO_2CF_3$ | $^nPr$ | H | I | H | H | 1 |
| $SO_2CF_3$ | $^nPr$ | H | I | H | H | 2 |
| $SO_2CF_3$ | $^nPr$ | H | Me | H | H | 0 |
| $SO_2CF_3$ | $^nPr$ | H | Me | H | H | 1 |
| $SO_2CF_3$ | $^nPr$ | H | Me | H | H | 2 |
| $SO_2CF_3$ | $^nPr$ | H | $CF_3$ | H | H | 0 |
| $SO_2CF_3$ | $^nPr$ | H | $CF_3$ | H | H | 1 |
| $SO_2CF_3$ | $^nPr$ | H | $CF_3$ | H | H | 2 |
| $SO_2CF_3$ | $^nPr$ | H | $CF_2CF_3$ | H | H | 0 |
| $SO_2CF_3$ | $^nPr$ | H | $CF_2CF_3$ | H | H | 1 |
| $SO_2CF_3$ | $^nPr$ | H | $CF_2CF_3$ | H | H | 2 |
| $SO_2CF_3$ | $^nPr$ | H | $CF(CF_3)_2$ | H | H | 0 |
| $SO_2CF_3$ | $^nPr$ | H | $CF(CF_3)_2$ | H | H | 1 |
| $SO_2CF_3$ | $^nPr$ | H | $CF(CF_3)_2$ | H | H | 2 |
| $SO_2CF_3$ | $^nPr$ | H | SMe | H | H | 0 |
| $SO_2CF_3$ | $^nPr$ | H | SMe | H | H | 1 |
| $SO_2CF_3$ | $^nPr$ | H | SMe | H | H | 2 |
| $SO_2CF_3$ | $^nPr$ | H | SOMe | H | H | 0 |
| $SO_2CF_3$ | $^nPr$ | H | SOMe | H | H | 1 |
| $SO_2CF_3$ | $^nPr$ | H | SOMe | H | H | 2 |
| $SO_2CF_3$ | $^nPr$ | H | $SO_2Me$ | H | H | 0 |
| $SO_2CF_3$ | $^nPr$ | H | $SO_2Me$ | H | H | 1 |
| $SO_2CF_3$ | $^nPr$ | H | $SO_2Me$ | H | H | 2 |
| $SO_2CF_3$ | $^nPr$ | H | OMe | H | H | 0 |
| $SO_2CF_3$ | $^nPr$ | H | OMe | H | H | 1 |
| $SO_2CF_3$ | $^nPr$ | H | OMe | H | H | 2 |
| $SO_2CF_3$ | $^nPr$ | H | $OCF_3$ | H | H | 0 |
| $SO_2CF_3$ | $^nPr$ | H | $OCF_3$ | H | H | 1 |
| $SO_2CF_3$ | $^nPr$ | H | $OCF_3$ | H | H | 2 |
| $SO_2CF_3$ | $^nPr$ | H | $NO_2$ | H | H | 0 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SO_2CF_3$ | $^nPr$ | H | $NO_2$ | H | H | 1 |
| $SO_2CF_3$ | $^nPr$ | H | $NO_2$ | H | H | 2 |
| $SO_2CF_3$ | $^nPr$ | H | CN | H | H | 0 |
| $SO_2CF_3$ | $^nPr$ | H | CN | H | H | 1 |
| $SO_2CF_3$ | $^nPr$ | H | CN | H | H | 2 |
| $SO_2CF_3$ | $^nPr$ | H | H | F | H | 0 |
| $SO_2CF_3$ | $^nPr$ | H | H | F | H | 1 |
| $SO_2CF_3$ | $^nPr$ | H | H | F | H | 2 |
| $SO_2CF_3$ | $^nPr$ | H | H | Cl | H | 0 |
| $SO_2CF_3$ | $^nPr$ | H | H | Cl | H | 1 |
| $SO_2CF_3$ | $^nPr$ | H | H | Cl | H | 2 |
| $SO_2CF_3$ | $^nPr$ | H | H | Br | H | 0 |
| $SO_2CF_3$ | $^nPr$ | H | H | Br | H | 1 |
| $SO_2CF_3$ | $^nPr$ | H | H | Br | H | 2 |
| $SO_2CF_3$ | $^nPr$ | H | H | I | H | 0 |
| $SO_2CF_3$ | $^nPr$ | H | H | I | H | 1 |
| $SO_2CF_3$ | $^nPr$ | H | H | I | H | 2 |
| $SO_2CF_3$ | $^nPr$ | H | H | Me | H | 0 |
| $SO_2CF_3$ | $^nPr$ | H | H | Me | H | 1 |
| $SO_2CF_3$ | $^nPr$ | H | H | Me | H | 2 |
| $SO_2CF_3$ | $^nPr$ | H | H | $CF_3$ | H | 0 |
| $SO_2CF_3$ | $^nPr$ | H | H | $CF_3$ | H | 1 |
| $SO_2CF_3$ | $^nPr$ | H | H | $CF_3$ | H | 2 |
| $SO_2CF_3$ | $^nPr$ | H | H | $CF_2CF_3$ | H | 0 |
| $SO_2CF_3$ | $^nPr$ | H | H | $CF_2CF_3$ | H | 1 |
| $SO_2CF_3$ | $^nPr$ | H | H | $CF_2CF_3$ | H | 2 |
| $SO_2CF_3$ | $^nPr$ | H | H | $CF(CF_3)_2$ | H | 0 |
| $SO_2CF_3$ | $^nPr$ | H | H | $CF(CF_3)_2$ | H | 1 |
| $SO_2CF_3$ | $^nPr$ | H | H | $CF(CF_3)_2$ | H | 2 |
| $SO_2CF_3$ | $^nPr$ | H | H | SMe | H | 0 |
| $SO_2CF_3$ | $^nPr$ | H | H | SMe | H | 1 |
| $SO_2CF_3$ | $^nPr$ | H | H | SMe | H | 2 |
| $SO_2CF_3$ | $^nPr$ | H | H | SOMe | H | 0 |
| $SO_2CF_3$ | $^nPr$ | H | H | SOMe | H | 1 |
| $SO_2CF_3$ | $^nPr$ | H | H | SOMe | H | 2 |
| $SO_2CF_3$ | $^nPr$ | H | H | $SO_2Me$ | H | 0 |
| $SO_2CF_3$ | $^nPr$ | H | H | $SO_2Me$ | H | 1 |
| $SO_2CF_3$ | $^nPr$ | H | H | $SO_2Me$ | H | 2 |
| $SO_2CF_3$ | $^nPr$ | H | H | OMe | H | 0 |
| $SO_2CF_3$ | $^nPr$ | H | H | OMe | H | 1 |
| $SO_2CF_3$ | $^nPr$ | H | H | OMe | H | 2 |
| $SO_2CF_3$ | $^nPr$ | H | H | $OCF_3$ | H | 0 |
| $SO_2CF_3$ | $^nPr$ | H | H | $OCF_3$ | H | 1 |
| $SO_2CF_3$ | $^nPr$ | H | H | $OCF_3$ | H | 2 |
| $SO_2CF_3$ | $^nPr$ | H | H | $NO_2$ | H | 0 |
| $SO_2CF_3$ | $^nPr$ | H | H | $NO_2$ | H | 1 |
| $SO_2CF_3$ | $^nPr$ | H | H | $NO_2$ | H | 2 |
| $SO_2CF_3$ | $^nPr$ | H | H | CN | H | 0 |
| $SO_2CF_3$ | $^nPr$ | H | H | CN | H | 1 |
| $SO_2CF_3$ | $^nPr$ | H | H | CN | H | 2 |
| $SO_2CF_3$ | $^nPr$ | H | H | H | F | 0 |
| $SO_2CF_3$ | $^nPr$ | H | H | H | F | 1 |
| $SO_2CF_3$ | $^nPr$ | H | H | H | F | 2 |
| $SO_2CF_3$ | $^nPr$ | H | H | H | Cl | 0 |
| $SO_2CF_3$ | $^nPr$ | H | H | H | Cl | 1 |
| $SO_2CF_3$ | $^nPr$ | H | H | H | Cl | 2 |
| $SO_2CF_3$ | $^nPr$ | H | H | H | Br | 0 |
| $SO_2CF_3$ | $^nPr$ | H | H | H | Br | 1 |
| $SO_2CF_3$ | $^nPr$ | H | H | H | Br | 2 |
| $SO_2CF_3$ | $^nPr$ | H | H | H | I | 0 |
| $SO_2CF_3$ | $^nPr$ | H | H | H | I | 1 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SO_2CF_3$ | $^nPr$ | H | H | H | I | 2 |
| $SO_2CF_3$ | $^nPr$ | H | H | H | Me | 0 |
| $SO_2CF_3$ | $^nPr$ | H | H | H | Me | 1 |
| $SO_2CF_3$ | $^nPr$ | H | H | H | Me | 2 |
| $SO_2CF_3$ | $^nPr$ | H | H | H | $CF_3$ | 0 |
| $SO_2CF_3$ | $^nPr$ | H | H | H | $CF_3$ | 1 |
| $SO_2CF_3$ | $^nPr$ | H | H | H | $CF_3$ | 2 |
| $SO_2CF_3$ | $^nPr$ | H | H | H | $CF_2CF_3$ | 0 |
| $SO_2CF_3$ | $^nPr$ | H | H | H | $CF_2CF_3$ | 1 |
| $SO_2CF_3$ | $^nPr$ | H | H | H | $CF_2CF_3$ | 2 |
| $SO_2CF_3$ | $^nPr$ | H | H | H | $CF(CF_3)_2$ | 0 |
| $SO_2CF_3$ | $^nPr$ | H | H | H | $CF(CF_3)_2$ | 1 |
| $SO_2CF_3$ | $^nPr$ | H | H | H | $CF(CF_3)_2$ | 2 |
| $SO_2CF_3$ | $^nPr$ | H | H | H | SMe | 0 |
| $SO_2CF_3$ | $^nPr$ | H | H | H | SMe | 1 |
| $SO_2CF_3$ | $^nPr$ | H | H | H | SMe | 2 |
| $SO_2CF_3$ | $^nPr$ | H | H | H | SOMe | 0 |
| $SO_2CF_3$ | $^nPr$ | H | H | H | SOMe | 1 |
| $SO_2CF_3$ | $^nPr$ | H | H | H | SOMe | 2 |
| $SO_2CF_3$ | $^nPr$ | H | H | H | $SO_2Me$ | 0 |
| $SO_2CF_3$ | $^nPr$ | H | H | H | $SO_2Me$ | 1 |
| $SO_2CF_3$ | $^nPr$ | H | H | H | $SO_2Me$ | 2 |
| $SO_2CF_3$ | $^nPr$ | H | H | H | OMe | 0 |
| $SO_2CF_3$ | $^nPr$ | H | H | H | OMe | 1 |
| $SO_2CF_3$ | $^nPr$ | H | H | H | OMe | 2 |
| $SO_2CF_3$ | $^nPr$ | H | H | H | $OCF_3$ | 0 |
| $SO_2CF_3$ | $^nPr$ | H | H | H | $OCF_3$ | 1 |
| $SO_2CF_3$ | $^nPr$ | H | H | H | $OCF_3$ | 2 |
| $SO_2CF_3$ | $^nPr$ | H | H | H | $NO_2$ | 0 |
| $SO_2CF_3$ | $^nPr$ | H | H | H | $NO_2$ | 1 |
| $SO_2CF_3$ | $^nPr$ | H | H | H | $NO_2$ | 2 |
| $SO_2CF_3$ | $^nPr$ | H | H | H | CN | 0 |
| $SO_2CF_3$ | $^nPr$ | H | H | H | CN | 1 |
| $SO_2CF_3$ | $^nPr$ | H | H | H | CN | 2 |
| $SO_2CF_3$ | $^nPr$ | H | F | H | F | 0 |
| $SO_2CF_3$ | $^nPr$ | H | F | H | F | 1 |
| $SO_2CF_3$ | $^nPr$ | H | F | H | F | 2 |
| $SO_2CF_3$ | $^nPr$ | H | Cl | H | Cl | 0 |
| $SO_2CF_3$ | $^nPr$ | H | Cl | H | Cl | 1 |
| $SO_2CF_3$ | $^nPr$ | H | Cl | H | Cl | 2 |
| $SO_2CF_3$ | $^nPr$ | H | Br | H | Br | 0 |
| $SO_2CF_3$ | $^nPr$ | H | Br | H | Br | 1 |
| $SO_2CF_3$ | $^nPr$ | H | Br | H | Br | 2 |
| $SO_2CF_3$ | $^nPr$ | H | I | H | I | 0 |
| $SO_2CF_3$ | $^nPr$ | H | I | H | I | 1 |
| $SO_2CF_3$ | $^nPr$ | H | I | H | I | 2 |
| $SO_2CF_3$ | $^nPr$ | H | F | H | Cl | 0 |
| $SO_2CF_3$ | $^nPr$ | H | F | H | Cl | 1 |
| $SO_2CF_3$ | $^nPr$ | H | F | H | Cl | 2 |
| $SO_2CF_3$ | $^nPr$ | H | F | H | Br | 0 |
| $SO_2CF_3$ | $^nPr$ | H | F | H | Br | 1 |
| $SO_2CF_3$ | $^nPr$ | H | F | H | Br | 2 |
| $SO_2CF_3$ | $^nPr$ | H | F | H | I | 0 |
| $SO_2CF_3$ | $^nPr$ | H | F | H | I | 1 |
| $SO_2CF_3$ | $^nPr$ | H | F | H | I | 2 |
| $SO_2CF_3$ | $^nPr$ | H | Cl | H | F | 0 |
| $SO_2CF_3$ | $^nPr$ | H | Cl | H | F | 1 |
| $SO_2CF_3$ | $^nPr$ | H | Cl | H | F | 2 |
| $SO_2CF_3$ | $^nPr$ | H | Cl | H | Br | 0 |
| $SO_2CF_3$ | $^nPr$ | H | Cl | H | Br | 1 |
| $SO_2CF_3$ | $^nPr$ | H | Cl | H | Br | 2 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SO_2CF_3$ | $^nPr$ | H | Cl | H | I | 0 |
| $SO_2CF_3$ | $^nPr$ | H | Cl | H | I | 1 |
| $SO_2CF_3$ | $^nPr$ | H | Cl | H | I | 2 |
| $SO_2CF_3$ | $^nPr$ | H | Br | H | F | 0 |
| $SO_2CF_3$ | $^nPr$ | H | Br | H | F | 1 |
| $SO_2CF_3$ | $^nPr$ | H | Br | H | F | 2 |
| $SO_2CF_3$ | $^nPr$ | H | Br | H | Cl | 0 |
| $SO_2CF_3$ | $^nPr$ | H | Br | H | Cl | 1 |
| $SO_2CF_3$ | $^nPr$ | H | Br | H | Cl | 2 |
| $SO_2CF_3$ | $^nPr$ | H | Br | H | I | 0 |
| $SO_2CF_3$ | $^nPr$ | H | Br | H | I | 1 |
| $SO_2CF_3$ | $^nPr$ | H | Br | H | I | 2 |
| $SO_2CF_3$ | $^nPr$ | H | I | H | F | 0 |
| $SO_2CF_3$ | $^nPr$ | H | I | H | F | 1 |
| $SO_2CF_3$ | $^nPr$ | H | I | H | F | 2 |
| $SO_2CF_3$ | $^nPr$ | H | I | H | Cl | 0 |
| $SO_2CF_3$ | $^nPr$ | H | I | H | Cl | 1 |
| $SO_2CF_3$ | $^nPr$ | H | I | H | Cl | 2 |
| $SO_2CF_3$ | $^nPr$ | H | I | H | Br | 0 |
| $SO_2CF_3$ | $^nPr$ | H | I | H | Br | 1 |
| $SO_2CF_3$ | $^nPr$ | H | I | H | Br | 2 |
| $SO_2CF_3$ | $^nPr$ | H | F | H | CN | 0 |
| $SO_2CF_3$ | $^nPr$ | H | F | H | CN | 1 |
| $SO_2CF_3$ | $^nPr$ | H | F | H | CN | 2 |
| $SO_2CF_3$ | $^nPr$ | H | Cl | H | CN | 0 |
| $SO_2CF_3$ | $^nPr$ | H | Cl | H | CN | 1 |
| $SO_2CF_3$ | $^nPr$ | H | Cl | H | CN | 2 |
| $SO_2CF_3$ | $^nPr$ | H | Br | H | CN | 0 |
| $SO_2CF_3$ | $^nPr$ | H | Br | H | CN | 1 |
| $SO_2CF_3$ | $^nPr$ | H | Br | H | CN | 2 |
| $SO_2CF_3$ | $^nPr$ | H | I | H | CN | 0 |
| $SO_2CF_3$ | $^nPr$ | H | I | H | CN | 1 |
| $SO_2CF_3$ | $^nPr$ | H | I | H | CN | 2 |
| $SO_2CF_3$ | $^nPr$ | H | $CF_3$ | H | F | 0 |
| $SO_2CF_3$ | $^nPr$ | H | $CF_3$ | H | F | 1 |
| $SO_2CF_3$ | $^nPr$ | H | $CF_3$ | H | F | 2 |
| $SO_2CF_3$ | $^nPr$ | H | $CF_3$ | H | Cl | 0 |
| $SO_2CF_3$ | $^nPr$ | H | $CF_3$ | H | Cl | 1 |
| $SO_2CF_3$ | $^nPr$ | H | $CF_3$ | H | Cl | 2 |
| $SO_2CF_3$ | $^nPr$ | H | $CF_3$ | H | Br | 0 |
| $SO_2CF_3$ | $^nPr$ | H | $CF_3$ | H | Br | 1 |
| $SO_2CF_3$ | $^nPr$ | H | $CF_3$ | H | Br | 2 |
| $SO_2CF_3$ | $^nPr$ | H | $CF_3$ | H | I | 0 |
| $SO_2CF_3$ | $^nPr$ | H | $CF_3$ | H | I | 1 |
| $SO_2CF_3$ | $^nPr$ | H | $CF_3$ | H | I | 2 |
| $SO_2CF_3$ | $^nPr$ | H | $CF_3$ | H | CN | 0 |
| $SO_2CF_3$ | $^nPr$ | H | $CF_3$ | H | CN | 1 |
| $SO_2CF_3$ | $^nPr$ | H | $CF_3$ | H | CN | 2 |
| $SO_2CF_3$ | $^nPr$ | H | F | F | H | 0 |
| $SO_2CF_3$ | $^nPr$ | H | F | F | H | 1 |
| $SO_2CF_3$ | $^nPr$ | H | F | F | H | 2 |
| $SO_2CF_3$ | $^nPr$ | H | Cl | Cl | H | 0 |
| $SO_2CF_3$ | $^nPr$ | H | Cl | Cl | H | 1 |
| $SO_2CF_3$ | $^nPr$ | H | Cl | Cl | H | 2 |
| $SO_2CF_3$ | $^nPr$ | H | Br | Br | H | 0 |
| $SO_2CF_3$ | $^nPr$ | H | Br | Br | H | 1 |
| $SO_2CF_3$ | $^nPr$ | H | Br | Br | H | 2 |
| $SO_2CF_3$ | $^nPr$ | H | I | I | H | 0 |
| $SO_2CF_3$ | $^nPr$ | H | I | I | H | 1 |
| $SO_2CF_3$ | $^nPr$ | H | I | I | H | 2 |
| $SO_2CF_3$ | $^nPr$ | H | F | Cl | H | 0 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SO_2CF_3$ | $^n$Pr | H | F | Cl | H | 1 |
| $SO_2CF_3$ | $^n$Pr | H | F | Cl | H | 2 |
| $SO_2CF_3$ | $^n$Pr | H | F | Br | H | 0 |
| $SO_2CF_3$ | $^n$Pr | H | F | Br | H | 1 |
| $SO_2CF_3$ | $^n$Pr | H | F | Br | H | 2 |
| $SO_2CF_3$ | $^n$Pr | H | F | I | H | 0 |
| $SO_2CF_3$ | $^n$Pr | H | F | I | H | 1 |
| $SO_2CF_3$ | $^n$Pr | H | F | I | H | 2 |
| $SO_2CF_3$ | $^n$Pr | H | Cl | F | H | 0 |
| $SO_2CF_3$ | $^n$Pr | H | Cl | F | H | 1 |
| $SO_2CF_3$ | $^n$Pr | H | Cl | F | H | 2 |
| $SO_2CF_3$ | $^n$Pr | H | Cl | Br | H | 0 |
| $SO_2CF_3$ | $^n$Pr | H | Cl | Br | H | 1 |
| $SO_2CF_3$ | $^n$Pr | H | Cl | Br | H | 2 |
| $SO_2CF_3$ | $^n$Pr | H | Cl | I | H | 0 |
| $SO_2CF_3$ | $^n$Pr | H | Cl | I | H | 1 |
| $SO_2CF_3$ | $^n$Pr | H | Cl | I | H | 2 |
| $SO_2CF_3$ | $^n$Pr | H | Br | F | H | 0 |
| $SO_2CF_3$ | $^n$Pr | H | Br | F | H | 1 |
| $SO_2CF_3$ | $^n$Pr | H | Br | F | H | 2 |
| $SO_2CF_3$ | $^n$Pr | H | Br | Cl | H | 0 |
| $SO_2CF_3$ | $^n$Pr | H | Br | Cl | H | 1 |
| $SO_2CF_3$ | $^n$Pr | H | Br | Cl | H | 2 |
| $SO_2CF_3$ | $^n$Pr | H | Br | I | H | 0 |
| $SO_2CF_3$ | $^n$Pr | H | Br | I | H | 1 |
| $SO_2CF_3$ | $^n$Pr | H | Br | I | H | 2 |
| $SO_2CF_3$ | $^n$Pr | H | I | F | H | 0 |
| $SO_2CF_3$ | $^n$Pr | H | I | F | H | 1 |
| $SO_2CF_3$ | $^n$Pr | H | I | F | H | 2 |
| $SO_2CF_3$ | $^n$Pr | H | I | Cl | H | 0 |
| $SO_2CF_3$ | $^n$Pr | H | I | Cl | H | 1 |
| $SO_2CF_3$ | $^n$Pr | H | I | Cl | H | 2 |
| $SO_2CF_3$ | $^n$Pr | H | I | Br | H | 0 |
| $SO_2CF_3$ | $^n$Pr | H | I | Br | H | 1 |
| $SO_2CF_3$ | $^n$Pr | H | I | Br | H | 2 |
| $SO_2CF_3$ | $^n$Pr | H | F | CN | H | 0 |
| $SO_2CF_3$ | $^n$Pr | H | F | CN | H | 1 |
| $SO_2CF_3$ | $^n$Pr | H | F | CN | H | 2 |
| $SO_2CF_3$ | $^n$Pr | H | Cl | CN | H | 0 |
| $SO_2CF_3$ | $^n$Pr | H | Cl | CN | H | 1 |
| $SO_2CF_3$ | $^n$Pr | H | Cl | CN | H | 2 |
| $SO_2CF_3$ | $^n$Pr | H | Br | CN | H | 0 |
| $SO_2CF_3$ | $^n$Pr | H | Br | CN | H | 1 |
| $SO_2CF_3$ | $^n$Pr | H | Br | CN | H | 2 |
| $SO_2CF_3$ | $^n$Pr | H | I | CN | H | 0 |
| $SO_2CF_3$ | $^n$Pr | H | I | CN | H | 1 |
| $SO_2CF_3$ | $^n$Pr | H | I | CN | H | 2 |
| $SO_2CF_3$ | $^n$Pr | H | $CF_3$ | F | H | 0 |
| $SO_2CF_3$ | $^n$Pr | H | $CF_3$ | F | H | 1 |
| $SO_2CF_3$ | $^n$Pr | H | $CF_3$ | F | H | 2 |
| $SO_2CF_3$ | $^n$Pr | H | $CF_3$ | Cl | H | 0 |
| $SO_2CF_3$ | $^n$Pr | H | $CF_3$ | Cl | H | 1 |
| $SO_2CF_3$ | $^n$Pr | H | $CF_3$ | Cl | H | 2 |
| $SO_2CF_3$ | $^n$Pr | H | $CF_3$ | Br | H | 0 |
| $SO_2CF_3$ | $^n$Pr | H | $CF_3$ | Br | H | 1 |
| $SO_2CF_3$ | $^n$Pr | H | $CF_3$ | Br | H | 2 |
| $SO_2CF_3$ | $^n$Pr | H | $CF_3$ | I | H | 0 |
| $SO_2CF_3$ | $^n$Pr | H | $CF_3$ | I | H | 1 |
| $SO_2CF_3$ | $^n$Pr | H | $CF_3$ | I | H | 2 |
| $SO_2CF_3$ | $^n$Pr | H | $CF_3$ | CN | H | 0 |
| $SO_2CF_3$ | $^n$Pr | H | $CF_3$ | CN | H | 1 |
| $SO_2CF_3$ | $^n$Pr | H | $CF_3$ | CN | H | 2 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SO_2CF_3$ | $^i$Pr | H | H | H | H | 0 |
| $SO_2CF_3$ | $^i$Pr | H | H | H | H | 1 |
| $SO_2CF_3$ | $^i$Pr | H | H | H | H | 2 |
| $SO_2CF_3$ | $^i$Pr | F | H | H | H | 0 |
| $SO_2CF_3$ | $^i$Pr | F | H | H | H | 1 |
| $SO_2CF_3$ | $^i$Pr | F | H | H | H | 2 |
| $SO_2CF_3$ | $^i$Pr | Cl | H | H | H | 0 |
| $SO_2CF_3$ | $^i$Pr | Cl | H | H | H | 1 |
| $SO_2CF_3$ | $^i$Pr | Cl | H | H | H | 2 |
| $SO_2CF_3$ | $^i$Pr | Br | H | H | H | 0 |
| $SO_2CF_3$ | $^i$Pr | Br | H | H | H | 1 |
| $SO_2CF_3$ | $^i$Pr | Br | H | H | H | 2 |
| $SO_2CF_3$ | $^i$Pr | I | H | H | H | 0 |
| $SO_2CF_3$ | $^i$Pr | I | H | H | H | 1 |
| $SO_2CF_3$ | $^i$Pr | I | H | H | H | 2 |
| $SO_2CF_3$ | $^i$Pr | Me | H | H | H | 0 |
| $SO_2CF_3$ | $^i$Pr | Me | H | H | H | 1 |
| $SO_2CF_3$ | $^i$Pr | Me | H | H | H | 2 |
| $SO_2CF_3$ | $^i$Pr | $CF_3$ | H | H | H | 0 |
| $SO_2CF_3$ | $^i$Pr | $CF_3$ | H | H | H | 1 |
| $SO_2CF_3$ | $^i$Pr | $CF_3$ | H | H | H | 2 |
| $SO_2CF_3$ | $^i$Pr | H | F | H | H | 0 |
| $SO_2CF_3$ | $^i$Pr | H | F | H | H | 1 |
| $SO_2CF_3$ | $^i$Pr | H | F | H | H | 2 |
| $SO_2CF_3$ | $^i$Pr | H | Cl | H | H | 0 |
| $SO_2CF_3$ | $^i$Pr | H | Cl | H | H | 1 |
| $SO_2CF_3$ | $^i$Pr | H | Cl | H | H | 2 |
| $SO_2CF_3$ | $^i$Pr | H | Br | H | H | 0 |
| $SO_2CF_3$ | $^i$Pr | H | Br | H | H | 1 |
| $SO_2CF_3$ | $^i$Pr | H | Br | H | H | 2 |
| $SO_2CF_3$ | $^i$Pr | H | I | H | H | 0 |
| $SO_2CF_3$ | $^i$Pr | H | I | H | H | 1 |
| $SO_2CF_3$ | $^i$Pr | H | I | H | H | 2 |
| $SO_2CF_3$ | $^i$Pr | H | Me | H | H | 0 |
| $SO_2CF_3$ | $^i$Pr | H | Me | H | H | 1 |
| $SO_2CF_3$ | $^i$Pr | H | Me | H | H | 2 |
| $SO_2CF_3$ | $^i$Pr | H | $CF_3$ | H | H | 0 |
| $SO_2CF_3$ | $^i$Pr | H | $CF_3$ | H | H | 1 |
| $SO_2CF_3$ | $^i$Pr | H | $CF_3$ | H | H | 2 |
| $SO_2CF_3$ | $^i$Pr | H | $CF_2CF_3$ | H | H | 0 |
| $SO_2CF_3$ | $^i$Pr | H | $CF_2CF_3$ | H | H | 1 |
| $SO_2CF_3$ | $^i$Pr | H | $CF_2CF_3$ | H | H | 2 |
| $SO_2CF_3$ | $^i$Pr | H | $CF(CF_3)_2$ | H | H | 0 |
| $SO_2CF_3$ | $^i$Pr | H | $CF(CF_3)_2$ | H | H | 1 |
| $SO_2CF_3$ | $^i$Pr | H | $CF(CF_3)_2$ | H | H | 2 |
| $SO_2CF_3$ | $^i$Pr | H | SMe | H | H | 0 |
| $SO_2CF_3$ | $^i$Pr | H | SMe | H | H | 1 |
| $SO_2CF_3$ | $^i$Pr | H | SMe | H | H | 2 |
| $SO_2CF_3$ | $^i$Pr | H | SOMe | H | H | 0 |
| $SO_2CF_3$ | $^i$Pr | H | SOMe | H | H | 1 |
| $SO_2CF_3$ | $^i$Pr | H | SOMe | H | H | 2 |
| $SO_2CF_3$ | $^i$Pr | H | $SO_2Me$ | H | H | 0 |
| $SO_2CF_3$ | $^i$Pr | H | $SO_2Me$ | H | H | 1 |
| $SO_2CF_3$ | $^i$Pr | H | $SO_2Me$ | H | H | 2 |
| $SO_2CF_3$ | $^i$Pr | H | OMe | H | H | 0 |
| $SO_2CF_3$ | $^i$Pr | H | OMe | H | H | 1 |
| $SO_2CF_3$ | $^i$Pr | H | OMe | H | H | 2 |
| $SO_2CF_3$ | $^i$Pr | H | $OCF_3$ | H | H | 0 |
| $SO_2CF_3$ | $^i$Pr | H | $OCF_3$ | H | H | 1 |
| $SO_2CF_3$ | $^i$Pr | H | $OCF_3$ | H | H | 2 |
| $SO_2CF_3$ | $^i$Pr | H | $NO_2$ | H | H | 0 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SO_2CF_3$ | $^iPr$ | H | $NO_2$ | H | H | 1 |
| $SO_2CF_3$ | $^iPr$ | H | $NO_2$ | H | H | 2 |
| $SO_2CF_3$ | $^iPr$ | H | CN | H | H | 0 |
| $SO_2CF_3$ | $^iPr$ | H | CN | H | H | 1 |
| $SO_2CF_3$ | $^iPr$ | H | CN | H | H | 2 |
| $SO_2CF_3$ | $^iPr$ | H | H | F | H | 0 |
| $SO_2CF_3$ | $^iPr$ | H | H | F | H | 1 |
| $SO_2CF_3$ | $^iPr$ | H | H | F | H | 2 |
| $SO_2CF_3$ | $^iPr$ | H | H | Cl | H | 0 |
| $SO_2CF_3$ | $^iPr$ | H | H | Cl | H | 1 |
| $SO_2CF_3$ | $^iPr$ | H | H | Cl | H | 2 |
| $SO_2CF_3$ | $^iPr$ | H | H | Br | H | 0 |
| $SO_2CF_3$ | $^iPr$ | H | H | Br | H | 1 |
| $SO_2CF_3$ | $^iPr$ | H | H | Br | H | 2 |
| $SO_2CF_3$ | $^iPr$ | H | H | I | H | 0 |
| $SO_2CF_3$ | $^iPr$ | H | H | I | H | 1 |
| $SO_2CF_3$ | $^iPr$ | H | H | I | H | 2 |
| $SO_2CF_3$ | $^iPr$ | H | H | Me | H | 0 |
| $SO_2CF_3$ | $^iPr$ | H | H | Me | H | 1 |
| $SO_2CF_3$ | $^iPr$ | H | H | Me | H | 2 |
| $SO_2CF_3$ | $^iPr$ | H | H | $CF_3$ | H | 0 |
| $SO_2CF_3$ | $^iPr$ | H | H | $CF_3$ | H | 1 |
| $SO_2CF_3$ | $^iPr$ | H | H | $CF_3$ | H | 2 |
| $SO_2CF_3$ | $^iPr$ | H | H | $CF_2CF_3$ | H | 0 |
| $SO_2CF_3$ | $^iPr$ | H | H | $CF_2CF_3$ | H | 1 |
| $SO_2CF_3$ | $^iPr$ | H | H | $CF_2CF_3$ | H | 2 |
| $SO_2CF_3$ | $^iPr$ | H | H | $CF(CF_3)_2$ | H | 0 |
| $SO_2CF_3$ | $^iPr$ | H | H | $CF(CF_3)_2$ | H | 1 |
| $SO_2CF_3$ | $^iPr$ | H | H | $CF(CF_3)_2$ | H | 2 |
| $SO_2CF_3$ | $^iPr$ | H | H | SMe | H | 0 |
| $SO_2CF_3$ | $^iPr$ | H | H | SMe | H | 1 |
| $SO_2CF_3$ | $^iPr$ | H | H | SMe | H | 2 |
| $SO_2CF_3$ | $^iPr$ | H | H | SOMe | H | 0 |
| $SO_2CF_3$ | $^iPr$ | H | H | SOMe | H | 1 |
| $SO_2CF_3$ | $^iPr$ | H | H | SOMe | H | 2 |
| $SO_2CF_3$ | $^iPr$ | H | H | $SO_2Me$ | H | 0 |
| $SO_2CF_3$ | $^iPr$ | H | H | $SO_2Me$ | H | 1 |
| $SO_2CF_3$ | $^iPr$ | H | H | $SO_2Me$ | H | 2 |
| $SO_2CF_3$ | $^iPr$ | H | H | OMe | H | 0 |
| $SO_2CF_3$ | $^iPr$ | H | H | OMe | H | 1 |
| $SO_2CF_3$ | $^iPr$ | H | H | OMe | H | 2 |
| $SO_2CF_3$ | $^iPr$ | H | H | $OCF_3$ | H | 0 |
| $SO_2CF_3$ | $^iPr$ | H | H | $OCF_3$ | H | 1 |
| $SO_2CF_3$ | $^iPr$ | H | H | $OCF_3$ | H | 2 |
| $SO_2CF_3$ | $^iPr$ | H | H | $NO_2$ | H | 0 |
| $SO_2CF_3$ | $^iPr$ | H | H | $NO_2$ | H | 1 |
| $SO_2CF_3$ | $^iPr$ | H | H | $NO_2$ | H | 2 |
| $SO_2CF_3$ | $^iPr$ | H | H | CN | H | 0 |
| $SO_2CF_3$ | $^iPr$ | H | H | CN | H | 1 |
| $SO_2CF_3$ | $^iPr$ | H | H | CN | H | 2 |
| $SO_2CF_3$ | $^iPr$ | H | H | H | F | 0 |
| $SO_2CF_3$ | $^iPr$ | H | H | H | F | 1 |
| $SO_2CF_3$ | $^iPr$ | H | H | H | F | 2 |
| $SO_2CF_3$ | $^iPr$ | H | H | H | Cl | 0 |
| $SO_2CF_3$ | $^iPr$ | H | H | H | Cl | 1 |
| $SO_2CF_3$ | $^iPr$ | H | H | H | Cl | 2 |
| $SO_2CF_3$ | $^iPr$ | H | H | H | Br | 0 |
| $SO_2CF_3$ | $^iPr$ | H | H | H | Br | 1 |
| $SO_2CF_3$ | $^iPr$ | H | H | H | Br | 2 |
| $SO_2CF_3$ | $^iPr$ | H | H | H | I | 0 |
| $SO_2CF_3$ | $^iPr$ | H | H | H | I | 1 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SO_2CF_3$ | $^iPr$ | H | H | H | I | 2 |
| $SO_2CF_3$ | $^iPr$ | H | H | H | Me | 0 |
| $SO_2CF_3$ | $^iPr$ | H | H | H | Me | 1 |
| $SO_2CF_3$ | $^iPr$ | H | H | H | Me | 2 |
| $SO_2CF_3$ | $^iPr$ | H | H | H | $CF_3$ | 0 |
| $SO_2CF_3$ | $^iPr$ | H | H | H | $CF_3$ | 1 |
| $SO_2CF_3$ | $^iPr$ | H | H | H | $CF_3$ | 2 |
| $SO_2CF_3$ | $^iPr$ | H | H | H | $CF_2CF_3$ | 0 |
| $SO_2CF_3$ | $^iPr$ | H | H | H | $CF_2CF_3$ | 1 |
| $SO_2CF_3$ | $^iPr$ | H | H | H | $CF_2CF_3$ | 2 |
| $SO_2CF_3$ | $^iPr$ | H | H | H | $CF(CF_3)_2$ | 0 |
| $SO_2CF_3$ | $^iPr$ | H | H | H | $CF(CF_3)_2$ | 1 |
| $SO_2CF_3$ | $^iPr$ | H | H | H | $CF(CF_3)_2$ | 2 |
| $SO_2CF_3$ | $^iPr$ | H | H | H | SMe | 0 |
| $SO_2CF_3$ | $^iPr$ | H | H | H | SMe | 1 |
| $SO_2CF_3$ | $^iPr$ | H | H | H | SMe | 2 |
| $SO_2CF_3$ | $^iPr$ | H | H | H | SOMe | 0 |
| $SO_2CF_3$ | $^iPr$ | H | H | H | SOMe | 1 |
| $SO_2CF_3$ | $^iPr$ | H | H | H | SOMe | 2 |
| $SO_2CF_3$ | $^iPr$ | H | H | H | $SO_2Me$ | 0 |
| $SO_2CF_3$ | $^iPr$ | H | H | H | $SO_2Me$ | 1 |
| $SO_2CF_3$ | $^iPr$ | H | H | H | $SO_2Me$ | 2 |
| $SO_2CF_3$ | $^iPr$ | H | H | H | OMe | 0 |
| $SO_2CF_3$ | $^iPr$ | H | H | H | OMe | 1 |
| $SO_2CF_3$ | $^iPr$ | H | H | H | OMe | 2 |
| $SO_2CF_3$ | $^iPr$ | H | H | H | $OCF_3$ | 0 |
| $SO_2CF_3$ | $^iPr$ | H | H | H | $OCF_3$ | 1 |
| $SO_2CF_3$ | $^iPr$ | H | H | H | $OCF_3$ | 2 |
| $SO_2CF_3$ | $^iPr$ | H | H | H | $NO_2$ | 0 |
| $SO_2CF_3$ | $^iPr$ | H | H | H | $NO_2$ | 1 |
| $SO_2CF_3$ | $^iPr$ | H | H | H | $NO_2$ | 2 |
| $SO_2CF_3$ | $^iPr$ | H | H | H | CN | 0 |
| $SO_2CF_3$ | $^iPr$ | H | H | H | CN | 1 |
| $SO_2CF_3$ | $^iPr$ | H | H | H | CN | 2 |
| $SO_2CF_3$ | $^iPr$ | H | F | H | F | 0 |
| $SO_2CF_3$ | $^iPr$ | H | F | H | F | 1 |
| $SO_2CF_3$ | $^iPr$ | H | F | H | F | 2 |
| $SO_2CF_3$ | $^iPr$ | H | Cl | H | Cl | 0 |
| $SO_2CF_3$ | $^iPr$ | H | Cl | H | Cl | 1 |
| $SO_2CF_3$ | $^iPr$ | H | Cl | H | Cl | 2 |
| $SO_2CF_3$ | $^iPr$ | H | Br | H | Br | 0 |
| $SO_2CF_3$ | $^iPr$ | H | Br | H | Br | 1 |
| $SO_2CF_3$ | $^iPr$ | H | Br | H | Br | 2 |
| $SO_2CF_3$ | $^iPr$ | H | I | H | I | 0 |
| $SO_2CF_3$ | $^iPr$ | H | I | H | I | 1 |
| $SO_2CF_3$ | $^iPr$ | H | I | H | I | 2 |
| $SO_2CF_3$ | $^iPr$ | H | F | H | Cl | 0 |
| $SO_2CF_3$ | $^iPr$ | H | F | H | Cl | 1 |
| $SO_2CF_3$ | $^iPr$ | H | F | H | Cl | 2 |
| $SO_2CF_3$ | $^iPr$ | H | F | H | Br | 0 |
| $SO_2CF_3$ | $^iPr$ | H | F | H | Br | 1 |
| $SO_2CF_3$ | $^iPr$ | H | F | H | Br | 2 |
| $SO_2CF_3$ | $^iPr$ | H | F | H | I | 0 |
| $SO_2CF_3$ | $^iPr$ | H | F | H | I | 1 |
| $SO_2CF_3$ | $^iPr$ | H | F | H | I | 2 |
| $SO_2CF_3$ | $^iPr$ | H | Cl | H | F | 0 |
| $SO_2CF_3$ | $^iPr$ | H | Cl | H | F | 1 |
| $SO_2CF_3$ | $^iPr$ | H | Cl | H | F | 2 |
| $SO_2CF_3$ | $^iPr$ | H | Cl | H | Br | 0 |
| $SO_2CF_3$ | $^iPr$ | H | Cl | H | Br | 1 |
| $SO_2CF_3$ | $^iPr$ | H | Cl | H | Br | 2 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SO_2CF_3$ | $^iPr$ | H | Cl | H | I | 0 |
| $SO_2CF_3$ | $^iPr$ | H | Cl | H | I | 1 |
| $SO_2CF_3$ | $^iPr$ | H | Cl | H | I | 2 |
| $SO_2CF_3$ | $^iPr$ | H | Br | H | F | 0 |
| $SO_2CF_3$ | $^iPr$ | H | Br | H | F | 1 |
| $SO_2CF_3$ | $^iPr$ | H | Br | H | F | 2 |
| $SO_2CF_3$ | $^iPr$ | H | Br | H | Cl | 0 |
| $SO_2CF_3$ | $^iPr$ | H | Br | H | Cl | 1 |
| $SO_2CF_3$ | $^iPr$ | H | Br | H | Cl | 2 |
| $SO_2CF_3$ | $^iPr$ | H | Br | H | I | 0 |
| $SO_2CF_3$ | $^iPr$ | H | Br | H | I | 1 |
| $SO_2CF_3$ | $^iPr$ | H | Br | H | I | 2 |
| $SO_2CF_3$ | $^iPr$ | H | I | H | F | 0 |
| $SO_2CF_3$ | $^iPr$ | H | I | H | F | 1 |
| $SO_2CF_3$ | $^iPr$ | H | I | H | F | 2 |
| $SO_2CF_3$ | $^iPr$ | H | I | H | Cl | 0 |
| $SO_2CF_3$ | $^iPr$ | H | I | H | Cl | 1 |
| $SO_2CF_3$ | $^iPr$ | H | I | H | Cl | 2 |
| $SO_2CF_3$ | $^iPr$ | H | I | H | Br | 0 |
| $SO_2CF_3$ | $^iPr$ | H | I | H | Br | 1 |
| $SO_2CF_3$ | $^iPr$ | H | I | H | Br | 2 |
| $SO_2CF_3$ | $^iPr$ | H | F | H | CN | 0 |
| $SO_2CF_3$ | $^iPr$ | H | F | H | CN | 1 |
| $SO_2CF_3$ | $^iPr$ | H | F | H | CN | 2 |
| $SO_2CF_3$ | $^iPr$ | H | Cl | H | CN | 0 |
| $SO_2CF_3$ | $^iPr$ | H | Cl | H | CN | 1 |
| $SO_2CF_3$ | $^iPr$ | H | Cl | H | CN | 2 |
| $SO_2CF_3$ | $^iPr$ | H | Br | H | CN | 0 |
| $SO_2CF_3$ | $^iPr$ | H | Br | H | CN | 1 |
| $SO_2CF_3$ | $^iPr$ | H | Br | H | CN | 2 |
| $SO_2CF_3$ | $^iPr$ | H | I | H | CN | 0 |
| $SO_2CF_3$ | $^iPr$ | H | I | H | CN | 1 |
| $SO_2CF_3$ | $^iPr$ | H | I | H | CN | 2 |
| $SO_2CF_3$ | $^iPr$ | H | $CF_3$ | H | F | 0 |
| $SO_2CF_3$ | $^iPr$ | H | $CF_3$ | H | F | 1 |
| $SO_2CF_3$ | $^iPr$ | H | $CF_3$ | H | F | 2 |
| $SO_2CF_3$ | $^iPr$ | H | $CF_3$ | H | Cl | 0 |
| $SO_2CF_3$ | $^iPr$ | H | $CF_3$ | H | Cl | 1 |
| $SO_2CF_3$ | $^iPr$ | H | $CF_3$ | H | Cl | 2 |
| $SO_2CF_3$ | $^iPr$ | H | $CF_3$ | H | Br | 0 |
| $SO_2CF_3$ | $^iPr$ | H | $CF_3$ | H | Br | 1 |
| $SO_2CF_3$ | $^iPr$ | H | $CF_3$ | H | Br | 2 |
| $SO_2CF_3$ | $^iPr$ | H | $CF_3$ | H | I | 0 |
| $SO_2CF_3$ | $^iPr$ | H | $CF_3$ | H | I | 1 |
| $SO_2CF_3$ | $^iPr$ | H | $CF_3$ | H | I | 2 |
| $SO_2CF_3$ | $^iPr$ | H | $CF_3$ | H | CN | 0 |
| $SO_2CF_3$ | $^iPr$ | H | $CF_3$ | H | CN | 1 |
| $SO_2CF_3$ | $^iPr$ | H | $CF_3$ | H | CN | 2 |
| $SO_2CF_3$ | $^iPr$ | H | F | F | H | 0 |
| $SO_2CF_3$ | $^iPr$ | H | F | F | H | 1 |
| $SO_2CF_3$ | $^iPr$ | H | F | F | H | 2 |
| $SO_2CF_3$ | $^iPr$ | H | Cl | Cl | H | 0 |
| $SO_2CF_3$ | $^iPr$ | H | Cl | Cl | H | 1 |
| $SO_2CF_3$ | $^iPr$ | H | Cl | Cl | H | 2 |
| $SO_2CF_3$ | $^iPr$ | H | Br | Br | H | 0 |
| $SO_2CF_3$ | $^iPr$ | H | Br | Br | H | 1 |
| $SO_2CF_3$ | $^iPr$ | H | Br | Br | H | 2 |
| $SO_2CF_3$ | $^iPr$ | H | I | I | H | 0 |
| $SO_2CF_3$ | $^iPr$ | H | I | I | H | 1 |
| $SO_2CF_3$ | $^iPr$ | H | I | I | H | 2 |
| $SO_2CF_3$ | $^iPr$ | H | F | Cl | H | 0 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SO_2CF_3$ | $^iPr$ | H | F | Cl | H | 1 |
| $SO_2CF_3$ | $^iPr$ | H | F | Cl | H | 2 |
| $SO_2CF_3$ | $^iPr$ | H | F | Br | H | 0 |
| $SO_2CF_3$ | $^iPr$ | H | F | Br | H | 1 |
| $SO_2CF_3$ | $^iPr$ | H | F | Br | H | 2 |
| $SO_2CF_3$ | $^iPr$ | H | F | I | H | 0 |
| $SO_2CF_3$ | $^iPr$ | H | F | I | H | 1 |
| $SO_2CF_3$ | $^iPr$ | H | F | I | H | 2 |
| $SO_2CF_3$ | $^iPr$ | H | Cl | F | H | 0 |
| $SO_2CF_3$ | $^iPr$ | H | Cl | F | H | 1 |
| $SO_2CF_3$ | $^iPr$ | H | Cl | F | H | 2 |
| $SO_2CF_3$ | $^iPr$ | H | Cl | Br | H | 0 |
| $SO_2CF_3$ | $^iPr$ | H | Cl | Br | H | 1 |
| $SO_2CF_3$ | $^iPr$ | H | Cl | Br | H | 2 |
| $SO_2CF_3$ | $^iPr$ | H | Cl | I | H | 0 |
| $SO_2CF_3$ | $^iPr$ | H | Cl | I | H | 1 |
| $SO_2CF_3$ | $^iPr$ | H | Cl | I | H | 2 |
| $SO_2CF_3$ | $^iPr$ | H | Br | F | H | 0 |
| $SO_2CF_3$ | $^iPr$ | H | Br | F | H | 1 |
| $SO_2CF_3$ | $^iPr$ | H | Br | F | H | 2 |
| $SO_2CF_3$ | $^iPr$ | H | Br | Cl | H | 0 |
| $SO_2CF_3$ | $^iPr$ | H | Br | Cl | H | 1 |
| $SO_2CF_3$ | $^iPr$ | H | Br | Cl | H | 2 |
| $SO_2CF_3$ | $^iPr$ | H | Br | I | H | 0 |
| $SO_2CF_3$ | $^iPr$ | H | Br | I | H | 1 |
| $SO_2CF_3$ | $^iPr$ | H | Br | I | H | 2 |
| $SO_2CF_3$ | $^iPr$ | H | I | F | H | 0 |
| $SO_2CF_3$ | $^iPr$ | H | I | F | H | 1 |
| $SO_2CF_3$ | $^iPr$ | H | I | F | H | 2 |
| $SO_2CF_3$ | $^iPr$ | H | I | Cl | H | 0 |
| $SO_2CF_3$ | $^iPr$ | H | I | Cl | H | 1 |
| $SO_2CF_3$ | $^iPr$ | H | I | Cl | H | 2 |
| $SO_2CF_3$ | $^iPr$ | H | I | Br | H | 0 |
| $SO_2CF_3$ | $^iPr$ | H | I | Br | H | 1 |
| $SO_2CF_3$ | $^iPr$ | H | I | Br | H | 2 |
| $SO_2CF_3$ | $^iPr$ | H | F | CN | H | 0 |
| $SO_2CF_3$ | $^iPr$ | H | F | CN | H | 1 |
| $SO_2CF_3$ | $^iPr$ | H | F | CN | H | 2 |
| $SO_2CF_3$ | $^iPr$ | H | Cl | CN | H | 0 |
| $SO_2CF_3$ | $^iPr$ | H | Cl | CN | H | 1 |
| $SO_2CF_3$ | $^iPr$ | H | Cl | CN | H | 2 |
| $SO_2CF_3$ | $^iPr$ | H | Br | CN | H | 0 |
| $SO_2CF_3$ | $^iPr$ | H | Br | CN | H | 1 |
| $SO_2CF_3$ | $^iPr$ | H | Br | CN | H | 2 |
| $SO_2CF_3$ | $^iPr$ | H | I | CN | H | 0 |
| $SO_2CF_3$ | $^iPr$ | H | I | CN | H | 1 |
| $SO_2CF_3$ | $^iPr$ | H | I | CN | H | 2 |
| $SO_2CF_3$ | $^iPr$ | H | $CF_3$ | F | H | 0 |
| $SO_2CF_3$ | $^iPr$ | H | $CF_3$ | F | H | 1 |
| $SO_2CF_3$ | $^iPr$ | H | $CF_3$ | F | H | 2 |
| $SO_2CF_3$ | $^iPr$ | H | $CF_3$ | Cl | H | 0 |
| $SO_2CF_3$ | $^iPr$ | H | $CF_3$ | Cl | H | 1 |
| $SO_2CF_3$ | $^iPr$ | H | $CF_3$ | Cl | H | 2 |
| $SO_2CF_3$ | $^iPr$ | H | $CF_3$ | Br | H | 0 |
| $SO_2CF_3$ | $^iPr$ | H | $CF_3$ | Br | H | 1 |
| $SO_2CF_3$ | $^iPr$ | H | $CF_3$ | Br | H | 2 |
| $SO_2CF_3$ | $^iPr$ | H | $CF_3$ | I | H | 0 |
| $SO_2CF_3$ | $^iPr$ | H | $CF_3$ | I | H | 1 |
| $SO_2CF_3$ | $^iPr$ | H | $CF_3$ | I | H | 2 |
| $SO_2CF_3$ | $^iPr$ | H | $CF_3$ | CN | H | 0 |
| $SO_2CF_3$ | $^iPr$ | H | $CF_3$ | CN | H | 1 |
| $SO_2CF_3$ | $^iPr$ | H | $CF_3$ | CN | H | 2 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | H | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | H | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | H | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | F | H | H | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | F | H | H | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | F | H | H | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | Cl | H | H | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | Cl | H | H | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | Cl | H | H | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | Br | H | H | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | Br | H | H | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | Br | H | H | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | I | H | H | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | I | H | H | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | I | H | H | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | Me | H | H | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | Me | H | H | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | Me | H | H | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | $CF_3$ | H | H | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | $CF_3$ | H | H | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | $CF_3$ | H | H | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | F | H | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | F | H | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | F | H | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Cl | H | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Cl | H | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Cl | H | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Br | H | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Br | H | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Br | H | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | I | H | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | I | H | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | I | H | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Me | H | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Me | H | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Me | H | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | $CF_2CF_3$ | H | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | $CF_2CF_3$ | H | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | $CF_2CF_3$ | H | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | $CF(CF_3)_2$ | H | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | $CF(CF_3)_2$ | H | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | $CF(CF_3)_2$ | H | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | SMe | H | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | SMe | H | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | SMe | H | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | SOMe | H | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | SOMe | H | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | SOMe | H | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | $SO_2Me$ | H | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | $SO_2Me$ | H | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | $SO_2Me$ | H | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | OMe | H | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | OMe | H | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | OMe | H | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | $OCF_3$ | H | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | $OCF_3$ | H | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | $OCF_3$ | H | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | $NO_2$ | H | H | 0 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SO_2CF_3$ | $CH_2CF_3$ | H | $NO_2$ | H | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | $NO_2$ | H | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | CN | H | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | CN | H | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | CN | H | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | F | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | F | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | F | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | Cl | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | Cl | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | Cl | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | Br | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | Br | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | Br | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | I | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | I | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | I | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | Me | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | Me | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | Me | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | $CF_3$ | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | $CF_3$ | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | $CF_3$ | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | $CF_2CF_3$ | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | $CF_2CF_3$ | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | $CF_2CF_3$ | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | $CF(CF_3)_2$ | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | $CF(CF_3)_2$ | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | $CF(CF_3)_2$ | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | SMe | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | SMe | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | SMe | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | SOMe | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | SOMe | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | SOMe | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | $SO_2Me$ | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | $SO_2Me$ | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | $SO_2Me$ | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | OMe | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | OMe | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | OMe | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | $OCF_3$ | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | $OCF_3$ | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | $OCF_3$ | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | $NO_2$ | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | $NO_2$ | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | $NO_2$ | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | CN | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | CN | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | CN | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | H | F | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | H | F | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | H | F | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | H | Cl | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | H | Cl | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | H | Cl | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | H | Br | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | H | Br | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | H | Br | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | H | I | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | H | I | 1 |

Table 1 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | H | I | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | H | Me | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | H | Me | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | H | Me | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | H | $CF_3$ | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | H | $CF_3$ | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | H | $CF_3$ | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | H | $CF_2CF_3$ | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | H | $CF_2CF_3$ | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | H | $CF_2CF_3$ | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | H | $CF(CF_3)_2$ | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | H | $CF(CF_3)_2$ | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | H | $CF(CF_3)_2$ | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | H | SMe | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | H | SMe | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | H | SMe | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | H | SOMe | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | H | SOMe | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | H | SOMe | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | H | $SO_2Me$ | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | H | $SO_2Me$ | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | H | $SO_2Me$ | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | H | OMe | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | H | OMe | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | H | OMe | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | H | $OCF_3$ | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | H | $OCF_3$ | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | H | $OCF_3$ | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | H | $NO_2$ | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | H | $NO_2$ | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | H | $NO_2$ | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | H | CN | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | H | CN | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | H | H | CN | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | F | H | F | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | F | H | F | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | F | H | F | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Cl | H | Cl | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Cl | H | Cl | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Cl | H | Cl | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Br | H | Br | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Br | H | Br | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Br | H | Br | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | I | H | I | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | I | H | I | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | I | H | I | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | F | H | Cl | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | F | H | Cl | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | F | H | Cl | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | F | H | Br | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | F | H | Br | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | F | H | Br | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | F | H | I | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | F | H | I | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | F | H | I | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Cl | H | F | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Cl | H | F | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Cl | H | F | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Cl | H | Br | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Cl | H | Br | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Cl | H | Br | 2 |

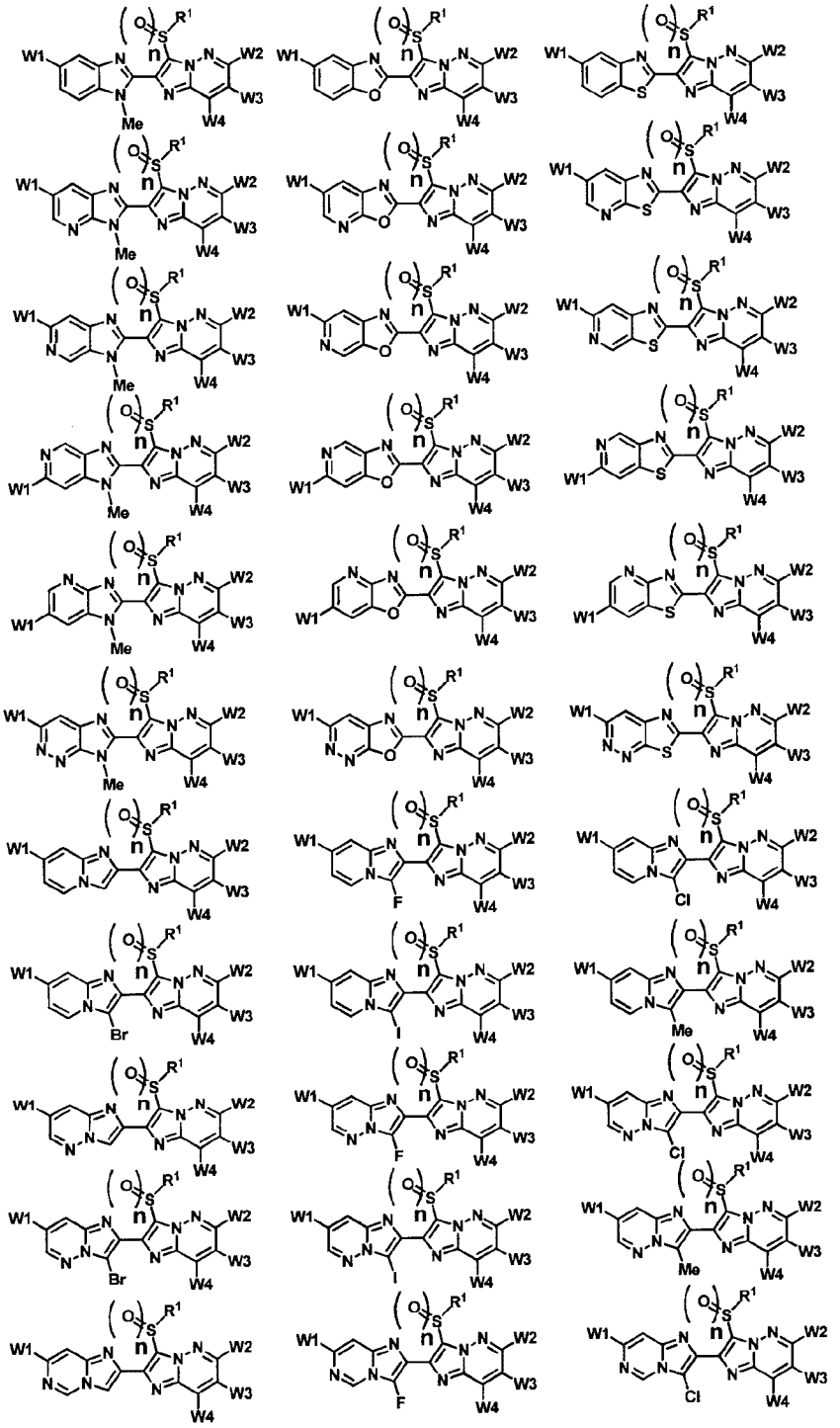
Table 1 (Continued)

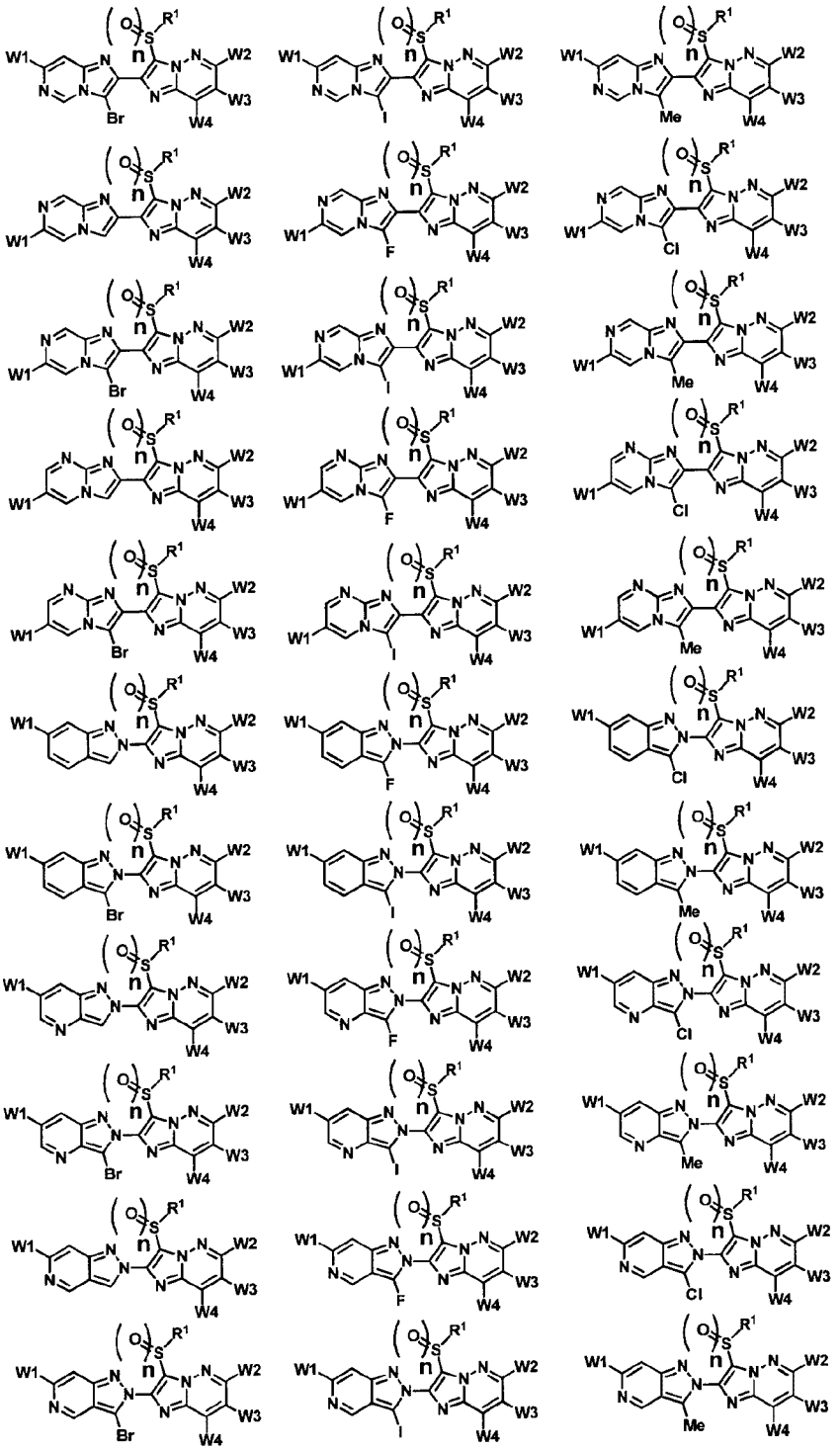
| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SO_2CF_3$ | $CH_2CF_3$ | H | Cl | H | I | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Cl | H | I | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Cl | H | I | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Br | H | F | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Br | H | F | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Br | H | F | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Br | H | Cl | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Br | H | Cl | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Br | H | Cl | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Br | H | I | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Br | H | I | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Br | H | I | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | I | H | F | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | I | H | F | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | I | H | F | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | I | H | Cl | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | I | H | Cl | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | I | H | Cl | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | I | H | Br | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | I | H | Br | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | I | H | Br | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | F | H | CN | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | F | H | CN | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | F | H | CN | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Cl | H | CN | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Cl | H | CN | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Cl | H | CN | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Br | H | CN | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Br | H | CN | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Br | H | CN | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | I | H | CN | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | I | H | CN | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | I | H | CN | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | F | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | F | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | F | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | Cl | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | Cl | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | Cl | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | Br | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | Br | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | Br | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | I | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | I | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | I | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | CN | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | CN | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | H | CN | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | F | F | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | F | F | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | F | F | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Cl | Cl | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Cl | Cl | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Cl | Cl | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Br | Br | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Br | Br | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Br | Br | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | I | I | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | I | I | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | I | I | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | F | Cl | H | 0 |

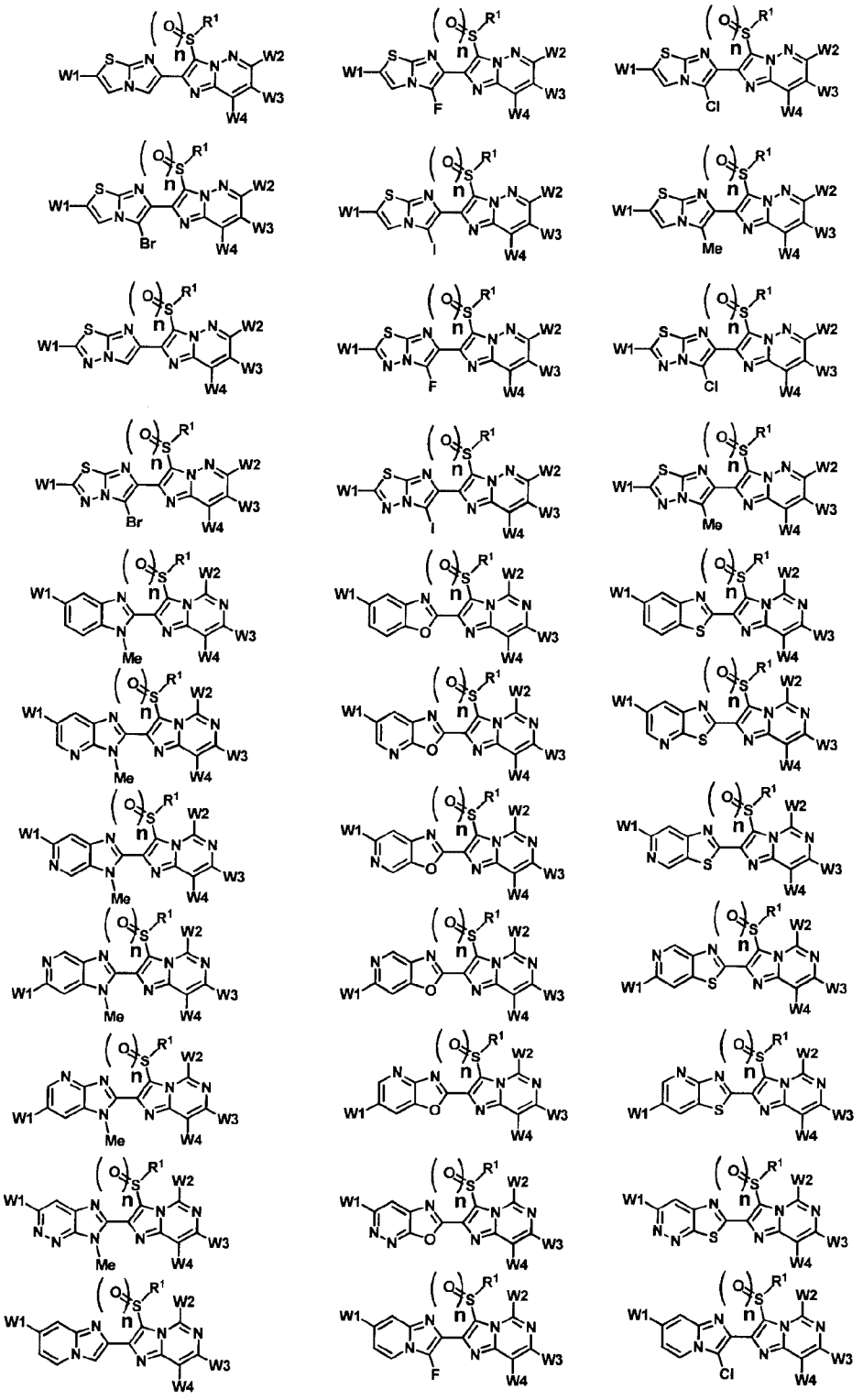
Table 1 (Continued)

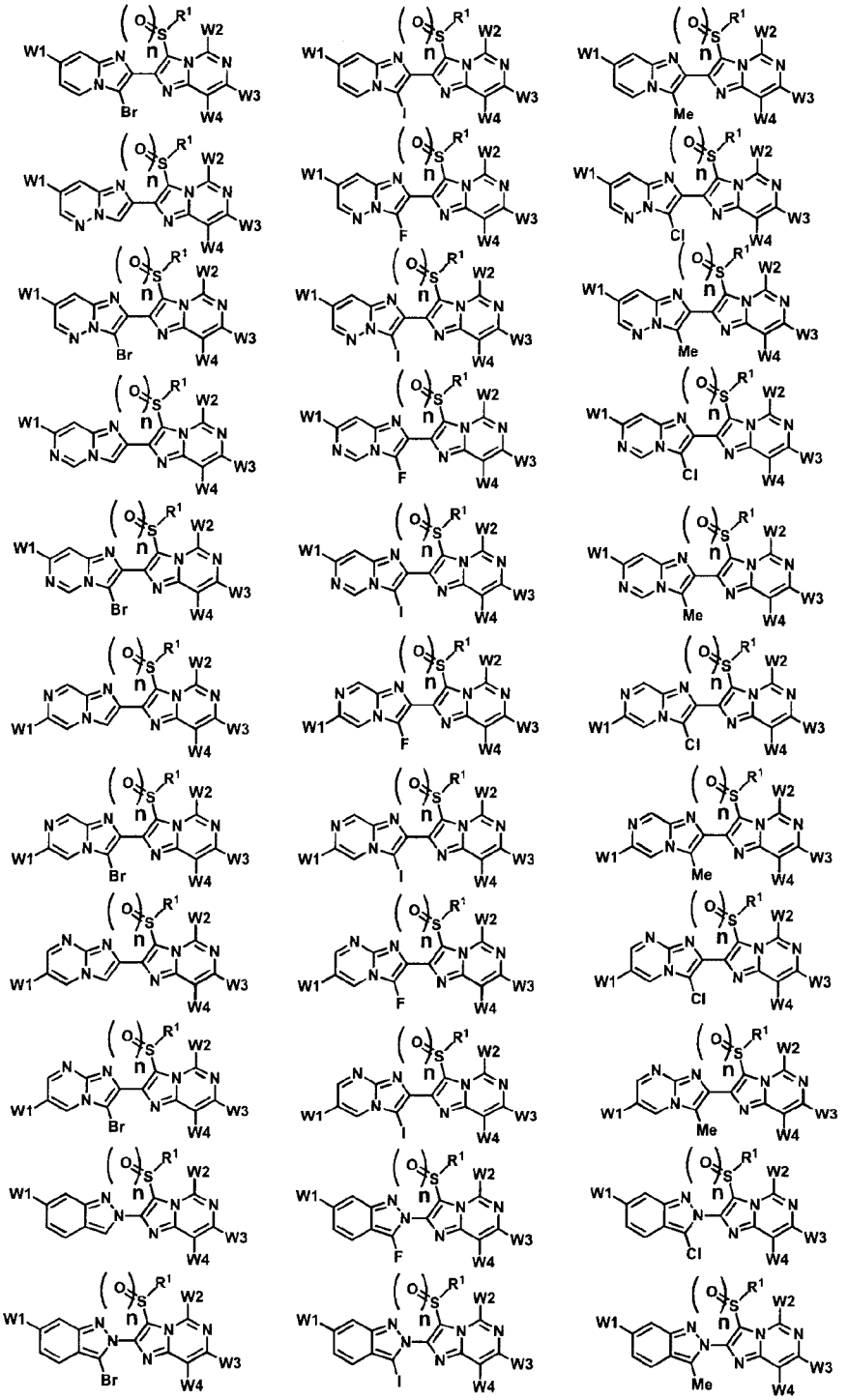
| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $SO_2CF_3$ | $CH_2CF_3$ | H | F | Cl | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | F | Cl | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | F | Br | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | F | Br | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | F | Br | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | F | I | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | F | I | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | F | I | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Cl | F | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Cl | F | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Cl | F | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Cl | Br | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Cl | Br | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Cl | Br | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Cl | I | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Cl | I | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Cl | I | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Br | F | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Br | F | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Br | F | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Br | Cl | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Br | Cl | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Br | Cl | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Br | I | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Br | I | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Br | I | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | I | F | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | I | F | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | I | F | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | I | Cl | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | I | Cl | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | I | Cl | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | I | Br | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | I | Br | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | I | Br | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | F | CN | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | F | CN | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | F | CN | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Cl | CN | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Cl | CN | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Cl | CN | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Br | CN | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Br | CN | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | Br | CN | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | I | CN | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | I | CN | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | I | CN | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | F | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | F | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | F | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | Cl | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | Cl | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | Cl | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | Br | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | Br | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | Br | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | I | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | I | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | I | H | 2 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | CN | H | 0 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | CN | H | 1 |
| $SO_2CF_3$ | $CH_2CF_3$ | H | $CF_3$ | CN | H | 2 |

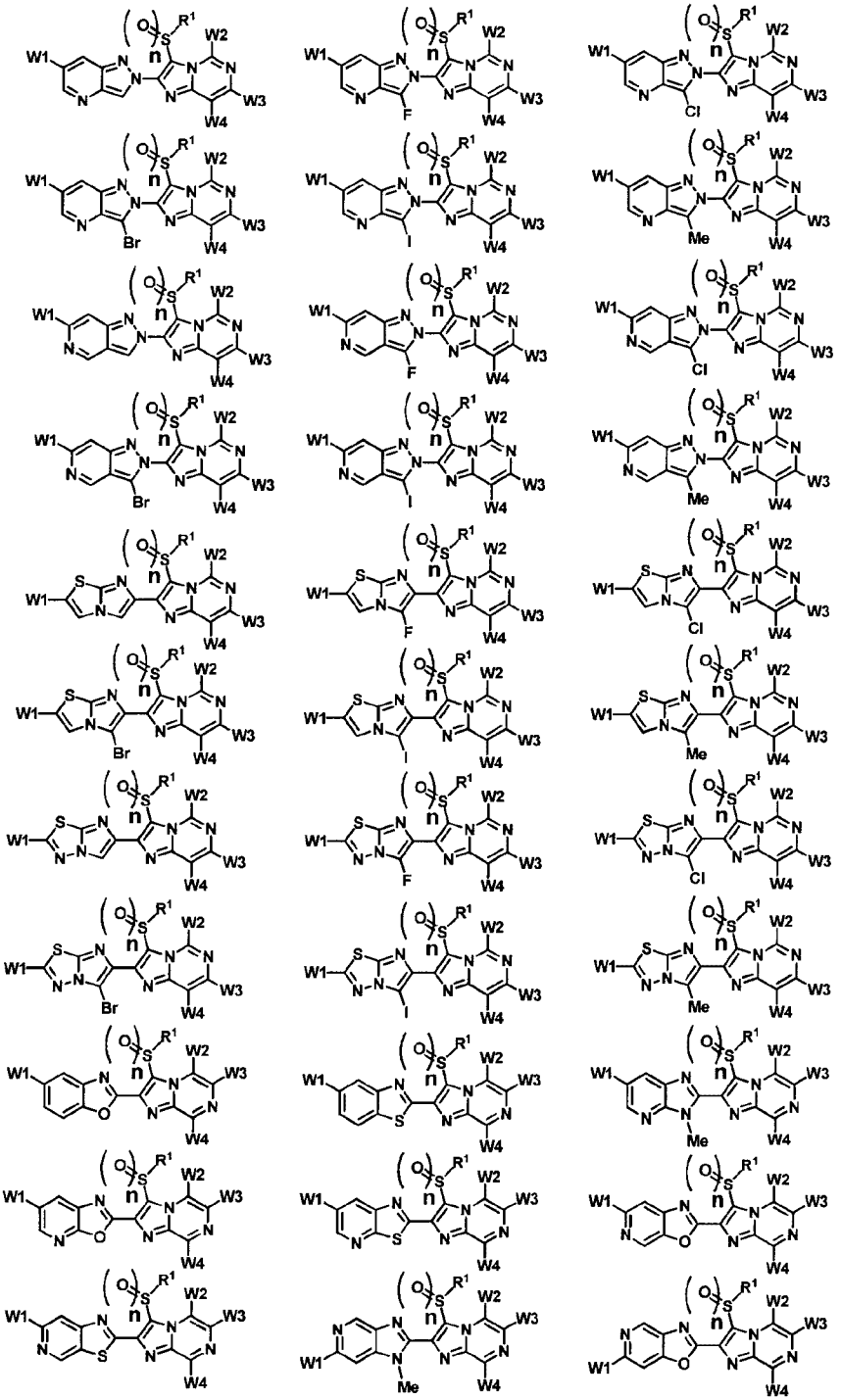
Table 2

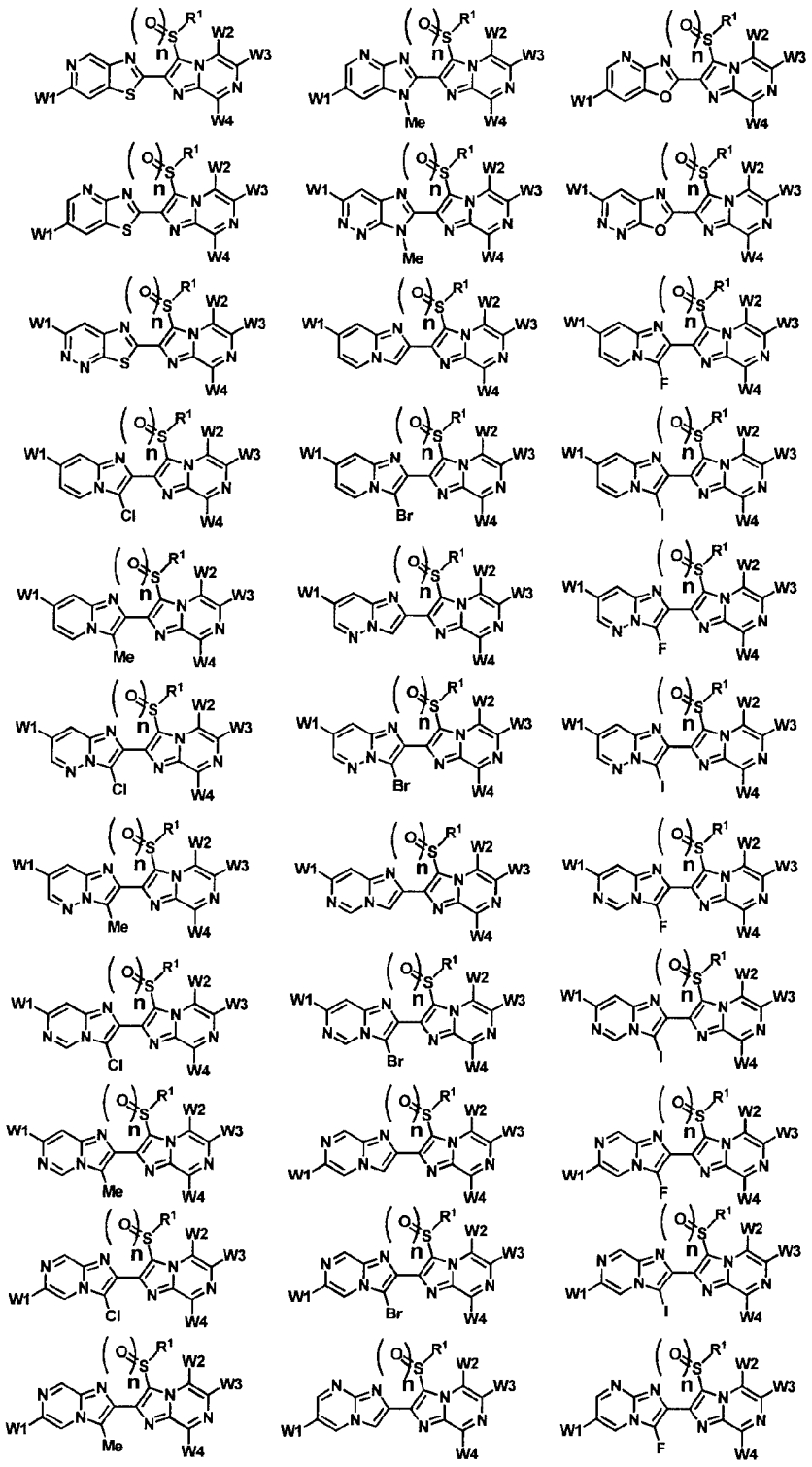


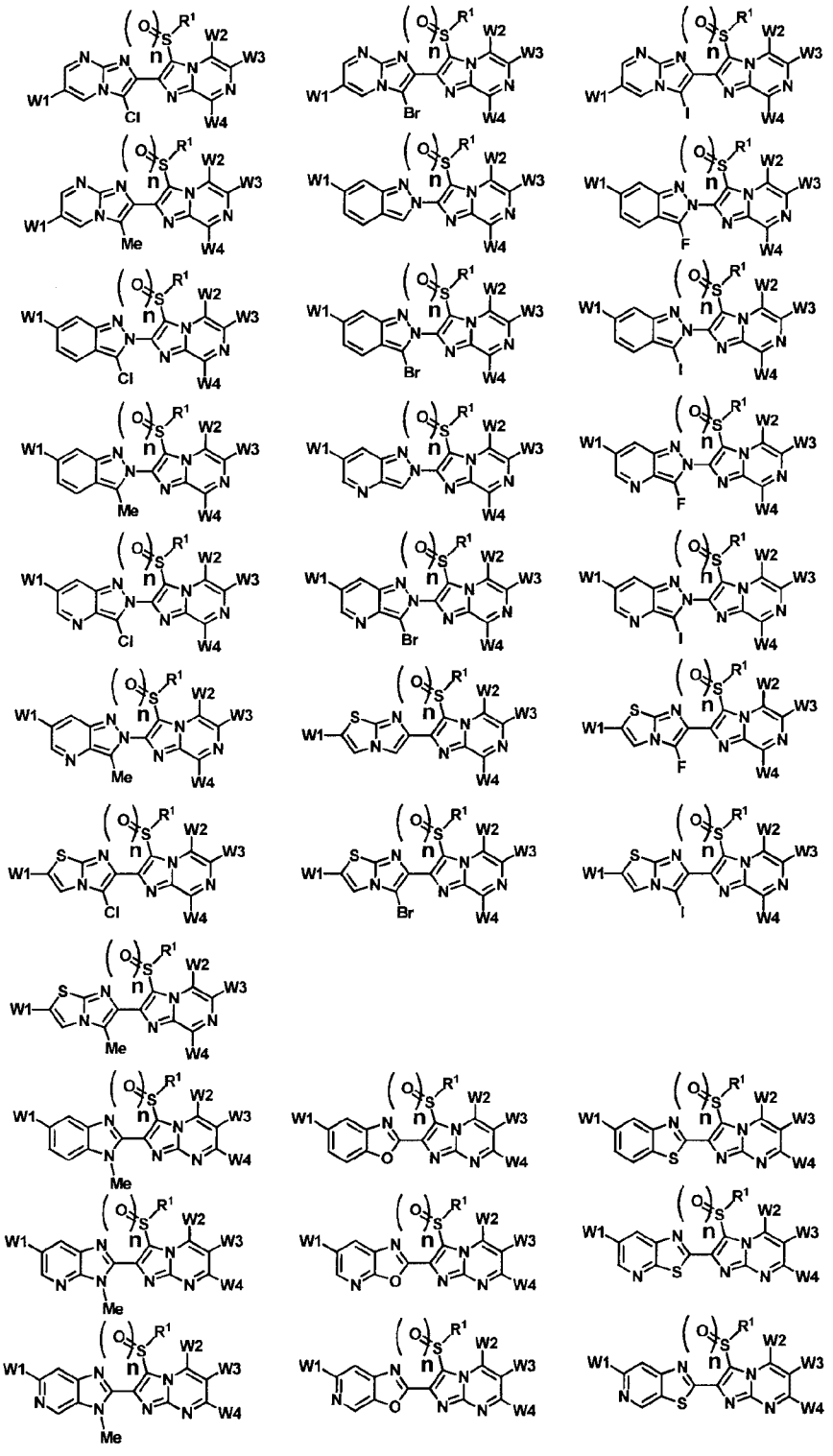


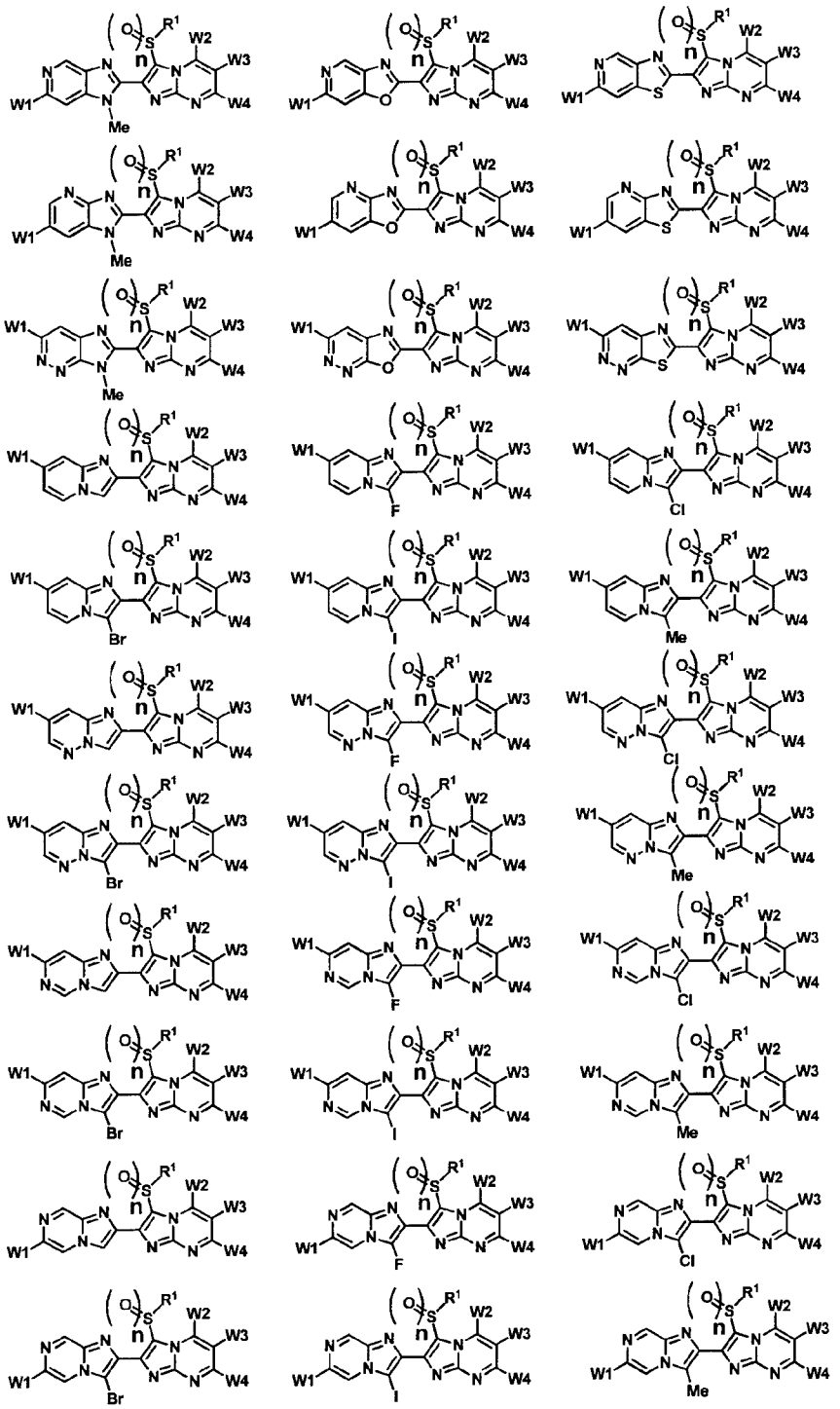












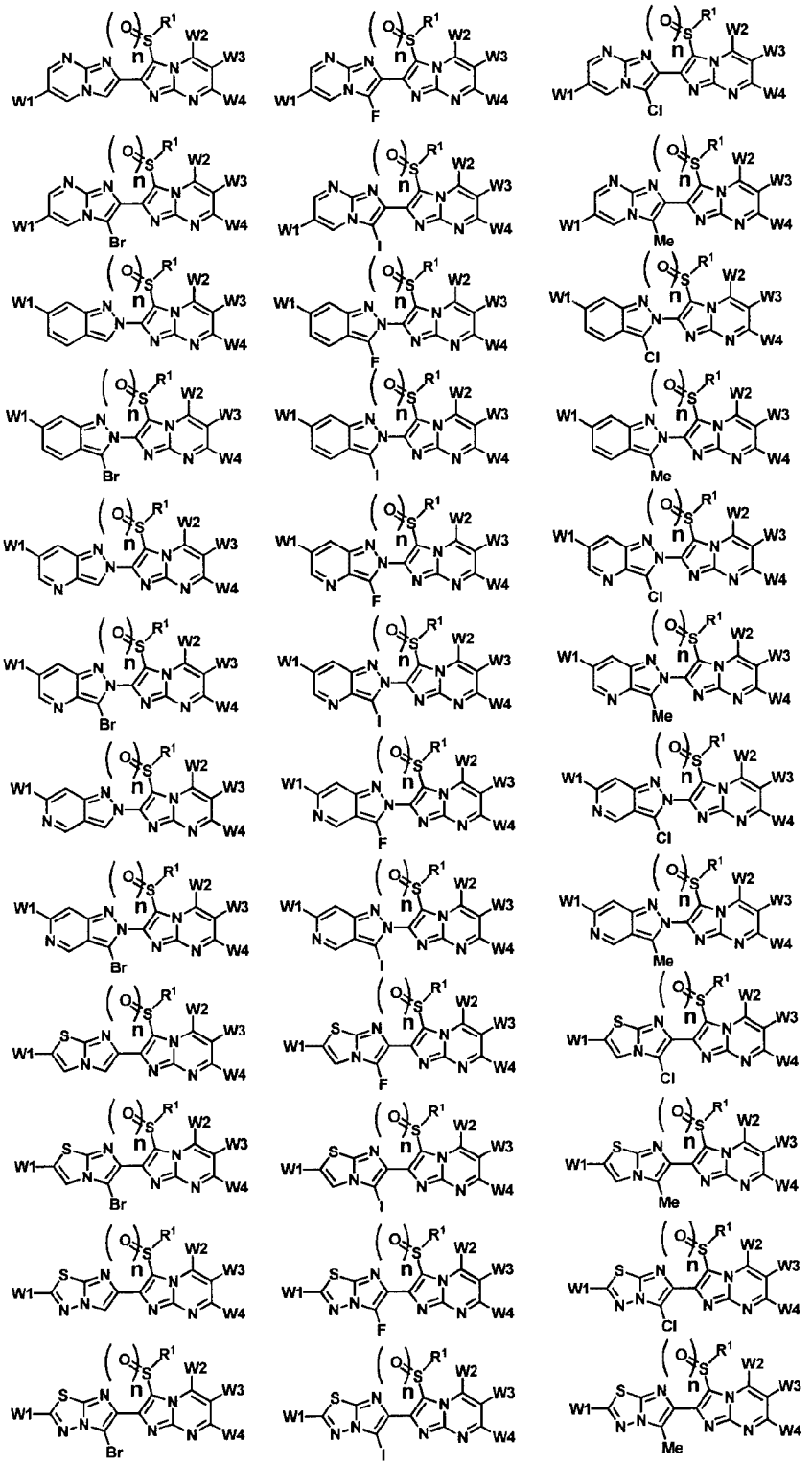


Table 2 (Continued)

| W1 | $R^1$ | W2 | W3 | W4 | n |
|---|---|---|---|---|---|
| $CF_3$ | Et | H | H | H | 0 |
| $CF_3$ | Et | H | H | H | 1 |
| $CF_3$ | Et | H | H | H | 2 |
| $CF_3$ | Et | F | H | H | 0 |
| $CF_3$ | Et | F | H | H | 1 |
| $CF_3$ | Et | F | H | H | 2 |
| $CF_3$ | Et | Cl | H | H | 0 |
| $CF_3$ | Et | Cl | H | H | 1 |
| $CF_3$ | Et | Cl | H | H | 2 |
| $CF_3$ | Et | Br | H | H | 0 |
| $CF_3$ | Et | Br | H | H | 1 |
| $CF_3$ | Et | Br | H | H | 2 |
| $CF_3$ | Et | I | H | H | 0 |
| $CF_3$ | Et | I | H | H | 1 |
| $CF_3$ | Et | I | H | H | 2 |
| $CF_3$ | Et | Me | H | H | 0 |
| $CF_3$ | Et | Me | H | H | 1 |
| $CF_3$ | Et | Me | H | H | 2 |
| $CF_3$ | Et | $CF_3$ | H | H | 0 |
| $CF_3$ | Et | $CF_3$ | H | H | 1 |
| $CF_3$ | Et | $CF_3$ | H | H | 2 |
| $CF_3$ | Et | $CF_2CF_3$ | H | H | 0 |
| $CF_3$ | Et | $CF_2CF_3$ | H | H | 1 |
| $CF_3$ | Et | $CF_2CF_3$ | H | H | 2 |
| $CF_3$ | Et | $CF(CF_3)_2$ | H | H | 0 |
| $CF_3$ | Et | $CF(CF_3)_2$ | H | H | 1 |
| $CF_3$ | Et | $CF(CF_3)_2$ | H | H | 2 |
| $CF_3$ | Et | SMe | H | H | 0 |
| $CF_3$ | Et | SMe | H | H | 1 |
| $CF_3$ | Et | SMe | H | H | 2 |
| $CF_3$ | Et | SOMe | H | H | 0 |
| $CF_3$ | Et | SOMe | H | H | 1 |
| $CF_3$ | Et | SOMe | H | H | 2 |
| $CF_3$ | Et | $SO_2Me$ | H | H | 0 |
| $CF_3$ | Et | $SO_2Me$ | H | H | 1 |
| $CF_3$ | Et | $SO_2Me$ | H | H | 2 |
| $CF_3$ | Et | OMe | H | H | 0 |
| $CF_3$ | Et | OMe | H | H | 1 |
| $CF_3$ | Et | OMe | H | H | 2 |
| $CF_3$ | Et | $OCF_3$ | H | H | 0 |
| $CF_3$ | Et | $OCF_3$ | H | H | 1 |
| $CF_3$ | Et | $OCF_3$ | H | H | 2 |
| $CF_3$ | Et | $NO_2$ | H | H | 0 |
| $CF_3$ | Et | $NO_2$ | H | H | 1 |
| $CF_3$ | Et | $NO_2$ | H | H | 2 |
| $CF_3$ | Et | CN | H | H | 0 |
| $CF_3$ | Et | CN | H | H | 1 |
| $CF_3$ | Et | CN | H | H | 2 |
| $CF_3$ | Et | H | F | H | 0 |
| $CF_3$ | Et | H | F | H | 1 |
| $CF_3$ | Et | H | F | H | 2 |
| $CF_3$ | Et | H | Cl | H | 0 |
| $CF_3$ | Et | H | Cl | H | 1 |
| $CF_3$ | Et | H | Cl | H | 2 |

| W1 | $R^1$ | W2 | W3 | W4 | n |
|---|---|---|---|---|---|
| $CF_3$ | Et | H | Br | H | 0 |
| $CF_3$ | Et | H | Br | H | 1 |
| $CF_3$ | Et | H | Br | H | 2 |
| $CF_3$ | Et | H | I | H | 0 |
| $CF_3$ | Et | H | I | H | 1 |
| $CF_3$ | Et | H | I | H | 2 |
| $CF_3$ | Et | H | Me | H | 0 |
| $CF_3$ | Et | H | Me | H | 1 |
| $CF_3$ | Et | H | Me | H | 2 |
| $CF_3$ | Et | H | $CF_3$ | H | 0 |
| $CF_3$ | Et | H | $CF_3$ | H | 1 |
| $CF_3$ | Et | H | $CF_3$ | H | 2 |
| $CF_3$ | Et | H | $CF_2CF_3$ | H | 0 |
| $CF_3$ | Et | H | $CF_2CF_3$ | H | 1 |
| $CF_3$ | Et | H | $CF_2CF_3$ | H | 2 |
| $CF_3$ | Et | H | $CF(CF_3)_2$ | H | 0 |
| $CF_3$ | Et | H | $CF(CF_3)_2$ | H | 1 |
| $CF_3$ | Et | H | $CF(CF_3)_2$ | H | 2 |
| $CF_3$ | Et | H | SMe | H | 0 |
| $CF_3$ | Et | H | SMe | H | 1 |
| $CF_3$ | Et | H | SMe | H | 2 |
| $CF_3$ | Et | H | SOMe | H | 0 |
| $CF_3$ | Et | H | SOMe | H | 1 |
| $CF_3$ | Et | H | SOMe | H | 2 |
| $CF_3$ | Et | H | $SO_2Me$ | H | 0 |
| $CF_3$ | Et | H | $SO_2Me$ | H | 1 |
| $CF_3$ | Et | H | $SO_2Me$ | H | 2 |
| $CF_3$ | Et | H | OMe | H | 0 |
| $CF_3$ | Et | H | OMe | H | 1 |
| $CF_3$ | Et | H | OMe | H | 2 |
| $CF_3$ | Et | H | $OCF_3$ | H | 0 |
| $CF_3$ | Et | H | $OCF_3$ | H | 1 |
| $CF_3$ | Et | H | $OCF_3$ | H | 2 |
| $CF_3$ | Et | H | $NO_2$ | H | 0 |
| $CF_3$ | Et | H | $NO_2$ | H | 1 |
| $CF_3$ | Et | H | $NO_2$ | H | 2 |
| $CF_3$ | Et | H | CN | H | 0 |
| $CF_3$ | Et | H | CN | H | 1 |
| $CF_3$ | Et | H | CN | H | 2 |
| $CF_3$ | Et | H | H | F | 0 |
| $CF_3$ | Et | H | H | F | 1 |
| $CF_3$ | Et | H | H | F | 2 |
| $CF_3$ | Et | H | H | Cl | 0 |
| $CF_3$ | Et | H | H | Cl | 1 |
| $CF_3$ | Et | H | H | Cl | 2 |
| $CF_3$ | Et | H | H | Br | 0 |
| $CF_3$ | Et | H | H | Br | 1 |
| $CF_3$ | Et | H | H | Br | 2 |
| $CF_3$ | Et | H | H | I | 0 |
| $CF_3$ | Et | H | H | I | 1 |
| $CF_3$ | Et | H | H | I | 2 |
| $CF_3$ | Et | H | H | Me | 0 |
| $CF_3$ | Et | H | H | Me | 1 |
| $CF_3$ | Et | H | H | Me | 2 |

Table 2 (Continued)

| W1 | $R^1$ | W2 | W3 | W4 | n |
|---|---|---|---|---|---|
| $CF_3$ | Et | H | H | $CF_3$ | 0 |
| $CF_3$ | Et | H | H | $CF_3$ | 1 |
| $CF_3$ | Et | H | H | $CF_3$ | 2 |
| $CF_3$ | Et | H | H | $CF_2CF_3$ | 0 |
| $CF_3$ | Et | H | H | $CF_2CF_3$ | 1 |
| $CF_3$ | Et | H | H | $CF_2CF_3$ | 2 |
| $CF_3$ | Et | H | H | $CF(CF_3)_2$ | 0 |
| $CF_3$ | Et | H | H | $CF(CF_3)_2$ | 1 |
| $CF_3$ | Et | H | H | $CF(CF_3)_2$ | 2 |
| $CF_3$ | Et | H | H | SMe | 0 |
| $CF_3$ | Et | H | H | SMe | 1 |
| $CF_3$ | Et | H | H | SMe | 2 |
| $CF_3$ | Et | H | H | SOMe | 0 |
| $CF_3$ | Et | H | H | SOMe | 1 |
| $CF_3$ | Et | H | H | SOMe | 2 |
| $CF_3$ | Et | H | H | $SO_2Me$ | 0 |
| $CF_3$ | Et | H | H | $SO_2Me$ | 1 |
| $CF_3$ | Et | H | H | $SO_2Me$ | 2 |
| $CF_3$ | Et | H | H | OMe | 0 |
| $CF_3$ | Et | H | H | OMe | 1 |
| $CF_3$ | Et | H | H | OMe | 2 |
| $CF_3$ | Et | H | H | $OCF_3$ | 0 |
| $CF_3$ | Et | H | H | $OCF_3$ | 1 |
| $CF_3$ | Et | H | H | $OCF_3$ | 2 |
| $CF_3$ | Et | H | H | $NO_2$ | 0 |
| $CF_3$ | Et | H | H | $NO_2$ | 1 |
| $CF_3$ | Et | H | H | $NO_2$ | 2 |
| $CF_3$ | Et | H | H | CN | 0 |
| $CF_3$ | Et | H | H | CN | 1 |
| $CF_3$ | Et | H | H | CN | 2 |

Table 2 (Continued)

| W1 | $R^1$ | W2 | W3 | W4 | n |
|---|---|---|---|---|---|
| $CF_2CF_3$ | Et | H | H | H | 0 |
| $CF_2CF_3$ | Et | H | H | H | 1 |
| $CF_2CF_3$ | Et | H | H | H | 2 |
| $CF_2CF_3$ | Et | F | H | H | 0 |
| $CF_2CF_3$ | Et | F | H | H | 1 |
| $CF_2CF_3$ | Et | F | H | H | 2 |
| $CF_2CF_3$ | Et | Cl | H | H | 0 |
| $CF_2CF_3$ | Et | Cl | H | H | 1 |
| $CF_2CF_3$ | Et | Cl | H | H | 2 |
| $CF_2CF_3$ | Et | Br | H | H | 0 |
| $CF_2CF_3$ | Et | Br | H | H | 1 |
| $CF_2CF_3$ | Et | Br | H | H | 2 |
| $CF_2CF_3$ | Et | I | H | H | 0 |
| $CF_2CF_3$ | Et | I | H | H | 1 |
| $CF_2CF_3$ | Et | I | H | H | 2 |
| $CF_2CF_3$ | Et | Me | H | H | 0 |
| $CF_2CF_3$ | Et | Me | H | H | 1 |
| $CF_2CF_3$ | Et | Me | H | H | 2 |
| $CF_2CF_3$ | Et | $CF_3$ | H | H | 0 |
| $CF_2CF_3$ | Et | $CF_3$ | H | H | 1 |
| $CF_2CF_3$ | Et | $CF_3$ | H | H | 2 |
| $CF_2CF_3$ | Et | $CF_2CF_3$ | H | H | 0 |
| $CF_2CF_3$ | Et | $CF_2CF_3$ | H | H | 1 |
| $CF_2CF_3$ | Et | $CF_2CF_3$ | H | H | 2 |
| $CF_2CF_3$ | Et | $CF(CF_3)_2$ | H | H | 0 |
| $CF_2CF_3$ | Et | $CF(CF_3)_2$ | H | H | 1 |
| $CF_2CF_3$ | Et | $CF(CF_3)_2$ | H | H | 2 |
| $CF_2CF_3$ | Et | SMe | H | H | 0 |
| $CF_2CF_3$ | Et | SMe | H | H | 1 |
| $CF_2CF_3$ | Et | SMe | H | H | 2 |
| $CF_2CF_3$ | Et | SOMe | H | H | 0 |
| $CF_2CF_3$ | Et | SOMe | H | H | 1 |
| $CF_2CF_3$ | Et | SOMe | H | H | 2 |
| $CF_2CF_3$ | Et | $SO_2Me$ | H | H | 0 |
| $CF_2CF_3$ | Et | $SO_2Me$ | H | H | 1 |
| $CF_2CF_3$ | Et | $SO_2Me$ | H | H | 2 |
| $CF_2CF_3$ | Et | OMe | H | H | 0 |
| $CF_2CF_3$ | Et | OMe | H | H | 1 |
| $CF_2CF_3$ | Et | OMe | H | H | 2 |
| $CF_2CF_3$ | Et | $OCF_3$ | H | H | 0 |
| $CF_2CF_3$ | Et | $OCF_3$ | H | H | 1 |
| $CF_2CF_3$ | Et | $OCF_3$ | H | H | 2 |
| $CF_2CF_3$ | Et | $NO_2$ | H | H | 0 |
| $CF_2CF_3$ | Et | $NO_2$ | H | H | 1 |
| $CF_2CF_3$ | Et | $NO_2$ | H | H | 2 |
| $CF_2CF_3$ | Et | CN | H | H | 0 |
| $CF_2CF_3$ | Et | CN | H | H | 1 |
| $CF_2CF_3$ | Et | CN | H | H | 2 |
| $CF_2CF_3$ | Et | H | F | H | 0 |
| $CF_2CF_3$ | Et | H | F | H | 1 |
| $CF_2CF_3$ | Et | H | F | H | 2 |
| $CF_2CF_3$ | Et | H | Cl | H | 0 |
| $CF_2CF_3$ | Et | H | Cl | H | 1 |
| $CF_2CF_3$ | Et | H | Cl | H | 2 |

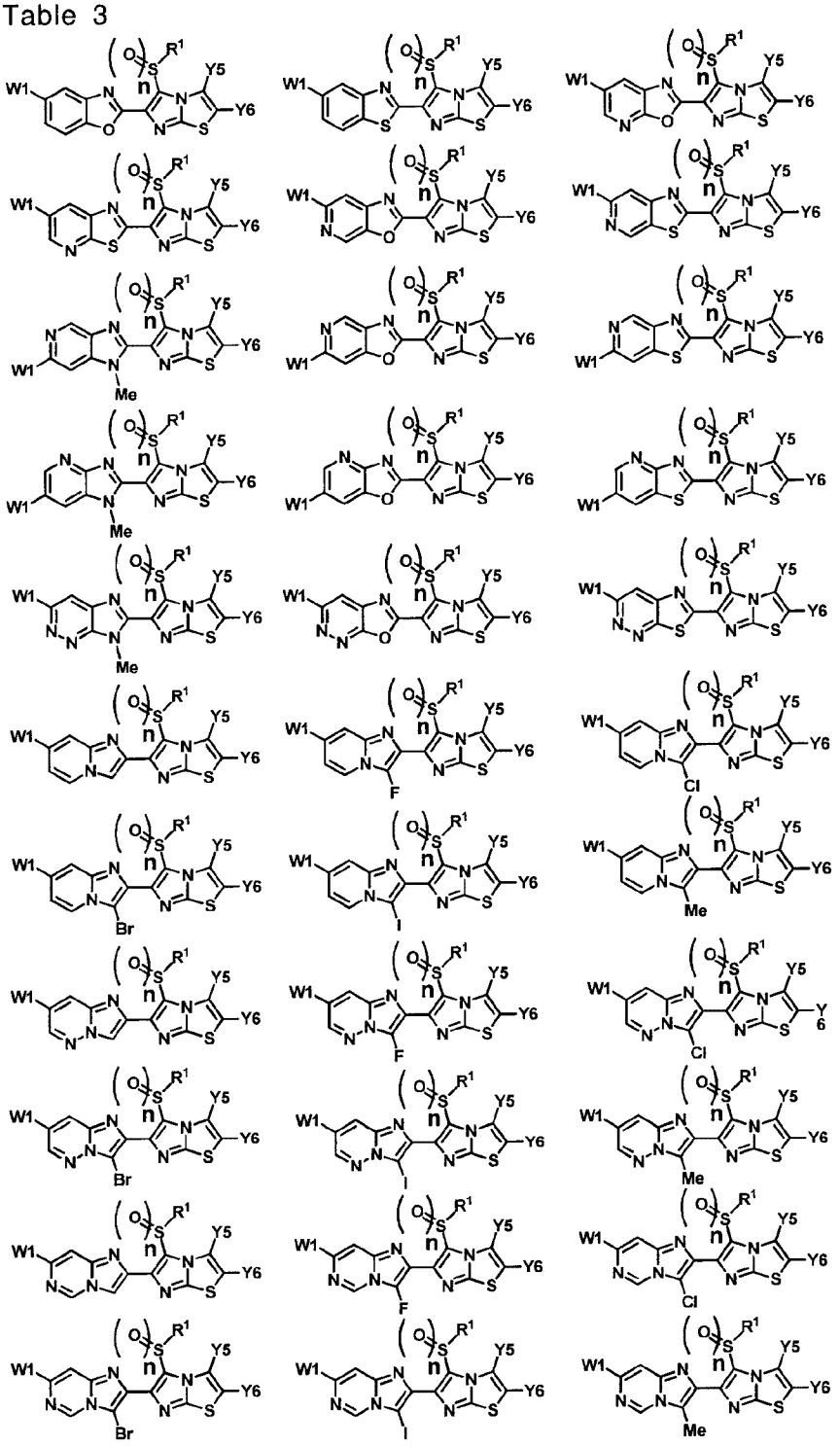
Table 2 (Continued)

| W1 | $R^1$ | W2 | W3 | W4 | n |
|---|---|---|---|---|---|
| $CF_2CF_3$ | Et | H | Br | H | 0 |
| $CF_2CF_3$ | Et | H | Br | H | 1 |
| $CF_2CF_3$ | Et | H | Br | H | 2 |
| $CF_2CF_3$ | Et | H | I | H | 0 |
| $CF_2CF_3$ | Et | H | I | H | 1 |
| $CF_2CF_3$ | Et | H | I | H | 2 |
| $CF_2CF_3$ | Et | H | Me | H | 0 |
| $CF_2CF_3$ | Et | H | Me | H | 1 |
| $CF_2CF_3$ | Et | H | Me | H | 2 |
| $CF_2CF_3$ | Et | H | $CF_3$ | H | 0 |
| $CF_2CF_3$ | Et | H | $CF_3$ | H | 1 |
| $CF_2CF_3$ | Et | H | $CF_3$ | H | 2 |
| $CF_2CF_3$ | Et | H | $CF_2CF_3$ | H | 0 |
| $CF_2CF_3$ | Et | H | $CF_2CF_3$ | H | 1 |
| $CF_2CF_3$ | Et | H | $CF_2CF_3$ | H | 2 |
| $CF_2CF_3$ | Et | H | $CF(CF_3)_2$ | H | 0 |
| $CF_2CF_3$ | Et | H | $CF(CF_3)_2$ | H | 1 |
| $CF_2CF_3$ | Et | H | $CF(CF_3)_2$ | H | 2 |
| $CF_2CF_3$ | Et | H | SMe | H | 0 |
| $CF_2CF_3$ | Et | H | SMe | H | 1 |
| $CF_2CF_3$ | Et | H | SMe | H | 2 |
| $CF_2CF_3$ | Et | H | SOMe | H | 0 |
| $CF_2CF_3$ | Et | H | SOMe | H | 1 |
| $CF_2CF_3$ | Et | H | SOMe | H | 2 |
| $CF_2CF_3$ | Et | H | $SO_2Me$ | H | 0 |
| $CF_2CF_3$ | Et | H | $SO_2Me$ | H | 1 |
| $CF_2CF_3$ | Et | H | $SO_2Me$ | H | 2 |
| $CF_2CF_3$ | Et | H | OMe | H | 0 |
| $CF_2CF_3$ | Et | H | OMe | H | 1 |
| $CF_2CF_3$ | Et | H | OMe | H | 2 |
| $CF_2CF_3$ | Et | H | $OCF_3$ | H | 0 |
| $CF_2CF_3$ | Et | H | $OCF_3$ | H | 1 |
| $CF_2CF_3$ | Et | H | $OCF_3$ | H | 2 |
| $CF_2CF_3$ | Et | H | $NO_2$ | H | 0 |
| $CF_2CF_3$ | Et | H | $NO_2$ | H | 1 |
| $CF_2CF_3$ | Et | H | $NO_2$ | H | 2 |
| $CF_2CF_3$ | Et | H | CN | H | 0 |
| $CF_2CF_3$ | Et | H | CN | H | 1 |
| $CF_2CF_3$ | Et | H | CN | H | 2 |
| $CF_2CF_3$ | Et | H | H | F | 0 |
| $CF_2CF_3$ | Et | H | H | F | 1 |
| $CF_2CF_3$ | Et | H | H | F | 2 |
| $CF_2CF_3$ | Et | H | H | Cl | 0 |
| $CF_2CF_3$ | Et | H | H | Cl | 1 |
| $CF_2CF_3$ | Et | H | H | Cl | 2 |
| $CF_2CF_3$ | Et | H | H | Br | 0 |
| $CF_2CF_3$ | Et | H | H | Br | 1 |
| $CF_2CF_3$ | Et | H | H | Br | 2 |
| $CF_2CF_3$ | Et | H | H | I | 0 |
| $CF_2CF_3$ | Et | H | H | I | 1 |
| $CF_2CF_3$ | Et | H | H | I | 2 |
| $CF_2CF_3$ | Et | H | H | Me | 0 |
| $CF_2CF_3$ | Et | H | H | Me | 1 |
| $CF_2CF_3$ | Et | H | H | Me | 2 |

Table 2 (Continued)

| W1 | $R^1$ | W2 | W3 | W4 | n |
|---|---|---|---|---|---|
| $CF_2CF_3$ | Et | H | H | $CF_3$ | 0 |
| $CF_2CF_3$ | Et | H | H | $CF_3$ | 1 |
| $CF_2CF_3$ | Et | H | H | $CF_3$ | 2 |
| $CF_2CF_3$ | Et | H | H | $CF_2CF_3$ | 0 |
| $CF_2CF_3$ | Et | H | H | $CF_2CF_3$ | 1 |
| $CF_2CF_3$ | Et | H | H | $CF_2CF_3$ | 2 |
| $CF_2CF_3$ | Et | H | H | $CF(CF_3)_2$ | 0 |
| $CF_2CF_3$ | Et | H | H | $CF(CF_3)_2$ | 1 |
| $CF_2CF_3$ | Et | H | H | $CF(CF_3)_2$ | 2 |
| $CF_2CF_3$ | Et | H | H | SMe | 0 |
| $CF_2CF_3$ | Et | H | H | SMe | 1 |
| $CF_2CF_3$ | Et | H | H | SMe | 2 |
| $CF_2CF_3$ | Et | H | H | SOMe | 0 |
| $CF_2CF_3$ | Et | H | H | SOMe | 1 |
| $CF_2CF_3$ | Et | H | H | SOMe | 2 |
| $CF_2CF_3$ | Et | H | H | $SO_2Me$ | 0 |
| $CF_2CF_3$ | Et | H | H | $SO_2Me$ | 1 |
| $CF_2CF_3$ | Et | H | H | $SO_2Me$ | 2 |
| $CF_2CF_3$ | Et | H | H | OMe | 0 |
| $CF_2CF_3$ | Et | H | H | OMe | 1 |
| $CF_2CF_3$ | Et | H | H | OMe | 2 |
| $CF_2CF_3$ | Et | H | H | $OCF_3$ | 0 |
| $CF_2CF_3$ | Et | H | H | $OCF_3$ | 1 |
| $CF_2CF_3$ | Et | H | H | $OCF_3$ | 2 |
| $CF_2CF_3$ | Et | H | H | $NO_2$ | 0 |
| $CF_2CF_3$ | Et | H | H | $NO_2$ | 1 |
| $CF_2CF_3$ | Et | H | H | $NO_2$ | 2 |
| $CF_2CF_3$ | Et | H | H | CN | 0 |
| $CF_2CF_3$ | Et | H | H | CN | 1 |
| $CF_2CF_3$ | Et | H | H | CN | 2 |

Table 3



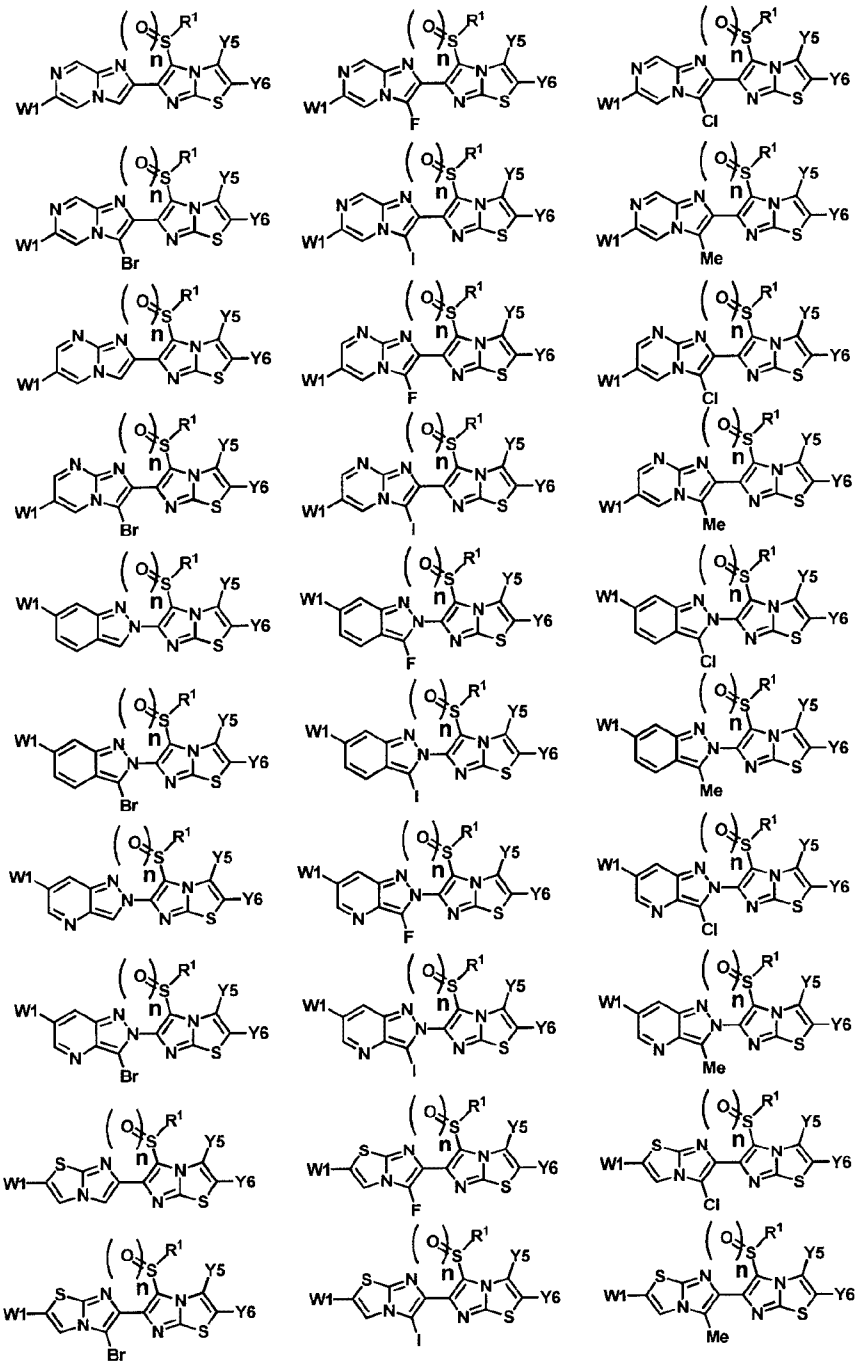
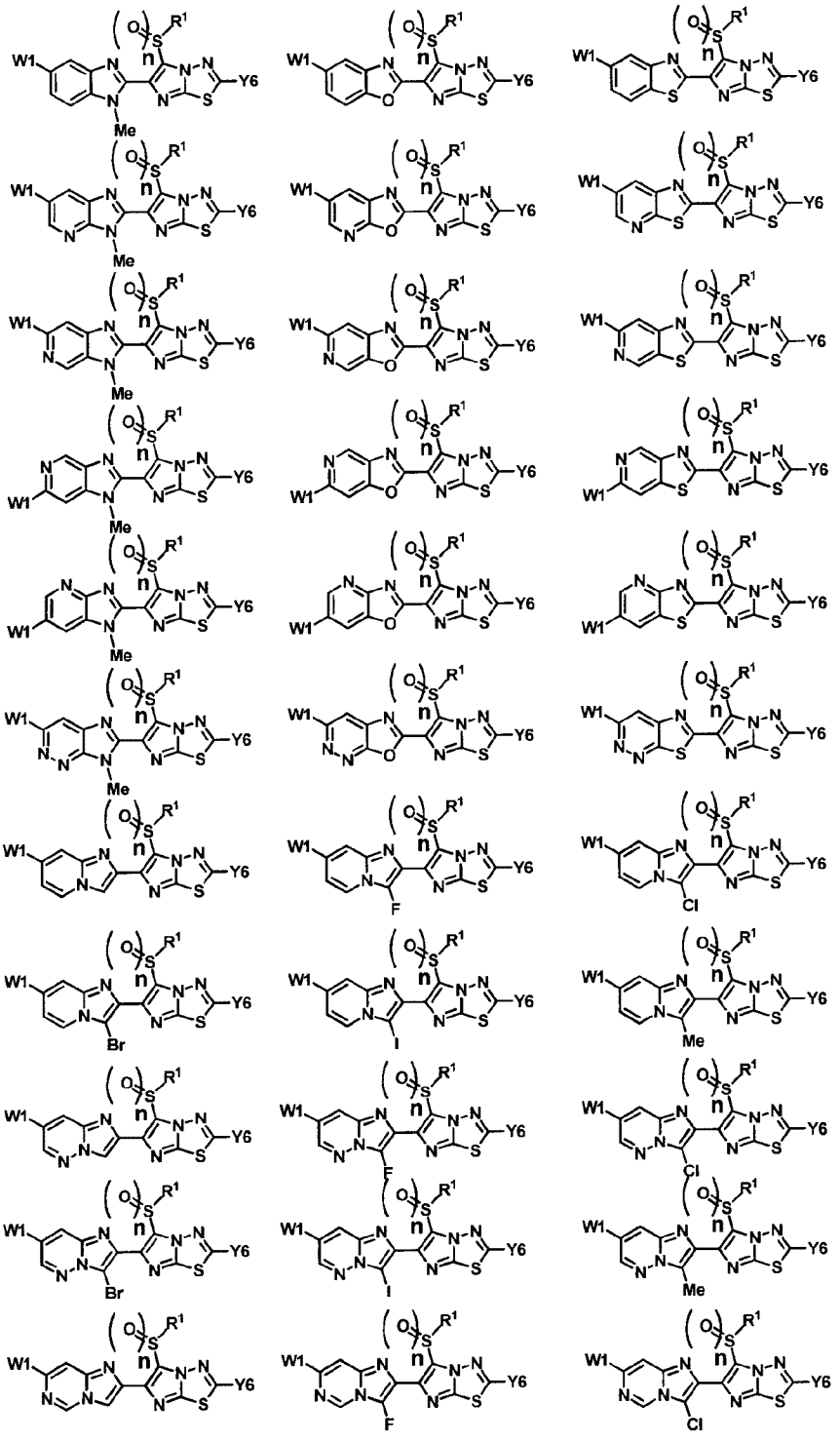


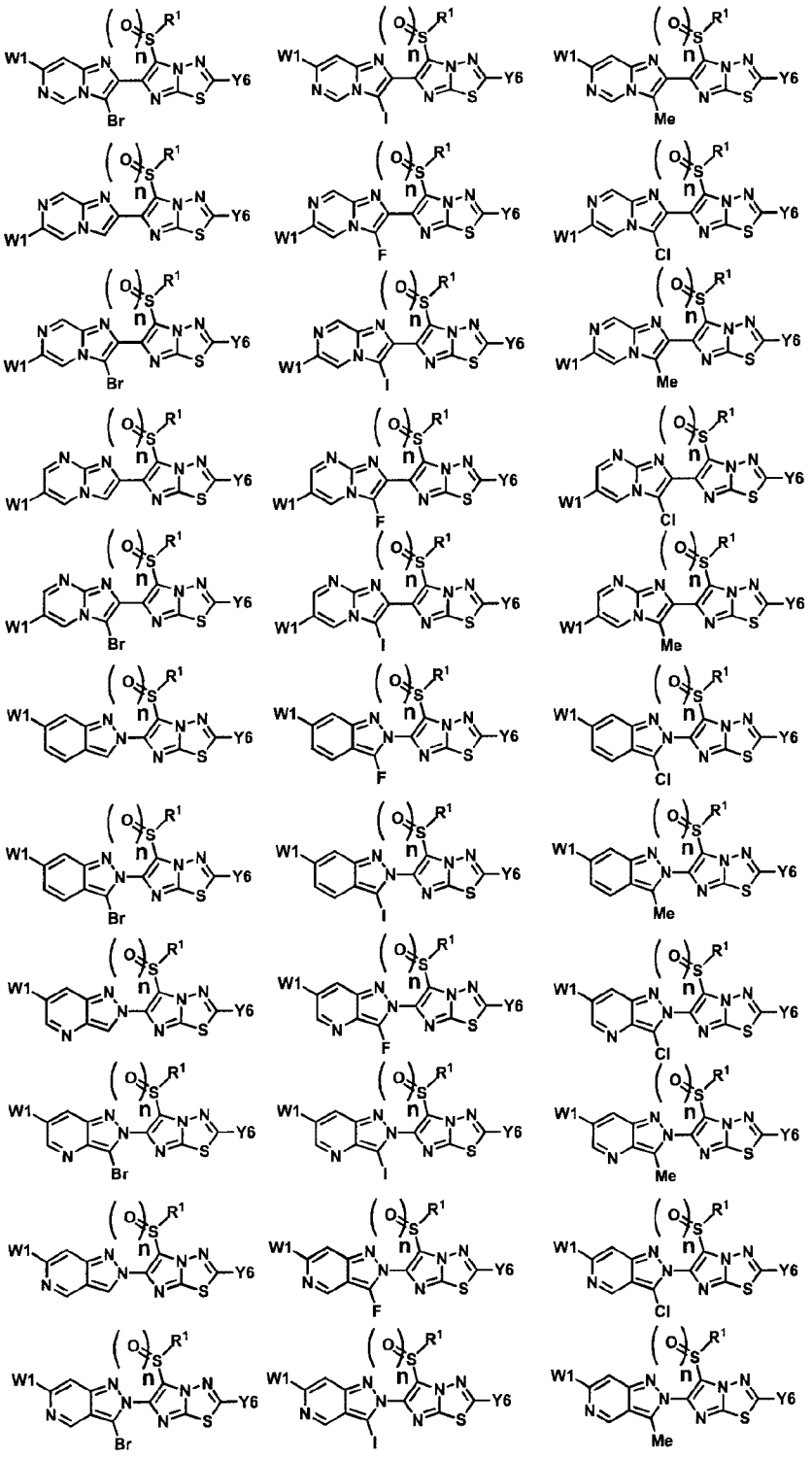
Table 3 (Continued)

| W1 | $R^1$ | Y5 | Y6 | n |
|---|---|---|---|---|
| $CF_3$ | Et | H | H | 0 |
| $CF_3$ | Et | H | H | 1 |
| $CF_3$ | Et | H | H | 2 |
| $CF_3$ | Et | H | F | 0 |
| $CF_3$ | Et | H | F | 1 |
| $CF_3$ | Et | H | F | 2 |
| $CF_3$ | Et | H | Cl | 0 |
| $CF_3$ | Et | H | Cl | 1 |
| $CF_3$ | Et | H | Cl | 2 |
| $CF_3$ | Et | H | Br | 0 |
| $CF_3$ | Et | H | Br | 1 |
| $CF_3$ | Et | H | Br | 2 |
| $CF_3$ | Et | H | I | 0 |
| $CF_3$ | Et | H | I | 1 |
| $CF_3$ | Et | H | I | 2 |
| $CF_3$ | Et | H | Me | 0 |
| $CF_3$ | Et | H | Me | 1 |
| $CF_3$ | Et | H | Me | 2 |
| $CF_3$ | Et | H | $CF_3$ | 0 |
| $CF_3$ | Et | H | $CF_3$ | 1 |
| $CF_3$ | Et | H | $CF_3$ | 2 |
| $CF_3$ | Et | H | $CF_2CF_3$ | 0 |
| $CF_3$ | Et | H | $CF_2CF_3$ | 1 |
| $CF_3$ | Et | H | $CF_2CF_3$ | 2 |
| $CF_3$ | Et | H | $CF(CF_3)_2$ | 0 |
| $CF_3$ | Et | H | $CF(CF_3)_2$ | 1 |
| $CF_3$ | Et | H | $CF(CF_3)_2$ | 2 |
| $CF_3$ | Et | H | SMe | 0 |
| $CF_3$ | Et | H | SMe | 1 |
| $CF_3$ | Et | H | SMe | 2 |
| $CF_3$ | Et | H | SOMe | 0 |
| $CF_3$ | Et | H | SOMe | 1 |
| $CF_3$ | Et | H | SOMe | 2 |
| $CF_3$ | Et | H | $SO_2Me$ | 0 |
| $CF_3$ | Et | H | $SO_2Me$ | 1 |
| $CF_3$ | Et | H | $SO_2Me$ | 2 |
| $CF_3$ | Et | H | OMe | 0 |
| $CF_3$ | Et | H | OMe | 1 |
| $CF_3$ | Et | H | OMe | 2 |
| $CF_3$ | Et | H | $OCF_3$ | 0 |
| $CF_3$ | Et | H | $OCF_3$ | 1 |
| $CF_3$ | Et | H | $OCF_3$ | 2 |
| $CF_3$ | Et | H | $NO_2$ | 0 |
| $CF_3$ | Et | H | $NO_2$ | 1 |
| $CF_3$ | Et | H | $NO_2$ | 2 |
| $CF_3$ | Et | H | CN | 0 |
| $CF_3$ | Et | H | CN | 1 |
| $CF_3$ | Et | H | CN | 2 |

| W1 | $R^1$ | Y5 | Y6 | n |
|---|---|---|---|---|
| $CF_2CF_3$ | Et | H | H | 0 |
| $CF_2CF_3$ | Et | H | H | 1 |
| $CF_2CF_3$ | Et | H | H | 2 |
| $CF_2CF_3$ | Et | H | F | 0 |
| $CF_2CF_3$ | Et | H | F | 1 |
| $CF_2CF_3$ | Et | H | F | 2 |
| $CF_2CF_3$ | Et | H | Cl | 0 |
| $CF_2CF_3$ | Et | H | Cl | 1 |
| $CF_2CF_3$ | Et | H | Cl | 2 |
| $CF_2CF_3$ | Et | H | Br | 0 |
| $CF_2CF_3$ | Et | H | Br | 1 |
| $CF_2CF_3$ | Et | H | Br | 2 |
| $CF_2CF_3$ | Et | H | I | 0 |
| $CF_2CF_3$ | Et | H | I | 1 |
| $CF_2CF_3$ | Et | H | I | 2 |
| $CF_2CF_3$ | Et | H | Me | 0 |
| $CF_2CF_3$ | Et | H | Me | 1 |
| $CF_2CF_3$ | Et | H | Me | 2 |
| $CF_2CF_3$ | Et | H | $CF_3$ | 0 |
| $CF_2CF_3$ | Et | H | $CF_3$ | 1 |
| $CF_2CF_3$ | Et | H | $CF_3$ | 2 |
| $CF_2CF_3$ | Et | H | $CF_2CF_3$ | 0 |
| $CF_2CF_3$ | Et | H | $CF_2CF_3$ | 1 |
| $CF_2CF_3$ | Et | H | $CF_2CF_3$ | 2 |
| $CF_2CF_3$ | Et | H | $CF(CF_3)_2$ | 0 |
| $CF_2CF_3$ | Et | H | $CF(CF_3)_2$ | 1 |
| $CF_2CF_3$ | Et | H | $CF(CF_3)_2$ | 2 |
| $CF_2CF_3$ | Et | H | SMe | 0 |
| $CF_2CF_3$ | Et | H | SMe | 1 |
| $CF_2CF_3$ | Et | H | SMe | 2 |
| $CF_2CF_3$ | Et | H | SOMe | 0 |
| $CF_2CF_3$ | Et | H | SOMe | 1 |
| $CF_2CF_3$ | Et | H | SOMe | 2 |
| $CF_2CF_3$ | Et | H | $SO_2Me$ | 0 |
| $CF_2CF_3$ | Et | H | $SO_2Me$ | 1 |
| $CF_2CF_3$ | Et | H | $SO_2Me$ | 2 |
| $CF_2CF_3$ | Et | H | OMe | 0 |
| $CF_2CF_3$ | Et | H | OMe | 1 |
| $CF_2CF_3$ | Et | H | OMe | 2 |
| $CF_2CF_3$ | Et | H | $OCF_3$ | 0 |
| $CF_2CF_3$ | Et | H | $OCF_3$ | 1 |
| $CF_2CF_3$ | Et | H | $OCF_3$ | 2 |
| $CF_2CF_3$ | Et | H | $NO_2$ | 0 |
| $CF_2CF_3$ | Et | H | $NO_2$ | 1 |
| $CF_2CF_3$ | Et | H | $NO_2$ | 2 |
| $CF_2CF_3$ | Et | H | CN | 0 |
| $CF_2CF_3$ | Et | H | CN | 1 |
| $CF_2CF_3$ | Et | H | CN | 2 |

Table 4





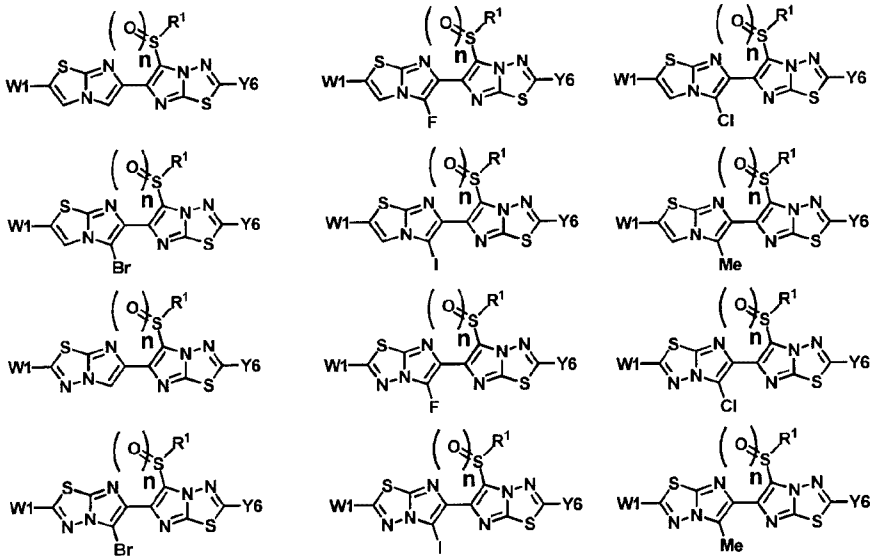
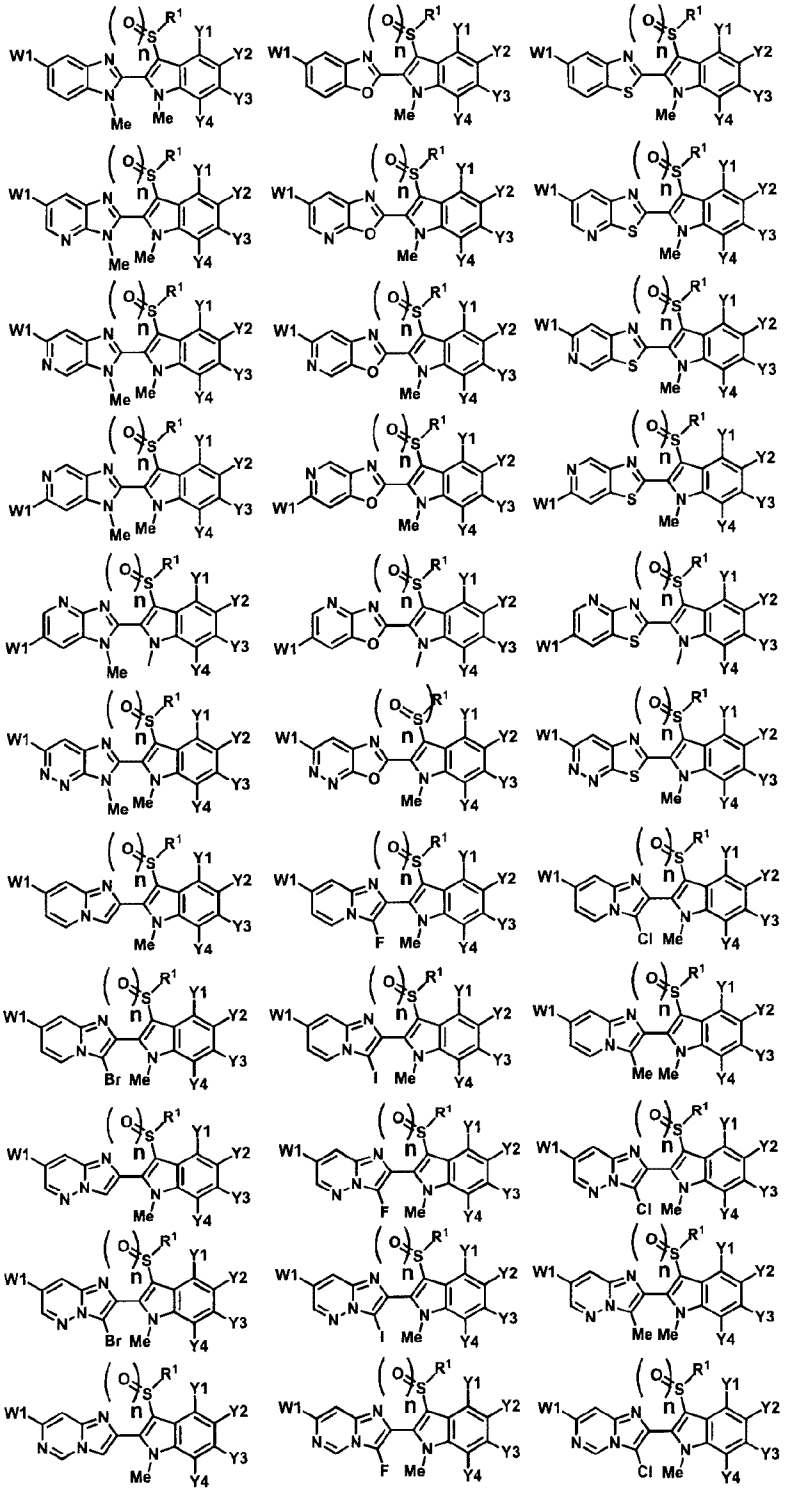


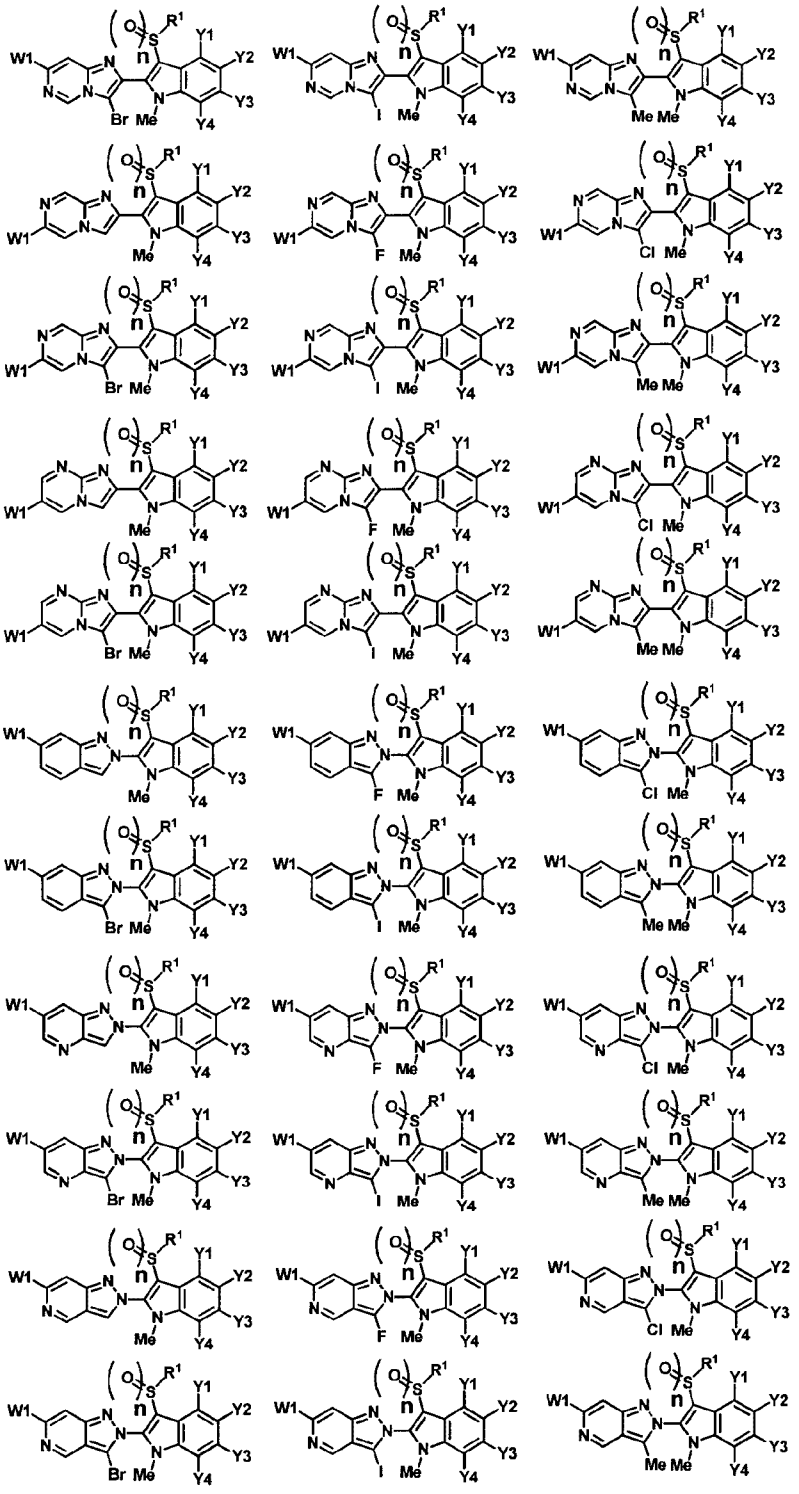
Table 4 (Continued)

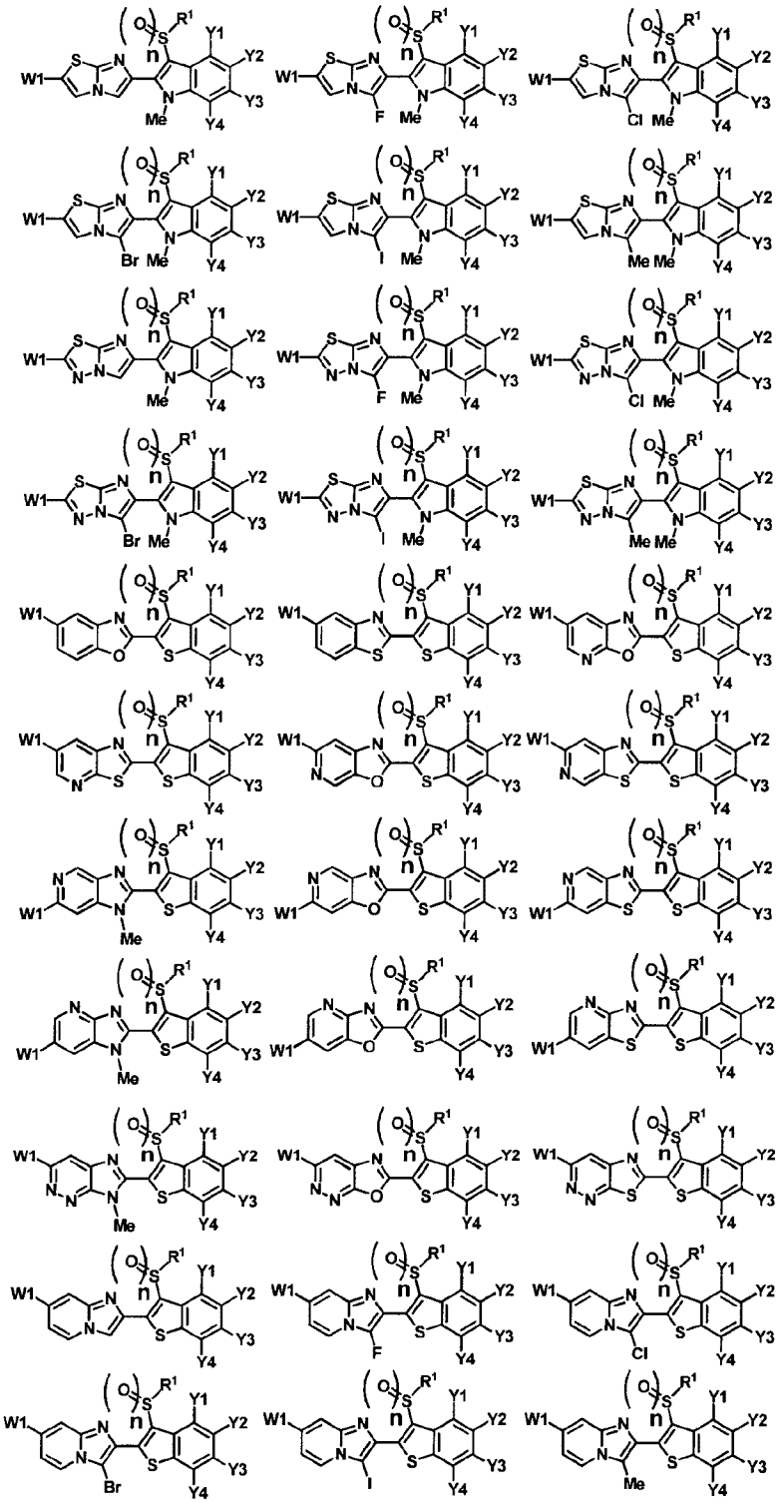
| W1 | $R^1$ | Y6 | n |
|---|---|---|---|
| $CF_3$ | Et | H | 0 |
| $CF_3$ | Et | H | 1 |
| $CF_3$ | Et | H | 2 |
| $CF_3$ | Et | F | 0 |
| $CF_3$ | Et | F | 1 |
| $CF_3$ | Et | F | 2 |
| $CF_3$ | Et | Cl | 0 |
| $CF_3$ | Et | Cl | 1 |
| $CF_3$ | Et | Cl | 2 |
| $CF_3$ | Et | Br | 0 |
| $CF_3$ | Et | Br | 1 |
| $CF_3$ | Et | Br | 2 |
| $CF_3$ | Et | I | 0 |
| $CF_3$ | Et | I | 1 |
| $CF_3$ | Et | I | 2 |
| $CF_3$ | Et | Me | 0 |
| $CF_3$ | Et | Me | 1 |
| $CF_3$ | Et | Me | 2 |
| $CF_3$ | Et | $CF_3$ | 0 |
| $CF_3$ | Et | $CF_3$ | 1 |
| $CF_3$ | Et | $CF_3$ | 2 |
| $CF_3$ | Et | $CF_2CF_3$ | 0 |
| $CF_3$ | Et | $CF_2CF_3$ | 1 |
| $CF_3$ | Et | $CF_2CF_3$ | 2 |
| $CF_3$ | Et | $CF(CF_3)_2$ | 0 |
| $CF_3$ | Et | $CF(CF_3)_2$ | 1 |
| $CF_3$ | Et | $CF(CF_3)_2$ | 2 |
| $CF_3$ | Et | SMe | 0 |
| $CF_3$ | Et | SMe | 1 |
| $CF_3$ | Et | SMe | 2 |
| $CF_3$ | Et | SOMe | 0 |
| $CF_3$ | Et | SOMe | 1 |
| $CF_3$ | Et | SOMe | 2 |
| $CF_3$ | Et | $SO_2Me$ | 0 |
| $CF_3$ | Et | $SO_2Me$ | 1 |
| $CF_3$ | Et | $SO_2Me$ | 2 |
| $CF_3$ | Et | OMe | 0 |
| $CF_3$ | Et | OMe | 1 |
| $CF_3$ | Et | OMe | 2 |
| $CF_3$ | Et | $OCF_3$ | 0 |
| $CF_3$ | Et | $OCF_3$ | 1 |
| $CF_3$ | Et | $OCF_3$ | 2 |
| $CF_3$ | Et | $NO_2$ | 0 |
| $CF_3$ | Et | $NO_2$ | 1 |
| $CF_3$ | Et | $NO_2$ | 2 |
| $CF_3$ | Et | CN | 0 |
| $CF_3$ | Et | CN | 1 |
| $CF_3$ | Et | CN | 2 |

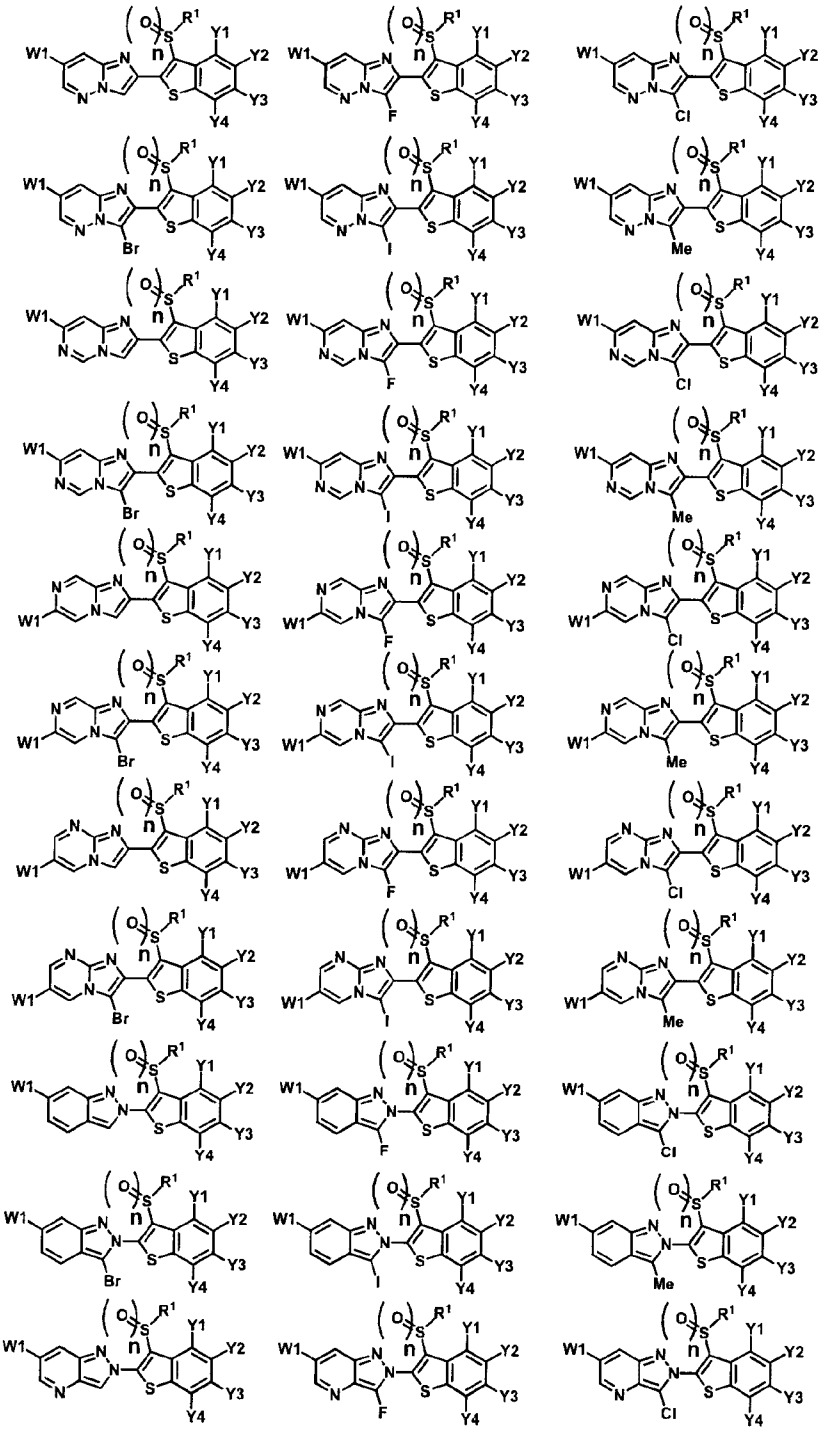
| W1 | $R^1$ | Y6 | n |
|---|---|---|---|
| $CF_2CF_3$ | Et | H | 0 |
| $CF_2CF_3$ | Et | H | 1 |
| $CF_2CF_3$ | Et | H | 2 |
| $CF_2CF_3$ | Et | F | 0 |
| $CF_2CF_3$ | Et | F | 1 |
| $CF_2CF_3$ | Et | F | 2 |
| $CF_2CF_3$ | Et | Cl | 0 |
| $CF_2CF_3$ | Et | Cl | 1 |
| $CF_2CF_3$ | Et | Cl | 2 |
| $CF_2CF_3$ | Et | Br | 0 |
| $CF_2CF_3$ | Et | Br | 1 |
| $CF_2CF_3$ | Et | Br | 2 |
| $CF_2CF_3$ | Et | I | 0 |
| $CF_2CF_3$ | Et | I | 1 |
| $CF_2CF_3$ | Et | I | 2 |
| $CF_2CF_3$ | Et | Me | 0 |
| $CF_2CF_3$ | Et | Me | 1 |
| $CF_2CF_3$ | Et | Me | 2 |
| $CF_2CF_3$ | Et | $CF_3$ | 0 |
| $CF_2CF_3$ | Et | $CF_3$ | 1 |
| $CF_2CF_3$ | Et | $CF_3$ | 2 |
| $CF_2CF_3$ | Et | $CF_2CF_3$ | 0 |
| $CF_2CF_3$ | Et | $CF_2CF_3$ | 1 |
| $CF_2CF_3$ | Et | $CF_2CF_3$ | 2 |
| $CF_2CF_3$ | Et | $CF(CF_3)_2$ | 0 |
| $CF_2CF_3$ | Et | $CF(CF_3)_2$ | 1 |
| $CF_2CF_3$ | Et | $CF(CF_3)_2$ | 2 |
| $CF_2CF_3$ | Et | SMe | 0 |
| $CF_2CF_3$ | Et | SMe | 1 |
| $CF_2CF_3$ | Et | SMe | 2 |
| $CF_2CF_3$ | Et | SOMe | 0 |
| $CF_2CF_3$ | Et | SOMe | 1 |
| $CF_2CF_3$ | Et | SOMe | 2 |
| $CF_2CF_3$ | Et | $SO_2Me$ | 0 |
| $CF_2CF_3$ | Et | $SO_2Me$ | 1 |
| $CF_2CF_3$ | Et | $SO_2Me$ | 2 |
| $CF_2CF_3$ | Et | OMe | 0 |
| $CF_2CF_3$ | Et | OMe | 1 |
| $CF_2CF_3$ | Et | OMe | 2 |
| $CF_2CF_3$ | Et | $OCF_3$ | 0 |
| $CF_2CF_3$ | Et | $OCF_3$ | 1 |
| $CF_2CF_3$ | Et | $OCF_3$ | 2 |
| $CF_2CF_3$ | Et | $NO_2$ | 0 |
| $CF_2CF_3$ | Et | $NO_2$ | 1 |
| $CF_2CF_3$ | Et | $NO_2$ | 2 |
| $CF_2CF_3$ | Et | CN | 0 |
| $CF_2CF_3$ | Et | CN | 1 |
| $CF_2CF_3$ | Et | CN | 2 |

Table 5









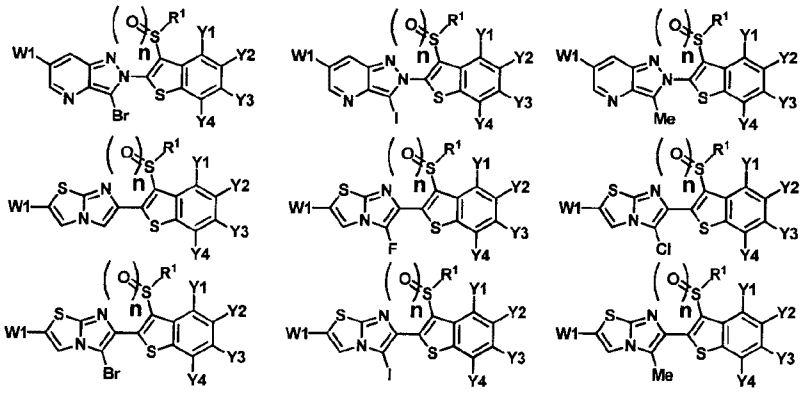


Table 4 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_3$ | Et | H | H | H | H | 0 |
| $CF_3$ | Et | H | H | H | H | 1 |
| $CF_3$ | Et | H | H | H | H | 2 |
| $CF_3$ | Et | F | H | H | H | 0 |
| $CF_3$ | Et | F | H | H | H | 1 |
| $CF_3$ | Et | F | H | H | H | 2 |
| $CF_3$ | Et | Cl | H | H | H | 0 |
| $CF_3$ | Et | Cl | H | H | H | 1 |
| $CF_3$ | Et | Cl | H | H | H | 2 |
| $CF_3$ | Et | Br | H | H | H | 0 |
| $CF_3$ | Et | Br | H | H | H | 1 |
| $CF_3$ | Et | Br | H | H | H | 2 |
| $CF_3$ | Et | I | H | H | H | 0 |
| $CF_3$ | Et | I | H | H | H | 1 |
| $CF_3$ | Et | I | H | H | H | 2 |
| $CF_3$ | Et | Me | H | H | H | 0 |
| $CF_3$ | Et | Me | H | H | H | 1 |
| $CF_3$ | Et | Me | H | H | H | 2 |
| $CF_3$ | Et | $CF_3$ | H | H | H | 0 |
| $CF_3$ | Et | $CF_3$ | H | H | H | 1 |
| $CF_3$ | Et | $CF_3$ | H | H | H | 2 |
| $CF_3$ | Et | H | F | H | H | 0 |
| $CF_3$ | Et | H | F | H | H | 1 |
| $CF_3$ | Et | H | F | H | H | 2 |
| $CF_3$ | Et | H | Cl | H | H | 0 |
| $CF_3$ | Et | H | Cl | H | H | 1 |
| $CF_3$ | Et | H | Cl | H | H | 2 |
| $CF_3$ | Et | H | Br | H | H | 0 |
| $CF_3$ | Et | H | Br | H | H | 1 |
| $CF_3$ | Et | H | Br | H | H | 2 |
| $CF_3$ | Et | H | I | H | H | 0 |
| $CF_3$ | Et | H | I | H | H | 1 |
| $CF_3$ | Et | H | I | H | H | 2 |
| $CF_3$ | Et | H | Me | H | H | 0 |
| $CF_3$ | Et | H | Me | H | H | 1 |
| $CF_3$ | Et | H | Me | H | H | 2 |
| $CF_3$ | Et | H | $CF_3$ | H | H | 0 |
| $CF_3$ | Et | H | $CF_3$ | H | H | 1 |
| $CF_3$ | Et | H | $CF_3$ | H | H | 2 |
| $CF_3$ | Et | H | $CF_2CF_3$ | H | H | 0 |
| $CF_3$ | Et | H | $CF_2CF_3$ | H | H | 1 |
| $CF_3$ | Et | H | $CF_2CF_3$ | H | H | 2 |
| $CF_3$ | Et | H | $CF(CF_3)_2$ | H | H | 0 |
| $CF_3$ | Et | H | $CF(CF_3)_2$ | H | H | 1 |
| $CF_3$ | Et | H | $CF(CF_3)_2$ | H | H | 2 |
| $CF_3$ | Et | H | SMe | H | H | 0 |
| $CF_3$ | Et | H | SMe | H | H | 1 |
| $CF_3$ | Et | H | SMe | H | H | 2 |
| $CF_3$ | Et | H | SOMe | H | H | 0 |
| $CF_3$ | Et | H | SOMe | H | H | 1 |
| $CF_3$ | Et | H | SOMe | H | H | 2 |
| $CF_3$ | Et | H | $SO_2Me$ | H | H | 0 |
| $CF_3$ | Et | H | $SO_2Me$ | H | H | 1 |
| $CF_3$ | Et | H | $SO_2Me$ | H | H | 2 |
| $CF_3$ | Et | H | OMe | H | H | 0 |
| $CF_3$ | Et | H | OMe | H | H | 1 |
| $CF_3$ | Et | H | OMe | H | H | 2 |
| $CF_3$ | Et | H | $OCF_3$ | H | H | 0 |
| $CF_3$ | Et | H | $OCF_3$ | H | H | 1 |
| $CF_3$ | Et | H | $OCF_3$ | H | H | 2 |
| $CF_3$ | Et | H | $NO_2$ | H | H | 0 |

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_3$ | Et | H | $NO_2$ | H | H | 1 |
| $CF_3$ | Et | H | $NO_2$ | H | H | 2 |
| $CF_3$ | Et | H | CN | H | H | 0 |
| $CF_3$ | Et | H | CN | H | H | 1 |
| $CF_3$ | Et | H | CN | H | H | 2 |
| $CF_3$ | Et | H | H | F | H | 0 |
| $CF_3$ | Et | H | H | F | H | 1 |
| $CF_3$ | Et | H | H | F | H | 2 |
| $CF_3$ | Et | H | H | Cl | H | 0 |
| $CF_3$ | Et | H | H | Cl | H | 1 |
| $CF_3$ | Et | H | H | Cl | H | 2 |
| $CF_3$ | Et | H | H | Br | H | 0 |
| $CF_3$ | Et | H | H | Br | H | 1 |
| $CF_3$ | Et | H | H | Br | H | 2 |
| $CF_3$ | Et | H | H | I | H | 0 |
| $CF_3$ | Et | H | H | I | H | 1 |
| $CF_3$ | Et | H | H | I | H | 2 |
| $CF_3$ | Et | H | H | Me | H | 0 |
| $CF_3$ | Et | H | H | Me | H | 1 |
| $CF_3$ | Et | H | H | Me | H | 2 |
| $CF_3$ | Et | H | H | $CF_3$ | H | 0 |
| $CF_3$ | Et | H | H | $CF_3$ | H | 1 |
| $CF_3$ | Et | H | H | $CF_3$ | H | 2 |
| $CF_3$ | Et | H | H | $CF_2CF_3$ | H | 0 |
| $CF_3$ | Et | H | H | $CF_2CF_3$ | H | 1 |
| $CF_3$ | Et | H | H | $CF_2CF_3$ | H | 2 |
| $CF_3$ | Et | H | H | $CF(CF_3)_2$ | H | 0 |
| $CF_3$ | Et | H | H | $CF(CF_3)_2$ | H | 1 |
| $CF_3$ | Et | H | H | $CF(CF_3)_2$ | H | 2 |
| $CF_3$ | Et | H | H | SMe | H | 0 |
| $CF_3$ | Et | H | H | SMe | H | 1 |
| $CF_3$ | Et | H | H | SMe | H | 2 |
| $CF_3$ | Et | H | H | SOMe | H | 0 |
| $CF_3$ | Et | H | H | SOMe | H | 1 |
| $CF_3$ | Et | H | H | SOMe | H | 2 |
| $CF_3$ | Et | H | H | $SO_2Me$ | H | 0 |
| $CF_3$ | Et | H | H | $SO_2Me$ | H | 1 |
| $CF_3$ | Et | H | H | $SO_2Me$ | H | 2 |
| $CF_3$ | Et | H | H | OMe | H | 0 |
| $CF_3$ | Et | H | H | OMe | H | 1 |
| $CF_3$ | Et | H | H | OMe | H | 2 |
| $CF_3$ | Et | H | H | $OCF_3$ | H | 0 |
| $CF_3$ | Et | H | H | $OCF_3$ | H | 1 |
| $CF_3$ | Et | H | H | $OCF_3$ | H | 2 |
| $CF_3$ | Et | H | H | $NO_2$ | H | 0 |
| $CF_3$ | Et | H | H | $NO_2$ | H | 1 |
| $CF_3$ | Et | H | H | $NO_2$ | H | 2 |
| $CF_3$ | Et | H | H | CN | H | 0 |
| $CF_3$ | Et | H | H | CN | H | 1 |
| $CF_3$ | Et | H | H | CN | H | 2 |
| $CF_3$ | Et | H | H | H | F | 0 |
| $CF_3$ | Et | H | H | H | F | 1 |
| $CF_3$ | Et | H | H | H | F | 2 |
| $CF_3$ | Et | H | H | H | Cl | 0 |
| $CF_3$ | Et | H | H | H | Cl | 1 |
| $CF_3$ | Et | H | H | H | Cl | 2 |
| $CF_3$ | Et | H | H | H | Br | 0 |
| $CF_3$ | Et | H | H | H | Br | 1 |
| $CF_3$ | Et | H | H | H | Br | 2 |
| $CF_3$ | Et | H | H | H | I | 0 |
| $CF_3$ | Et | H | H | H | I | 1 |

Table 5 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_3$ | Et | H | H | H | I | 2 |
| $CF_3$ | Et | H | H | H | Me | 0 |
| $CF_3$ | Et | H | H | H | Me | 1 |
| $CF_3$ | Et | H | H | H | Me | 2 |
| $CF_3$ | Et | H | H | H | $CF_3$ | 0 |
| $CF_3$ | Et | H | H | H | $CF_3$ | 1 |
| $CF_3$ | Et | H | H | H | $CF_3$ | 2 |
| $CF_3$ | Et | H | H | H | $CF_2CF_3$ | 0 |
| $CF_3$ | Et | H | H | H | $CF_2CF_3$ | 1 |
| $CF_3$ | Et | H | H | H | $CF_2CF_3$ | 2 |
| $CF_3$ | Et | H | H | H | $CF(CF_3)_2$ | 0 |
| $CF_3$ | Et | H | H | H | $CF(CF_3)_2$ | 1 |
| $CF_3$ | Et | H | H | H | $CF(CF_3)_2$ | 2 |
| $CF_3$ | Et | H | H | H | SMe | 0 |
| $CF_3$ | Et | H | H | H | SMe | 1 |
| $CF_3$ | Et | H | H | H | SMe | 2 |
| $CF_3$ | Et | H | H | H | SOMe | 0 |
| $CF_3$ | Et | H | H | H | SOMe | 1 |
| $CF_3$ | Et | H | H | H | SOMe | 2 |
| $CF_3$ | Et | H | H | H | $SO_2Me$ | 0 |
| $CF_3$ | Et | H | H | H | $SO_2Me$ | 1 |
| $CF_3$ | Et | H | H | H | $SO_2Me$ | 2 |
| $CF_3$ | Et | H | H | H | OMe | 0 |
| $CF_3$ | Et | H | H | H | OMe | 1 |
| $CF_3$ | Et | H | H | H | OMe | 2 |
| $CF_3$ | Et | H | H | H | $OCF_3$ | 0 |
| $CF_3$ | Et | H | H | H | $OCF_3$ | 1 |
| $CF_3$ | Et | H | H | H | $OCF_3$ | 2 |
| $CF_3$ | Et | H | H | H | $NO_2$ | 0 |
| $CF_3$ | Et | H | H | H | $NO_2$ | 1 |
| $CF_3$ | Et | H | H | H | $NO_2$ | 2 |
| $CF_3$ | Et | H | H | H | CN | 0 |
| $CF_3$ | Et | H | H | H | CN | 1 |
| $CF_3$ | Et | H | H | H | CN | 2 |

Table 5 (Continued)

| W1 | $R^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_2CF_3$ | Et | H | H | H | H | 0 |
| $CF_2CF_3$ | Et | H | H | H | H | 1 |
| $CF_2CF_3$ | Et | H | H | H | H | 2 |
| $CF_2CF_3$ | Et | F | H | H | H | 0 |
| $CF_2CF_3$ | Et | F | H | H | H | 1 |
| $CF_2CF_3$ | Et | F | H | H | H | 2 |
| $CF_2CF_3$ | Et | Cl | H | H | H | 0 |
| $CF_2CF_3$ | Et | Cl | H | H | H | 1 |
| $CF_2CF_3$ | Et | Cl | H | H | H | 2 |
| $CF_2CF_3$ | Et | Br | H | H | H | 0 |
| $CF_2CF_3$ | Et | Br | H | H | H | 1 |
| $CF_2CF_3$ | Et | Br | H | H | H | 2 |
| $CF_2CF_3$ | Et | I | H | H | H | 0 |
| $CF_2CF_3$ | Et | I | H | H | H | 1 |
| $CF_2CF_3$ | Et | I | H | H | H | 2 |
| $CF_2CF_3$ | Et | Me | H | H | H | 0 |
| $CF_2CF_3$ | Et | Me | H | H | H | 1 |
| $CF_2CF_3$ | Et | Me | H | H | H | 2 |
| $CF_2CF_3$ | Et | $CF_3$ | H | H | H | 0 |
| $CF_2CF_3$ | Et | $CF_3$ | H | H | H | 1 |
| $CF_2CF_3$ | Et | $CF_3$ | H | H | H | 2 |
| $CF_2CF_3$ | Et | H | F | H | H | 0 |
| $CF_2CF_3$ | Et | H | F | H | H | 1 |
| $CF_2CF_3$ | Et | H | F | H | H | 2 |
| $CF_2CF_3$ | Et | H | Cl | H | H | 0 |
| $CF_2CF_3$ | Et | H | Cl | H | H | 1 |
| $CF_2CF_3$ | Et | H | Cl | H | H | 2 |
| $CF_2CF_3$ | Et | H | Br | H | H | 0 |
| $CF_2CF_3$ | Et | H | Br | H | H | 1 |
| $CF_2CF_3$ | Et | H | Br | H | H | 2 |
| $CF_2CF_3$ | Et | H | I | H | H | 0 |
| $CF_2CF_3$ | Et | H | I | H | H | 1 |
| $CF_2CF_3$ | Et | H | I | H | H | 2 |
| $CF_2CF_3$ | Et | H | Me | H | H | 0 |
| $CF_2CF_3$ | Et | H | Me | H | H | 1 |
| $CF_2CF_3$ | Et | H | Me | H | H | 2 |
| $CF_2CF_3$ | Et | H | $CF_3$ | H | H | 0 |
| $CF_2CF_3$ | Et | H | $CF_3$ | H | H | 1 |
| $CF_2CF_3$ | Et | H | $CF_3$ | H | H | 2 |
| $CF_2CF_3$ | Et | H | $CF_2CF_3$ | H | H | 0 |
| $CF_2CF_3$ | Et | H | $CF_2CF_3$ | H | H | 1 |
| $CF_2CF_3$ | Et | H | $CF_2CF_3$ | H | H | 2 |
| $CF_2CF_3$ | Et | H | $CF(CF_3)_2$ | H | H | 0 |
| $CF_2CF_3$ | Et | H | $CF(CF_3)_2$ | H | H | 1 |
| $CF_2CF_3$ | Et | H | $CF(CF_3)_2$ | H | H | 2 |
| $CF_2CF_3$ | Et | H | SMe | H | H | 0 |
| $CF_2CF_3$ | Et | H | SMe | H | H | 1 |
| $CF_2CF_3$ | Et | H | SMe | H | H | 2 |
| $CF_2CF_3$ | Et | H | SOMe | H | H | 0 |
| $CF_2CF_3$ | Et | H | SOMe | H | H | 1 |
| $CF_2CF_3$ | Et | H | SOMe | H | H | 2 |
| $CF_2CF_3$ | Et | H | $SO_2Me$ | H | H | 0 |
| $CF_2CF_3$ | Et | H | $SO_2Me$ | H | H | 1 |
| $CF_2CF_3$ | Et | H | $SO_2Me$ | H | H | 2 |
| $CF_2CF_3$ | Et | H | OMe | H | H | 0 |
| $CF_2CF_3$ | Et | H | OMe | H | H | 1 |
| $CF_2CF_3$ | Et | H | OMe | H | H | 2 |
| $CF_2CF_3$ | Et | H | $OCF_3$ | H | H | 0 |
| $CF_2CF_3$ | Et | H | $OCF_3$ | H | H | 1 |
| $CF_2CF_3$ | Et | H | $OCF_3$ | H | H | 2 |
| $CF_2CF_3$ | Et | H | $NO_2$ | H | H | 0 |

Table 5 (Continued)

| W1 | R$^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_2CF_3$ | Et | H | $NO_2$ | H | H | 1 |
| $CF_2CF_3$ | Et | H | $NO_2$ | H | H | 2 |
| $CF_2CF_3$ | Et | H | CN | H | H | 0 |
| $CF_2CF_3$ | Et | H | CN | H | H | 1 |
| $CF_2CF_3$ | Et | H | CN | H | H | 2 |
| $CF_2CF_3$ | Et | H | H | F | H | 0 |
| $CF_2CF_3$ | Et | H | H | F | H | 1 |
| $CF_2CF_3$ | Et | H | H | F | H | 2 |
| $CF_2CF_3$ | Et | H | H | Cl | H | 0 |
| $CF_2CF_3$ | Et | H | H | Cl | H | 1 |
| $CF_2CF_3$ | Et | H | H | Cl | H | 2 |
| $CF_2CF_3$ | Et | H | H | Br | H | 0 |
| $CF_2CF_3$ | Et | H | H | Br | H | 1 |
| $CF_2CF_3$ | Et | H | H | Br | H | 2 |
| $CF_2CF_3$ | Et | H | H | I | H | 0 |
| $CF_2CF_3$ | Et | H | H | I | H | 1 |
| $CF_2CF_3$ | Et | H | H | I | H | 2 |
| $CF_2CF_3$ | Et | H | H | Me | H | 0 |
| $CF_2CF_3$ | Et | H | H | Me | H | 1 |
| $CF_2CF_3$ | Et | H | H | Me | H | 2 |
| $CF_2CF_3$ | Et | H | H | $CF_3$ | H | 0 |
| $CF_2CF_3$ | Et | H | H | $CF_3$ | H | 1 |
| $CF_2CF_3$ | Et | H | H | $CF_3$ | H | 2 |
| $CF_2CF_3$ | Et | H | H | $CF_2CF_3$ | H | 0 |
| $CF_2CF_3$ | Et | H | H | $CF_2CF_3$ | H | 1 |
| $CF_2CF_3$ | Et | H | H | $CF_2CF_3$ | H | 2 |
| $CF_2CF_3$ | Et | H | H | $CF(CF_3)_2$ | H | 0 |
| $CF_2CF_3$ | Et | H | H | $CF(CF_3)_2$ | H | 1 |
| $CF_2CF_3$ | Et | H | H | $CF(CF_3)_2$ | H | 2 |
| $CF_2CF_3$ | Et | H | H | SMe | H | 0 |
| $CF_2CF_3$ | Et | H | H | SMe | H | 1 |
| $CF_2CF_3$ | Et | H | H | SMe | H | 2 |
| $CF_2CF_3$ | Et | H | H | SOMe | H | 0 |
| $CF_2CF_3$ | Et | H | H | SOMe | H | 1 |
| $CF_2CF_3$ | Et | H | H | SOMe | H | 2 |
| $CF_2CF_3$ | Et | H | H | $SO_2Me$ | H | 0 |
| $CF_2CF_3$ | Et | H | H | $SO_2Me$ | H | 1 |
| $CF_2CF_3$ | Et | H | H | $SO_2Me$ | H | 2 |
| $CF_2CF_3$ | Et | H | H | OMe | H | 0 |
| $CF_2CF_3$ | Et | H | H | OMe | H | 1 |
| $CF_2CF_3$ | Et | H | H | OMe | H | 2 |
| $CF_2CF_3$ | Et | H | H | $OCF_3$ | H | 0 |
| $CF_2CF_3$ | Et | H | H | $OCF_3$ | H | 1 |
| $CF_2CF_3$ | Et | H | H | $OCF_3$ | H | 2 |
| $CF_2CF_3$ | Et | H | H | $NO_2$ | H | 0 |
| $CF_2CF_3$ | Et | H | H | $NO_2$ | H | 1 |
| $CF_2CF_3$ | Et | H | H | $NO_2$ | H | 2 |
| $CF_2CF_3$ | Et | H | H | CN | H | 0 |
| $CF_2CF_3$ | Et | H | H | CN | H | 1 |
| $CF_2CF_3$ | Et | H | H | CN | H | 2 |
| $CF_2CF_3$ | Et | H | H | H | F | 0 |
| $CF_2CF_3$ | Et | H | H | H | F | 1 |
| $CF_2CF_3$ | Et | H | H | H | F | 2 |
| $CF_2CF_3$ | Et | H | H | H | Cl | 0 |
| $CF_2CF_3$ | Et | H | H | H | Cl | 1 |
| $CF_2CF_3$ | Et | H | H | H | Cl | 2 |
| $CF_2CF_3$ | Et | H | H | H | Br | 0 |
| $CF_2CF_3$ | Et | H | H | H | Br | 1 |
| $CF_2CF_3$ | Et | H | H | H | Br | 2 |
| $CF_2CF_3$ | Et | H | H | H | I | 0 |
| $CF_2CF_3$ | Et | H | H | H | I | 1 |

Table 5 (Continued)

| W1 | R$^1$ | Y1 | Y2 | Y3 | Y4 | n |
|---|---|---|---|---|---|---|
| $CF_2CF_3$ | Et | H | H | H | I | 2 |
| $CF_2CF_3$ | Et | H | H | H | Me | 0 |
| $CF_2CF_3$ | Et | H | H | H | Me | 1 |
| $CF_2CF_3$ | Et | H | H | H | Me | 2 |
| $CF_2CF_3$ | Et | H | H | H | $CF_3$ | 0 |
| $CF_2CF_3$ | Et | H | H | H | $CF_3$ | 1 |
| $CF_2CF_3$ | Et | H | H | H | $CF_3$ | 2 |
| $CF_2CF_3$ | Et | H | H | H | $CF_2CF_3$ | 0 |
| $CF_2CF_3$ | Et | H | H | H | $CF_2CF_3$ | 1 |
| $CF_2CF_3$ | Et | H | H | H | $CF_2CF_3$ | 2 |
| $CF_2CF_3$ | Et | H | H | H | $CF(CF_3)_2$ | 0 |
| $CF_2CF_3$ | Et | H | H | H | $CF(CF_3)_2$ | 1 |
| $CF_2CF_3$ | Et | H | H | H | $CF(CF_3)_2$ | 2 |
| $CF_2CF_3$ | Et | H | H | H | SMe | 0 |
| $CF_2CF_3$ | Et | H | H | H | SMe | 1 |
| $CF_2CF_3$ | Et | H | H | H | SMe | 2 |
| $CF_2CF_3$ | Et | H | H | H | SOMe | 0 |
| $CF_2CF_3$ | Et | H | H | H | SOMe | 1 |
| $CF_2CF_3$ | Et | H | H | H | SOMe | 2 |
| $CF_2CF_3$ | Et | H | H | H | $SO_2Me$ | 0 |
| $CF_2CF_3$ | Et | H | H | H | $SO_2Me$ | 1 |
| $CF_2CF_3$ | Et | H | H | H | $SO_2Me$ | 2 |
| $CF_2CF_3$ | Et | H | H | H | OMe | 0 |
| $CF_2CF_3$ | Et | H | H | H | OMe | 1 |
| $CF_2CF_3$ | Et | H | H | H | OMe | 2 |
| $CF_2CF_3$ | Et | H | H | H | $OCF_3$ | 0 |
| $CF_2CF_3$ | Et | H | H | H | $OCF_3$ | 1 |
| $CF_2CF_3$ | Et | H | H | H | $OCF_3$ | 2 |
| $CF_2CF_3$ | Et | H | H | H | $NO_2$ | 0 |
| $CF_2CF_3$ | Et | H | H | H | $NO_2$ | 1 |
| $CF_2CF_3$ | Et | H | H | H | $NO_2$ | 2 |
| $CF_2CF_3$ | Et | H | H | H | CN | 0 |
| $CF_2CF_3$ | Et | H | H | H | CN | 1 |
| $CF_2CF_3$ | Et | H | H | H | CN | 2 |

The pesticides herein mean pesticides for controlling harmful arthropods in agricultural fields or in zootechnical/hygienic fields (internal/external parasites in or on mammals and birds as livestock and pets, and domestic or industrial hygienic insects/nuisance insects). Further, the agricultural chemicals herein mean insecticides/acaricides, nematicides, herbicides and fungicides in agricultural fields.

The insects, mites, crustaceans, mollusks and nematodes that the compounds of the present invention can control specifically include the following organisms, but the present invention is not restricted thereto.

Insects of the order Lepidoptera such as Adoxophyes honmai, Adoxophyes orana faciata, Archips breviplicanus, Archips fuscocupreanus, Grapholita molesta, Homona magnanima, Leguminivora glycinivorella, Matsumuraeses phaseoli, Pandemis heparana, Bucculatrix pyrivorella, Lyonetia clerkella, Lyonetia prunifoliella malinella, Caloptilia theivora, Phyllonorycter ringoniella, Phyllocnistis citrella, Acrolepiopsis sapporensis, Acrolepiopsis suzukiella, Plutella xylostella, Stathmopoda masinissa, Helcystogramma triannulella, Pectinophora gossypiella, Carposina sasakii, Cydla pomonella, Chilo suppressalis, Cnaphalocrocis medinalis, Conogethes punctiferalis, Diaphania indica, Etiella zinckenella, Glyphodes pyloalis, Hellula undalis, Ostrinia furnacalis, Ostrinia scapulalis, Ostrinia nubilalis, Parapediasia teterrella, Parnara guttata, Pieris brassicae, Pieris rapae crucivora, Ascotis selenaria, Pseudoplusia includens, Euproctis pseudoconspersa, Lymantria dispar, Orgyia thyellina, Hyphantria cunea, Lemyra imparilis, Adris tyrannus, Aedia leucomelas, Agrotis ipsilon, Agrotis segetum, Autographa nigrisigna, Ctenoplusia agnata, Helicoverpa armigera, Helicoverpa assulta, Helicoverpa zea, Heliothis virescens, Mamestra brassicae, Mythimna separata, Naranga aenescens, Spodoptera eridania, Spodoptera exigua, Spodoptera frugiperda, Spodoptera littoralis, Spodoptera litura, Spodoptera depravata, Trichoplusia ni, Endopiza viteana, Manduca quinquemaculata and Manduca sexta.

Insects of the order Thysanoptera such as Frankliniella intonsa, Frankliniella occidentalis, Heliothrips haemorrhoidalis, Scirtothrips dorsalis, Thrips palmi, Thrips tabaci and Ponticulothrips diospyrosi.

Insects of the order Hemiptera such as Dolycoris baccarum, Eurydema rugosum, Eysarcoris aeneus, Eysarcoris lewisi, Eysarcoris ventralis, Glaucias subpunctatus, Halyomorpha halys, Nezara antennata, Nezara viridula, Piezodorus hybneri, Plautia

crossota, Scotinophora lurida, Cletus punctiger, Leptocorisa chinensis, Riptortus clavatus, Rhopalus msculatus, Cavelerius saccharivorus, Togo hemipterus, Dysdercus cingulatus, Stephanitis pyrioides, Halticus insularis, Lygus lineolaris, Stenodema sibiricum, Stenotus rubrovittatus, Trigonotylus caelestialium, Arboridia apicalis, Balclutha saltuella, Epiacanthus stramineus, Empoasca fabae, Empoasca nipponica, Empoasca onukii, Empoasca sakaii, Macrosteles striifrons, Nephotettix cinctinceps, Psuedatomoscelis seriatus, Laodelphax striatella, Nilaparvata lugens, Sogatella furcifera, Diaphorina citri, Psylla pyrisuga, Aleurocanthus spiniferus, Bemisia argentifolii, Bemisia tabaci, Dialeurodes citri, Trialeurodes vaporariorum, Viteus vitifolii, Aphis gossypii, Aphis spiraecola, Myzus persicae, Toxoptera aurantii, Drosicha corpulenta, Icerya purchasi, Phenacoccus solani, Planococcus citri, Planococcus kuraunhiae, Pseudococcus comstocki, Ceroplastes ceriferus, Ceroplastes rubens, Aonidiella aurantii, Comstockaspis perniciosa, Fiorinia theae, Pseudaonidia paeoniae, Pseudaulacaspis pentagona, Pseudaulacaspis prunicola, Unaspis euonymi, Unaspis yanonensis and Cimex lectularius.

Insects of the order Coleoptera such as Anomala cuprea, Anomala rufocuprea, Gametis jucunda, Heptophylla picea, Popillia japonica, Lepinotarsa decemlineata, Melanotus fortnumi, Melanotus tamsuyensis, Lasioderma serricorne, Epuraea domina, Epilachna varivestis, Epilachna vigintioctopunctata, Tenebrio molitor, Tribolium castaneum, Anoplophora malasiaca, Monochamus alternatus, Psacothea hilaris, Xylotrechus pyrrhoderus, Callosobruchus chinensis, Aulacophora femoralis, Chaetocnema concinna, Diabrotica undecimpunctata, Diabrotica virgifera, Diabrotica barberi, Oulema oryzae, Phyllotreta striolata, Psylliodes angusticollis, Rhynchites heros, Cylas formicarius, Anthonomus grandis, Echinocnemus squameus, Euscepes postfasciatus, Hypera postica, Lissohoptrus oryzophilus, Otiorhynchus sulcatus, Sitophilus granarius, Sitophilus zeamais, Sphenophorus venatus vestitus and Paederus fuscipes.

Insects of the order Diptera such as Asphondylia yushimai, Sitodiplosis mosellana, Bactrocera cucurbitae, Bactrocera dorsalis, Ceratitis capitata, Hydrellia griseola, Drosophila suzukii, Agromyza oryzae, Chromatomyia horticola, Liriomyza bryoniae, Liriomyza chinensis, Liriomyza sativae, Liriomyza trifolii, Delia platura, Pegomya cunicularia, Rhagoletis pomonella, Mayetiola destructor, Musca domestica, Stomoxys

calcitrans, Melophagus ovinus, Hypoderma bovis, Hypoderma lineatum, Oestrus ovis, Glossina palpalis, Glossina morsitans, Prosimulium yezoensis, Tabanus trigonus, Telmatoscopus albipunctatus, Leptoconops nipponensis, Culex pipiens pallens, Aedes aegypti, Aedes albopicutus and Anopheles hyracanus sinesis.

Insects of the order Hymenoptera such as Apethymus kuri, Athalia rosae, Arge pagana, Neodiprion sertifer, Dryocosmus kuriphilus, Eciton burchelli, Eciton schmitti, Camponotus japonicus, Vespa mandarina, Myrmecia spp., Solenopsis spp. and Monomorium pharaonis.

Insects of the order Orthoptera such as Teleogryllus emma, Gryllotalpa orientalis, Locusta migratoria, Oxya yezoensis and Schistocerca gregaria.

Insects of the order Collembola such as Onychiurus folsomi, Onychiurus sibiricus and Bourletiella hortensis.

Insects of the order Dictyoptera such as Periplaneta fuliginosa, Periplaneta japonica and Blattella germanica.

Insects of the order Isoptera such as Coptotermes formosanus, Reticulitermes speratus and Odontotermes formosanus.

Insects of the order Siphonaptera such as Ctenocephalidae felis, Ctenocephalides canis, Echidnophaga gallinacea, Pulex irritans and Xenopsylla cheopis.

Insects of the order Mallophaga such as Menacanthus stramineus and Bovicola bovis.

Insects of the order Anoplura such as Haematopinus eurysternus, Haematopinus suis, Linognathus vituli and Solenopotes capillatus.

Tarsonemidae mites such as Phytonemus pallidus, Polyphagotarsonemus latus and Tarsonemus bilobatus.

Eupodidae mites such as Penthaleus erythrocephalus and Penthaleus major.

Tetranychidae mites such as Oligonychus shinkajii, Panonychus citri, Panonychus mori, Panonychus ulmi, Tetranychus kanzawai and Tetranychus urticae.

Eriophyidae mites such as Acaphylla theavagrans, Aceria tulipae, Aculops lycopersici, Aculops pelekassi, Aculus schlechtendali, Eriophyes chibaensis and Phyllocoptruta oleivora.

Acaridae mites such as Rhizoglyphus robini, Tyrophagus putrescentiae and Tyrophagus similis.

Bee mites such as Varroa jacobsoni.

Ticks such as Boophilus microplus, Rhipicephalus sanguineus, Haemaphysalis longicornis, Haemophysalis flava, Haemophysalis campanulata, Ixodes ovatus, Ixodes persulcatus, Amblyomma spp.and Dermacentor spp.

Mites of the suborder Mesostigmata such as red mite (Dermanyssus gallinae), tropical rat mite (Ornithonyssus bacoti) and northern fowl mite (Ornithonyssus sylviarum).

Cheyletidae mites such as Cheyletiella yasguri and Cheyletiella blakei.

Demodicidae mites such as Demodex canis and Demodex cati.

Psoroptidae mites such as Psoroptes ovis.

Sarcoptidae mites such as Sarcoptes scabiei, Notoedres cati and Knemidocoptes spp.

Crustaceans such as Armadillidium vulgare.

Gastropods such as Pomacea canaliculata, Achatina fulica, Meghimatium bilineatum, Limax Valentiana, Acusta despecta sieboldiana and Euhadra peliomphala.

Nematodes such as Prathylenchus coffeae, Prathylenchus penetrans, Prathylenchus vulnus, Globodera rostochiensis, Heterodera glycines, Meloidogyne hapla, Meloidogyne incognita, Aphelenchoides besseyi and Bursaphelenchus xylophilus.

Adult flies such as horn fly (Haematobia irritans), horse fly (Tabanus spp.), Stomoxys calcitrans, blackfly (Simulium spp.), deer fly (Chrysops spp.), louse fly (Melophagus ovinus) and tsetse fly (Glossina spp.).

Parasitic worms such as sheep bot fly (Oestrus ovis, Cuterebra spp.), blowfly (Phaenicia spp.), screwworm (Cochliomyia hominivorax), warble fly (Hypoderma spp.), fleeceworm and Gastrophilus.

Mosquitos such as Culex spp., Anopheles spp. and Aedes spp.

The internal, livestock, poultry or pet parasites that the compounds of the present invention can control specifically include the following internal pests, but the present invention is not restricted thereto.

Nematodes of the genera Haemonchus, Trichostrongylus, Ostertagia, Nematodirus, Cooperia, Ascaris, Bunostomum, Oesophagostomum, Chabertia, Trichuris, Storongylus, Trichonema, Dictyocaulus, Capillaria, Heterakis, Toxocara, Ascaridia, Oxyuris, Ancylostoma, Uncinaria, Toxascaris, Parascaris, and the like.

Nematodes of the family Filariidae such as the genera Wuchereria, Brugia, Onchoceca, Dirofilaria, Loa, and the like.

Nematodes of the family Dracunculidae such as the genus Dracunculus.

Cestodes such as Dipylidium caninum, Taenia taeniaeformis, Taenia solium, Taenia saginata, Hymenolepis diminuta, Moniezia benedeni, Diphyllobothrium latum, Diphyllobothrium erinacei, Echinococcus granulosus and Echinococcus multilocularis.

Trematodes such as Fasciola hepatica, F.gigantica, Paragonimus westermanii, Fasciolopsic bruski, Eurytrema pancreaticum, E.coelomaticum, Clonorchis sinensis, Schistosoma japonicum, Schistosoma haematobium and Schistosoma mansoni.

Eimeria spp. such as Eimeria tenella, Eimeria acervulina, Eimeria brunetti, Eimeria maxima, Eimeria necatrix, Eimeria bovis and Eimeria ovinoidalis.

Trypanosomsa cruzi, Leishmania spp., Plasmodium spp., Babesis spp., Trichomonadidae spp., Histomanas spp., Giardia spp., Toxoplasma spp., Entamoeba histolytica and Theileria spp.

The compounds of the present invention are effective against pests that have acquired resistance to conventional insecticides such as organic phosphorus compounds, carbamate compounds or pyrethroid compounds.

That is, the compounds of the present invention can effectively control pests such as insects of the order Collembola, the order Dictyoptera, the order Orthoptera, the order Isoptera, the order Thysanoptera, the order Hemiptera, the order Lepidoptera, the order Coleoptera, the order Hymenoptera, the order Diptera, the order Aphaniptera, the order Anoplura, Acari, gastropods and nematodes at low doses. On the other hand, the compounds of the present invention have a quite advantageous feature that they are almost harmless to mammals, fishes, crustaceans and beneficial insects (useful insects such as honey bees and bumblebees and natural enemies such as aphelinids, Aphidiinae, tachina flies, Orius spp., Phytoseiidae spp. etc.).

The compounds of the present invention may be used in any dosage form such as a soluble concentrate, an emulsifiable concentrate, a wettable powder, a water soluble powder, a water dispersible granule, a water soluble granule, a suspension concentrate, a concentrated emulsion, a suspoemulsion, a microemulsion, a dustable powder, a granule, a tablet or an emulsifiable gel usually after mixed with an appropriate solid carrier or liquid carrier, and if necessary, with a surfactant, a penetrant, a spreader, a

thickener, an anti-freezing agent, a binder, an anti-caking agent, a disintegrant, an antifoaming agent, a preservative, a stabilizer or the like. A formulation in an arbitrary dosage form may be sealed in water-soluble packaging such as a water-soluble capsule or a water-soluble film, for labor saving or improved safety.

As solid carriers, natural minerals such as quartz, calcite, meerschaum, dolomite, chalk, kaolinite, pyrophyllite, sericite, halloysite, methahalloysite, kibushi clay, gairome clay, pottery stone, zeeklite, allophane, Shirasu, mica, talc, bentonite, activated clay, acid clay, pumice, attapulgite, zeolite and diatomaceous earth; calcined natural minerals such as calcined clay, pearlite, Shirasu-balloons, vermiculite, attapulgus clay and calcined diatomaceous earth; inorganic salts such as magnesium carbonate, calcium carbonate, sodium carbonate, sodium hydrogen carbonate, ammonium sulfate, sodium sulfate, magnesium sulfate, diammonium hydrogen phosphate, ammonium dihydrogen phosphate and potassium chloride, saccharides such as glucose, fructose, sucrose and lactose; polysaccharides such as starch, cellulose powder and dextrin; organic substances such as urea, urea derivatives, benzoic acid and benzoic acid salts; plants such as wood flour, powdered cork, corncob, walnut shell and tobacco stems, fly ash, white carbon (such as hydrated synthetic silica, anhydrous synthetic silica and hydrous synthetic silicate), fertilizers and the like may be mentioned.

As liquid carriers, aromatic hydrocarbons such as xylene, alkyl ($C_9$ or $C_{10}$ etc.) benzene, phenylxylylethane and alkyl ($C_1$ or $C_3$ etc.) naphthalene; aliphatic hydrocarbons such as machine oil, normal paraffin, isoparaffin and naphthene; mixtures of aromatic hydrocarbons and aliphatic hydrocarbons such as kerosene; alcohols such as ethanol, isopropanol, cyclohexanol, phenoxyethanol and benzyl alcohol; polyhydric alcohols such as ethylene glycol, propylene glycol, diethylene glycol, hexylene glycol, polyethylene glycol and polypropylene glycol; ethers such as propyl cellosolve, butyl cellosolve, phenyl cellosolve, propylene glycol monomethyl ether, propylene glycol monoethyl ether, propylene glycol monopropyl ether, propylene glycol monobutyl ether and propylene glycol monophenyl ether; ketones such as acetophenone, cyclohexanone and γ-butyrolactone; esters such as fatty acid methyl esters, dialkyl succinates, dialkyl glutamate, dialkyl adipates and dialkyl phthalates; acid amides such as N- alkyl ($C_1$, $C_8$ or $C_{12}$ etc.) pyrrolidone; fats and oils such as soybean oil, linseed oil, rapeseed oil, coconut oil, cottonseed oil and castor oil; dimethyl sulfoxide; water and the

like may be mentioned.

These solid and liquid carriers may be used alone or in combinations of two or more.

As surfactants, nonionic surfactants such as polyoxyethylene alkyl ether, polyoxyethylene alkyl (mono or di) phenyl ether, polyoxyethylene(mono, di or tri)styrylphenyl ether, polyoxyethylenepolyoxypropylene block copolymers, polyoxyethylene fatty acid (mono or di) ester, sorbitan fatty acid ester, polyoxyethylene sorbitan fatty acid ester, ethylene oxide adducts of castor oil, acetylene glycol, acetylene alcohol, ethylene oxide adducts of acetylene glycol, ethylene oxide adducts of acetylene alcohol and alkyl glycosides; anionic surfactants such as alkyl sulfate salts, alkylbenzenesulfonic acid salts, lignin sulfonate, alkylsulfosuccinic acid salts, naphthalenesulfonic acid salts, alkylnaphthalenesulfonic acid salts, salts of naphthalenesulfonic acid-formalin condensates, salts of alkylnaphthalenesulfonic acid-formalin condensates, polyoxyethylene alkyl ether sulfate or phosphate salts, polyoxyethylene (mono or di) alkylphenyl ether sulfate or phosphate salts, polyoxyethylene (mono, di or tri) styrylphenyl ether sulfate or phosphate salts, polycarboxylic acid salts (such as polyacrylates, polymaleates and copolymers of maleic acid and an olefin) and polystyrenesulfonic acid salts; cationic surfactants such as alkylamine salts and alkyl quaternary ammonium salts; amphoteric surfactants such as amino acid types and betaine types, silicone surfactants; and fluorine surfactants may be mentioned.

The amount of these surfactants is usually preferably from 0.05 to 20 parts by weight per 100 parts by weight of the agent of the present invention, though there is no particular restrictions. These surfactants may be used alone or in combination of two or more.

The suitable application dose of the compounds of the present invention is generally about from 0.005 to 50 kg per hectare (ha) in terms of the active ingredient, though it varies depending on the application situation, the application season, the application method and the cultivated crop.

When the compounds of the present invention are used to control external or internal parasites in or on mammals and birds as farm animals/poultry and pet animals, the compounds of the present invention may be administered in an effective amount

together with pharmaceutically acceptable additives orally, parenterally by injection (intramuscular, subcutaneously, intravenously or intraperitoneally); percutaneously by dipping, spraying, bathing, washing, pouring-on and spotting-on and dusting, or intranasally. The compounds of the present invention may be administered through molded articles such as chips, plates, bands, collars, ear marks, limb bands and ID tags.

The compounds of the present invention are administered in an arbitrary dosage form suitable for the administration route.

In a case where the compounds of the present invention are used to control external or internal parasites, the suitable application dose of the compound of the present invention represented by the formula (1) as an active ingredient is generally from 0.01 to 100 mg/kg body weight, preferably from 0.01 to 50 mg/kg body weight of a target animal, though it varies depending on e.g. the type of pests to be controlled, the type of the target animal, or the application method. Particularly with respect to application to a dog, the suitable application dose is generally from 1 to 5,000 mg/kg body weight, preferably from 1 to 100 mg/g body weight of a target dog, though it varies depending on the type or the age of the target dog, or the external parasites to be controlled.

In a case where the compounds of the present invention are used to control external or internal parasites, the application interval may be optionally set usually within a range of from daily to annually, though it varies dependeing on e.g. the type of pests to be controlled, the type of the target animal, or the application method. The application interval is preferably from once a week to every six months, more preferably daily (every 24 hours), monthly, once a month, every two months, or every three months.

In a case where the compounds of the present invention are used to control external paracites on a dog, with respect to the timing of application of the compound of the present invention to the dog, the compound of the present invention may be orally administered to the dog 30 minutes before start of feeding or 120 minutes after completion of feeding. "30 minutes before start of feeding or 120 minutes after completion of feeding" here is based on an action of the dog to take nutritious food. For example, in a case where the dog feeding time is 20 minutes, the time specified is 30 minutes before start of feeding to 120 minutes after completion of feeding, that is, 170 minutes in total. A case where feeding is suspended, the compound of the present

invention is orally administered and feeding is restarted, is included. In this specification, feeding means an action of an animal to take food.

The number of feeding of a dug is usually three to four times a day in the case of a dog of less than six months old, twice to three times a day in the case of a dog of six months to less than one year old, twice a day in the case of an adult dog of about one to five years old, and twice to three times a day in the case of an old dog of 6 years old or older, though it varies depending on the type or the age of the dog or the habit. In the present invention, feeding means an action of an animal to take nutritious food, and does not include an action to give food and the like to a dog for training or breeding.

The dosage form may be a solid preparation such as dusts, granules, wettable powders, pellets, tablets, boluses, capsules and a molded article containing an active ingredient; a liquid preparation such as an injection fluid, an oral liquid, a liquid preparation applied to the skin or coelom; a solution preparation such as a pour-on preparation, a spot-on preparation, flowables and emulsions; and a semisolid preparation such as an ointment and gels.

In a case where the compounds of the present invention are orally administered, the dosage form may, for example, be a solid preparation such as tablets, chewables, capsules, pills, boluses, granules and powders; a semisolid preparation such as pastes and gels; and a liquid preparation such as drinks.

In the case of percutaneous administeration, the dosage form may, for example, be a solid preparation such as powders; a semisolid preparation such as a cream, a salve and ointment, pastes and gels; and a liquid preparation such as a spary, aerosols, solutions and emulsions, suspensions, and lotions.

Further, in the case of administration by injection, the dosage form may, for example, be a liquid preparation such as solutions and emulsions, and suspensions, and in the case of intranasal administration, the dosage form may, for example, be a liquid preparation such as aerosols. In the case of spraying over an environment where animals are bred, such as a stable, the dosage form may, for example, be a solid preparation such as wettale powders, dusts or granules; and a liquid preparation such as emulsions and suspension concentrates.

The formulation to be used for parasiticides of the present invention is not limited to such dosage forms.

The solid preparation may be orally administered as it is, or may be percutaneously administered or sprayed over an environment where animals are bred, such as a stable, after dilution with water.

The solid preparation to be orally administered, may be prepared by mixing the compound represented by the formula (1) or its salt and one or more vehicles or binders suitable for oral administration, and as the case requires, physiologically acceptable additives such as a lubricant, a disintegrant, a dye and a pigment, and forming the mixture into a desired shape.

The vehicle and the binder may, for example, be a saccharide or saccharide derivative such as lactose, sucrose, mannitol or sorbitol; a starch such as corn starch, wheat startch, rice starch or potato starch; a cellulse or cellulose derivative such as methyl cellulose, carboxymethyl cellulose, hydroxyethyl cellulose, hydroxypropyl cellulose or hydroxypropylmethyl cellulose; a protein or protein derivative such as zein or gelatin; honey, gum arabic glue, or a synthetic polymer compound such as polyvinyl alcohol or polyvinyl pyrolidone.

The lubricant may, for example, be magnesium stearate, and the disintegrant may, for example, be cellulose, agar, alginic acid, crosslinked polyvinyl pyrrolidone or a carbonate.

Among solid preparations to be orally administered, in the case of a solid formulation such as chewables, additives which impart a taste, texture or flavor desired by amimals to which the preparation is to be administered, may be used. The carriers and addtives to be used for the solid preparation of the parasiticidal composition of the present invention are not limited thereto.

The liquid preparation may be administered percutaneously or by injection as it is, or may be administered orally by being mixed with food, percutaneously administered after being diluted with water, or sprayed to an enviorment where animals are bred, such as a stable.

An injection fluid may be administered intravenously, intramuscularly or subcutaneously. An injection fluid can be prepared by dissolving an active ingredient in an appropriate solvent and, if necessary, adding additives such as a solubilizer, an acid, a base, a buffering salt, an antioxidant and a protectant.

As appropriate solvents, water, ethanol, butanol, benzyl alcohol, glycerin,

propylene glycol, polyethylene glycol, N-methylpyrrolidone and mixtures thereof, physiologically acceptable vegetable oils, and synthetic oils suitable for injection may be mentioned.

As solubilizers, polyvinylpyrrolidone, polyoxyethylated castor oil, polyoxyethylated sorbitan ester and the like may be mentioned.

As protectants, benzyl alcohol, trichlorobutanol, p-hydroxybenzoic acid esters, n-butanol and the like may be mentioned.

An oral liquid may be administered directly or after dilution and can be prepared in the same manner as an injection fluid.

A flowable, an emulsion or the like may be administered directly or after dilution percutaneously or by environmental application.

A liquid preparation applied to the skin is administered by dripping, spreading, rubbing, spraying, sprinkling or dipping (soaking, bathing or washing) and can be prepared in the same manner as an injection fluid.

A pour-on preparation and a spot-on preparation are dripped or sprayed to a limited area of the skin so that they permeate through the skin and act systemically. A pour-on preparation and a spot-on preparation can be prepared by dissolving, suspending or emulsifying an active ingredient in an appropriate skin-friendly solvent or solvent mixture. If necessary, additives such as a surfactant, a colorant, an absorbefacient, an antioxidant, a light stabilizer and an adhesive may be added.

As appropriate solvents, water, alkanol, glycol, polyethylene glycol, polypropylene glycol, glycerin, benzyl alcohol, phenylethanol, phenoxyethanol, ethyl acetate, butyl acetate, benzyl benzoate, dipropylene glycol monomethyl ether, diethylene glycol monobutyl ether, acetone, methyl ethyl ketone, aromatic and/or aliphatic hydrocarbons, vegetable or synthetic oils, DMF (N,N-dimethylformamide), liquid paraffin, light liquid paraffin, silicone, dimethylacetamide, N-methylpyrrolidone or 2,2-dimethyl-4-oxy-methylene-1,3-dioxolane may be mentioned.

As absorbefacients, DMSO (dimethyl sulfoxide), isopropyl myristate, pelargonic acid dipropylene glycol, silicone oil, fatty acid esters, triglycerides and aliphatic alcohols may be mentioned.

As antioxidants, sulfites, metabisulfites, ascorbic acid, butylhydroxytoluene, butylhydroxyanisole and tocopherol may be mentioned.

An emulsion may be administered orally, percutaneously or by injection. An emulsion can be prepared by dissolving an active ingredient in a hydrophobic phase or a hydrophilic phase and homogenizing the resulting solution with another liquid phase together with an appropriate emulsifier, and further if necessary with additives such as a colorant, an absorbefacient, a protectant, an antioxidant, a light screen and a thickner.

As hydrophobic phases (oils), paraffin oil, silicone oil, sesame oil, almond oil, castor oil, synthetic triglycerides, ethyl stearate, di-n-butyryl adipate, hexyl laurate, pelargonic acid dipropylene glycol, esters of branched short-chain fatty acids with $C_{16}$-$C_{18}$ saturated fatty acids, isopropyl myristate, isopropyl palmitate, esters of $C_{12}$-$C_{18}$ saturated alcohols with caprylic/capric acid, isopropyl stearate, oleyl oleate, decyl oleate, ethyl oleate, ethyl lactate, fatty acid ester waxes, dibutyl phthalate, diisopropyl adipate, isotridecyl alcohol, 2-octyldodecanol, cetylstearyl alcohol and oleyl alcohol may be mentioned.

As hydrophilic phases, water, propylene glycol, glycerin and sorbitol may be mentioned.

As emulsifiers, nonionic surfactants such as polyoxyethylated castor oil, polyoxyethylated sorbitan monoolefinic acid, sorbitan monostearate, glycerin monostearate, polyoxyethyl stearate and alkyl phenol polyglycol ether; amphoteric surfactants such as disodium N-lauryl-β-iminodipropionate and lecithin; anionic surfactants such as sodium lauryl sulfate, aliphatic alcohol sulfate ether and mono/dialkylpolyglycol orthophosphate monoethanolamine salt; and cationic surfactants such as cetyltrimethylammonium chloride may, for example, be mentioned.

As other additives, carboxymethylcellulose, methylcellulose, polyacrylate, alginate, gelatin, gum arabic, polyvinylpyrrolidone, polyvinyl alcohol, methyl vinyl ether, maleic anhydride copolymers, polyethylene glycol, waxes and colloidal silica may be mentioned.

A semisolid preparation is administered by applying or spreading onto the skin or introducing into the coelom. A gel can be prepared by adding a thickener to a solution prepared in the same manner as an injection fluid sufficiently to give a transparent viscous substance like an ointment.

Next, Formulation Examples of preparations using the compounds of the present invention are given below. However, formulations of the present invention are by no

means restricted thereto. In the following Formulation Examples, "parts" means parts by weight.

[Wettable powder]

| | |
|---|---|
| Compound of the present invention | 0.1 to 80 parts |
| Solid carrier | 5 to 98.9 parts |
| Surfactant | 1 to 10 parts |
| Others | 0 to 5 parts |

As the others, an anti-caking agent, a stabilizer and the like may be mentioned.

[Emulsifiable concentrate]

| | |
|---|---|
| Compound of the present invention | 0.1 to 30 parts |
| Liquid carrier | 45 to 95 parts |
| Surfactant | 4.9 to 15 parts |
| Others | 0 to 10 parts |

As the others, a spreader, a stabilizer and the like may be mentioned.

[Suspension concentrate]

| | |
|---|---|
| Compound of the present invention | 0.1 to 70 parts |
| Liquid carrier | 15 to 98.89 parts |
| Surfactant | 1 to 12 parts |
| Others | 0.01 to 30 parts |

As the others, an anti-freezing agent, a thickener and the like may be mentioned.

[Water dispersible granule]

| | |
|---|---|
| Compound of the present invention | 0.1 to 90 parts |
| Solid carrier | 0 to 98.9 parts |
| Surfactant | 1 to 20 parts |
| Others | 0 to 10 parts |

As the others, a binder, a stabilizer and the like may be mentioned.

[Soluble concentrate]

| | |
|---|---|
| Compound of the present invention | 0.01 to 70 parts |
| Liquid carrier | 20 to 99.99 parts |
| Others | 0 to 10 parts |

As the others, an anti-freezing agent, a spreader and the like may be mentioned.

[Granule]

| | |
|---|---|
| Compound of the present invention | 0.01 to 80 parts |
| Solid carrier | 10 to 99.99 parts |
| Others | 0 to 10 parts |

As the others, a binder, a stabilizer and the like may be mentioned.

[Dustable powder]

| | |
|---|---|
| Compound of the present invention | 0.01 to 30 parts |
| Solid carrier | 65 to 99.99 parts |
| Others | 0 to 5 parts |

As the others, an anti-drift agent, a stabilizer and the like may be mentioned.

Next, more specific Formulation Examples of preparations containing the compounds of the present invention as an active ingredient are given below. However, the present invention is by no means restricted thereto.

In the following Formulation Examples, "parts" means parts by weight.

[Formulation Example 1] Wettable powder

| | |
|---|---|
| Compound No.1-1-001a of the present invention | 20 parts |
| Pyrophyllite | 74 parts |
| Sorpol 5039 | 4 parts |

(tradename for a mixture of a nonionic surfactant and an anionic surfactant: manufactured by TOHO Chemical Industry Co., Ltd.)

| | |
|---|---|
| CARPLEX #80D | 2 parts |

(tradename for hydrous synthetic silicic acid: manufactured by Shionogi & Co., Ltd.)

The above ingredients are mixed and pulverized homogenously to obtain a wettable powder.

[Formulation Example 2] Emulsifiable concentrate

| | |
|---|---|
| Compound No.1-1-001a of the present invention | 5 parts |
| Xylene | 75 parts |
| N-methylpyrrolidone | 15 parts |
| Sorpol 2680 | 5 parts |

(tradename for a mixture of a nonionic surfactant and an anionic surfactant: manufactured by TOHO Chemical Industry Co., Ltd.)

The above ingredients are mixed homogenously to obtain an emulsifiable concentrate.

[Formulation Example 3] Suspension concentrate

| | |
|---|---|
| Compound No.1-1-001a | 25 parts |
| AGRISOL S-710 | 10 parts |

(tradename for a nonionic surfactant: manufactured by Kao Corporation)

| | |
|---|---|
| Runox 1000C | 0.5 part |

(tradename for an anionic surfactant: manufactured by TOHO Chemical Industry Co., Ltd.)

| | |
|---|---|
| Xanthan gum | 0.2 part |
| Water | 64.3 parts |

The above ingredients are mixed homogenously and wet-pulverized to obtain a suspension concentration.

[Formulation Example 4] Water dispersible granule

| | |
|---|---|
| Compound No. 1-1-001a of the present invention | 75 parts |
| HITENOL NE-15 | 5 parts |

(tradename for an anionic surfactant: manufactured by DKS Co., Ltd.)

| | |
|---|---|
| VANILLEX N | 10 parts |

(tradename for an anionic surfactant: manufactured by Nippon Paper Industries Co., Ltd.)

| | |
|---|---|
| CARPLEX #80D | 10 parts |

(tradename for hydrous synthetic silicic acid: manufactured by Shionogi & Co., Ltd.)

The above ingredients are mixed and pulverized homogenously, then kneaded with a small amount of water, granulated through an extrusion granulator and dried to obtain a water dispersible granule.

[Formulation Example 5] Granule

| | |
|---|---|
| Compound No. 1-1-001a of the present invention | 5 parts |
| Bentonite | 50 parts |
| Talc | 45 parts |

The above ingredients are mixed and pulverized homogenously, then kneaded with a small amount of water, granulated through an extrusion granulator and dried to obtain a granule.

[Formulation Example 6] Dustable powder

| | |
|---|---|
| Compound No. 1-1-001a of the present invention | 3 parts |

CARPLEX #80D 0.5 part

(tradename for a hydrous synthetic silicic acid: manufactured by Shionogi & Co., Ltd.)

Kaolinite 95 parts

Diisopropyl phosphate 1.5 parts

The above ingredients are mixed and pulverized homogeneously to obtain a dustable powder.

It is applied after diluted with water by a factor of from 1 to 10000 or directly without dilution.

[Formulation Example 7] Wettable powder preparation

Compound No. 1-1-001a of the present invention 25 parts

Sodium diisobutylnaphthalenesulfonate 1 part

Calcium n-dodecylbenzenesulfonate 10 parts

Alkyl aryl polyglycol ether 12 parts

Naphthalenesulfonic acid-formalin condensate sodium salt 3 parts

Silicone emulsion 1 part

Silicon dioxide 3 parts

Kaolin 45 parts

[Formulation Example 8] Water-soluble concentrate preparation

Compound No. 1-1-001a of the present invention 20 parts

Polyoxyethylenelauryl ether 3 parts

Sodium dioctylsulfosuccinate 3.5 parts

Dimethyl sulfoxide 37 parts

2-Propanol 36.5 parts

[Formulation Example 9] Liquid preparation for spraying

Compound No. 1-1-001a of the present invention 2 parts

Dimethyl sulfoxide 10 parts

2-Propanol 35 parts

Acetone 53 parts

[Formulation Example 10] Liquid preparation for percutaneous administration

Compound No. 1-1-001a of the present invention 5 parts

Hexylene glycol 50 parts

Isopropanol 45 parts

[Formulation Example 11] Liquid preparation for percutaneous administration

| | |
|---|---|
| Compound No. 1-1-001a of the present invention | 5 parts |
| Propylene glycol monomethyl ether | 50 parts |
| Dipropylene glycol | 45 parts |

[Formulation Example 12] Liquid preparation for percutaneous administration (by dripping)

| | |
|---|---|
| Compound No. 1-1-001a of the present invention | 2 parts |
| Light liquid paraffin | 98 parts |

[Formulation Example 13] Liquid preparation for percutaneous administration (by dripping)

| | |
|---|---|
| Compound No. 1-1-001a of the present invention | 2 parts |
| Light liquid paraffin | 58 parts |
| Olive oil | 30 parts |
| ODO-H | 9 parts |
| Shin-etsu silicone | 1 part |

For use as agricultural chemicals, the compounds of the present invention may be mixed with other herbicides, insecticides, acaricides, nematocides, fungicides, plant growth regulators, synergists, fertilizers, soil conditioners and the like at the time of formulation or application.

Particularly, the combined use with other agricultural chemicals or plant hormone is expected to reduce the cost by enabling control at lower doses, to broaden the insecticidal spectrum by the synergistic effect of the other agrochemicals, and to achieve a higher pesticidal effect. In such cases, they may be combined with a plurality of known agricultural chemicals.

The agricultural chemicals to be used in combination with the compounds of the present invention include, for example, the compounds disclosed in e.g. The Pesticide Manual, 15th edition, 2009, having the generic names listed below, but are not necessarily restricted thereto.

Fungicides: acibenzolar-S-methyl, acylaminobenzamide, acypetacs, aldimorph, ametoctradin, amisulbrom, amobam, ampropyfos, anilazine, azaconazole, azithiram, azoxystrobin, barium polysulfide, benalaxyl, benalaxyl-M, benodanil, benomyl, benquinox, bentaluron, benthiavalicarb-isopropyl, benthiazole, benzamacril, benzamorf,

benzovindiflupyr, bethoxazine, binapacryl, biphenyl, bitertanol, blasticidin-S, bixafen, bordeaux mixture, boscalid, bromuconazole, bupirimate, buthiobate, calcium polysulfide, calcium polysulfide, captafol, captan, carpropamid, carbamorph, carbendazim, carboxin, carvone, cheshunt mixture, chinomethionat, chlobenthiazone, chloraniformethane, chloranil, chlorfenazol, chloroneb, chloropicrin, chlorothalonil, chlorquinox, chlozolinate, climbazole, clotrimazole, copper acetate, copper carbonate, basic, copper hydroxide, copper naphthenate, copper oleate, copper oxychloride, copper sulfate, copper sulfate, basic, copper zinc chromate, cufraneb, coumoxystrobin, cuprobam, cyazofamid, cyclafuramid, cycloheximide, cyflufenamid, cymoxanil, cypendazole, cyproconazol, cyprodinil, cyprofuram, dazomet, debacarb, decafentin, dehydroacetic acid, dichlofluanid, dichlone, dichlorophen, dichlozoline, diclobutrazol, diclocymet, diclomedine, dicloran, etc.

Fungicides (continued): diethofencarb, difenoconazole, diflumetorim, dimethirimol, dimethomorph, dimoxystrobin, diniconazole, diniconazole-M, dinobuton, dinocap, dinocap-4, dinocap-6, dinocton, dinosulfon, dinoterbon, diphenylamine, dipymetitrone, dipyrithione, ditalimfos, dithianon, dodemorph-acetate, dodine, drazoxolon, edifenphos, enestrobin, enoxastrobin, epoxiconazole, etaconazole, ethaboxam, etem, ethirimol, ethoxyquin, etridiazole, famoxadone, fenarimol, fenbuconazole, fenamidone, fenaminosulf, fenaminstrobin, fenapanil, fendazosulam, fenfuram, fenhexamid, fenitropan, fenoxanil, fenpiclonil, fenpropidin, fenpyrazamine, fenpropimorph, fentin, ferbam, ferimzone, fluazinam, fludioxonil, flufenoxystrobin, flumetover, flumorph, fluopicolide, fluopyram, fluoroimide, fluotrimazole, fluoxastrobin, fluquinconazole, flusilazole, flusulfamide, flutianil, flutolanil, flutriafol, fluxapyroxad, folpet, fosetyl-aluminium, fuberidazole, furalaxyl, furametpyr, furcarbanil, furconazole, furconazole-cis, furmecyclox, furphanate, glyodin, griseofulvin, guazatine, halacrinate, hexachlorobenzene, hexaconazole, hexylthiofos, 8-hydroxyquinoline sulfate, hymexazol, imazalil, imibenconazole, iminoctadine-albesilate, iminoctadine-triacetate, ipconazole, iprobenfos, iprodione, iprovalicarb, isofetamid, isoprothiolane, isopyrazam, isotianil, isovaledione, etc.

Fungicides (continued): kasugamycin, kresoxim-methyl, laminarin, mancopper, mancozeb, mandestrobin, mandipropamid, maneb, mebenil, mecarbinzid, mepanipyrim, meptyldinocap, mepronil, metalaxyl, metalaxyl-M, metam, metazoxolon, metconazole,

methasulfocarb, methfuroxam, methyl isothiocyanate, metiram, metominostrobin, metrafenone, metsulfovax, milneb, myclobutanil, myclozolin, nabam, natamycin, nickel bis(dimethyldithiocarbamate), nitrostyrene, nitrothal-isopropyl, nuarimol, OCH, octhilinone, ofurace, orysastrobin, oxathiapiprolin, oxadixyl, oxine copper, oxycarboxin, oxpoconazole fumarate, pefurzoate, penconazole, penflufen, pencycuron, penthiopyrad, o-phenylphenol, phosdiphen, phthalide, picarbutrazox, picoxystrobin, piperalin, polycarbamate, polyoxins, polyoxorim, potassium azide, potassium hydrogen carbonate, proquinazid, probenazole, prochloraz, procymidone, propamocarb hydrochloride, propiconazole, propineb, prothiocarb, prothioconazole, pydiflumetofen, pyracarbolid, pyraclostrobin, pyrametostrobin, pyraoxystrobin, pyraziflumid, pyrazophos, pyribencarb-methyl, pyridinitril, pyrifenox, pyrimethanil, pyriminostrobin, pyrimorph, pyriofenone, pyrisoxazole, pyroquilon, pyroxychlor, pyroxyfur, quinomethionate, quinoxyfen, quintozene, quinacetol-sulfate, quinazamid, quinconazole, rabenzazole, Bacillus subtilis (Strain:D747, FZB24, GBO3, HAI0404, MBI600, QST713, Y1336, etc.), etc.

Fungicides (continued): sedaxane, sodium azide, sodium hydrogen carbonate, sodium hypochlorite, sulfur, spiroxamine, salycylanilide, silthiofam, simeconazole, tebuconazole, tebufloquin, tecnazene, tecoram, tetraconazole, thiabendazole, thiadifluor, thicyofen, thifluzamide, thiochlorfenphim, thiophanate, thiophanate-methyl, thioquinox, thiram, tiadinil, tioxymid, tolclofos-methyl, tolprocarb, tolylfluanid, triadimefon, toriadimenol, triamiphos, triarimol, triazoxide, triazbutil, tributyltin oxide, trichlamide, tricyclazole, tridemorph, trifloxystrobin, triflumizole, triforine, triclopyricarb, triticonazole, validamycin, valifenalate, vinclozolin, zarilamide, zinc sulfate, zineb, ziram, zoxamide, shiitake mushroom mycelium extracts, shiitake mushroom fruiting body extracts, ZF-9646 (test name), NF-180 (test name), MIF-1002 (test name), S-2399 (test name), AKD-5195 (test name), NNF-0721 (test name), etc.

Bactericides: benzalkonium chloride, bithionol, bronopol, cresol, formaldehyde, nitrapyrin, oxolinic acid, oxyterracycline, streptomycin, tecloftalam, etc.

Nematicides: aldoxycarb, benclothiaz, cadusafos, DBCP, dichlofenthion, DSP, ethoprophos, fenamiphos, fensulfothion, fluazaindolizine, fluensulfone, fosthiazate, fosthietan, imicyafos, isamidofos, isazofos, oxamyl, thiaxazafen, thionazin, tioxazafen, BYI-1921 (test name), MAI-08015 (test name), etc.

Acaricides: acequinocyl, acrinathrin, amidoflumet, amitraz, azocyclotin, BCI-033

(test name), benzoximate, bifenazate, bromopropylate, chinomethionat, chlorobezilate, clofentezine, cyenopyrafen, cyflumetofen, cyhexatine, dicofol, dienochlor, diflovidazin, DNOC, etoxazole, fenazaquin, fenbutatin oxide, fenothiocarb, fenpropathrin, fenpyroximate, fluacrypyrim, halfenprox, hexythiazox, milbemectin, propargite, pyflubumide, pyridaben, pyrimidifen, S-1870 (test name), spirodiclofen, spyromesifen, CL900167 (test name), tebufenpyrad, NA-89 (test name), etc.

Insecticides: abamectin, acephate, acetamipirid, afidopyropen, afoxolaner, alanycarb, aldicarb, allethrin, azamethiphos, azinphos-ethyl, azinphos-methyl, bacillus thuringiensis, bendiocarb, benfluthrin, benfuracarb, bensultap, bifenthrin, bioallethrin, bioresmethrin, bistrifluron, broflanilide, buprofezin, butocarboxim, carbaryl, carbofuran, carbosulfan, cartap, chlorantraniliprole, chlorethxyfos, chlorfenapyr, chlorfenvinphos, chlorfluazuron, chlormephos, chloroprallethrin, chlorpyrifos, chlorpyrifos-methyl, chromafenozide, clothianidin, cyanophos, cyantraniliprole, cyclaniliprole, cycloprothrin, cyflumetofen, cyfluthrin, beta-cyfluthrin, cyhalodiamide, cyhalothrin, lambda-cyhalothrin, cypermethrin, alpha-cypermethrin, beta-cypermethrin, zeta-cypermethrin, cyphenothrin, cyromazine, deltamethrin, diacloden, diafenthiuron, diazinon, dicloromezotiaz, dichlorvos, diflubenzuron, dimefluthrin, dimethylvinphos, dinotefuran, diofenolan, disulfoton, dimethoate, emamectin-benzoate, empenthrin, endosulfan, alpha-endosulfan, EPN, esfenvalerate, ethiofencarb, ethiprole, etofenprox, etrimfos, fenitrothion, fenobucarb, fenoxycarb, fenpropathrin, fenthion, fenvalerate, fipronil, flonicamid, fluazuron, flubendiamide, flucycloxuron, flucythrinate, flufenerim, flufenoxuron, flufenprox, flumethrin, fluralaner, fluvalinate, tau-fluvalinate, fonophos, formetanate, formothion, furathiocarb, flufiprole, fluhexafon, flupyradifurone, flometoquin, etc.

Insecticides (continued): gamma-cyhalothrin, halofenozide, heptafluthrin, hexaflumuron, hydramethylnon, imidacloprid, imiprothrin, isofenphos, indoxacarb, indoxacarb-MP, isoprocarb, isoxathion, kappa-bifenthrin, kappa-tefluthrin, lepimectin, lufenuron, malathion, meperfluthrin, metaflumizone, metaldehyde, methamidophos, methidathion, methacrifos, metalcarb, methomyl, methoprene, methoxychlor, methoxyfenozide, methyl bromide, epsilon-metofluthrin, metofluthrin, momfluorothrin, epsilon-momfluorothrin, monocrotophos, muscalure, nitenpyram, novaluron, noviflumuron, omethoate, oxamyl, oxydemeton-methyl, oxydeprofos, parathion, parathion-methyl, pentachlorophenol (PCP), permethrin, phenothrin, phenthoate,

phoxim, phorate, phosalone, phosmet, phosphamidon, pirimicarb, pirimiphos-methyl, profenofos, profluthrin, prothiofos, propaphos, protrifenbute, pymetrozine, pyraclofos, pyrethrins, pyridalyl, pyrifluquinazon, pyriprole, pyrafluprole, pyriproxyfen, resmethrin, rotenone, SI-0405 (test name), sulprofos, silafluofen, spinetoram, spinosad, spiromesifen, spirotetramat, sulfoxaflor, sulfotep, SYJ-159 (test name), tebfenozide, teflubenzuron, tefluthorin, terbufos, tetrachlorvinphos, tetramethrin, d-tetramethrin, tetramethylfluthrin, tetraniliprole, thiacloprid, thiocyclam, thiodicarb, thiamethoxam, thiofanox, thiometon, tolfenpyrad, tralomethrin, transfluthrin, triazamate, trichlorfon, triazuron, triflumezopyrim, triflumuron, vamidothion, fluxametamide, MIE-1209 (test name), ME5382 (test name), etc.

EXAMPLES

Now, the present invention will be described in further detail with reference to Examples of synthesis of and tests on the compounds of the present invention. However, the present invention is by no means restricted thereto.

For the preparative medium pressure liquid chromatography described in Synthetic Examples and Reference Examples, a preparative medium pressure chromatograph YFLC-Wprep manufactured by Yamazen Science, Inc. (flow rate: 18 ml/min, 40-μm silica gel column) was used.

Chemical shift values of proton nuclear magnetic resonance (NMR) in Synthetic Examples and Reference Examples were measured by using $Me_4Si$ (tetramethylsilane) as a standard substance at 300 MHz (ECX300 or ECP300 manufactured by JEOL Ltd.).

Reference symbols in proton nuclear magnetic resonance chemical shift values have the following meanings.

s: singlet, brs: broad singlet, d: doublet, dd: double doublet, t: triplet, q: quartet, and m: multiplet.

Solvents used for NMR measurement are represented in brackets in the chemical shift value data.

Synthetic Example 1: Synthesis of 2-[3-(ethylsulfonyl)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-7-(trifluoromethyl)imidazo[1,2-c]pyrimidine (compound No. 1-3-001a of the present invention)

82 mg of 6-(trifluoromethyl)pyrimidin-4-amine was dissolved in 5 ml of

chlorobenzene, and 200 mg of 2-bromo-1-[3-(ethylsulfonyl)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]ethanone was added at room temperature. After the addition, the reaction mixture was stirred under reflux with heating for 9 hours. After the reaction, the reaction mixture was mixed with 10 ml of a 1M sodium hydroxide aqueous solution and extracted with ethyl acetate (10 ml×2). The resulting organic layer was dehydrated with saturated aqueous sodium chloride and dried over anhydrous sodium sulfate, and the solvent was evaporated under reduced pressure. The resulting residue was purified by preparative medium pressure liquid chromatography using n-hexane/ethyl acetate [with a gradient of from 100:0 to 0:100 (volume ratio, the same applies hereinafter)] as the eluent to obtain 163.5 mg of the desired product as a flesh-colored solid.

Melting point: 235-237°C

$^1$H-NMR($CDCl_3$) : δ9.38(d, J=7.5Hz, 1H), 9.19(s, 1H), 8.63(s, 1H), 8.12-8.09(m, 1H), 8.02-8.00(m, 1H), 7.28-7.23(m, 1H), 3.73(q, J=7.4Hz, 2H), 1.34(t, J=7.4Hz, 3H).

Synthetic Example 2: Synthesis of 2-[3-(ethylthio)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-b]pyridine (compound No. 1-1-002b of the present invention) and 2-[3-(ethylsulfonyl)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-b]pyridine (compound No. 1-1-002a of the present invention)

Step 1: Synthesis of 3-(ethylthio)-N-[2-(methylamino)-5-(trifluoromethyl)pyridin-3-yl]-7-(trifluoromethyl)imidazo[1,2-a]pyridine-2-carboxamide

856 mg of $N^2$-methyl-5-(trifluoromethyl)pyridine-2,3-diamine was dissolved in 20 ml of pyridine, and 1.00 g of 3-(ethylthio)-7-(trifluoromethyl)imidazo[1,2-a]pyridine-2-carboxylic acid, 1.32 g of 1-ethyl-3-(3-dimethylaminopropyl)carbodiimide hydrochloride and 42 mg of 4-(dimethylamino)pyridine were added at room temperature. After the addition, the reaction mixture was stirred for 6 hours at room temperature. After the reaction, the solvent was evaporated under reduced pressure. The resulting residue was mixed with 10 ml of water and extracted with ethyl acetate (10 ml×2). The resulting organic layer was washed with a 1M hydrochloric acid aqueous solution, and dehydrated with saturated aqueous sodium chloride and dried over anhydrous sodium sulfate, and the solvent was evaporated under reduced pressure to obtain 1.40 g of the desired crude product. The crude product was used in the next step without further

purification.

Step 2: Synthesis of 2-[3-(ethylthio)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-b]pyridine (compound No. 1-1-002b of the present invention)

1.40 g of the crude 3-(ethylthio)-N-[2-(methylamino)-5-(trifluoromethyl)pyridin-3-yl]-7-(trifluoromethyl)imidazo[1,2-a]pyridine-2-carboxamide obtained in Step 1 was dissolved in 15 ml of acetic acid, and the solution was stirred under reflux with heating for 2 hours. After the stirring, the reaction mixture was stirred at room temperature overnight. After the stirring, the solid precipitated in the reaction mixture was collected by filtration. The obtained solid was washed with diisopropyl ether to obtain 645 mg of the desired product as a white solid.

Melting point: 199-202°C

$^1$H-NMR($CDCl_3$) : δ8.78(d, J=7.2Hz, 1H), 8.73(d, J=1.5Hz, 1H), 8.40(d, J=2.0Hz, 1H), 8.06-8.04(m, 1H), 7.21(dd, J=7.2, 1.5Hz, 1H), 4.33(s, 3H), 3.15(q, J=7.4Hz, 2H), 1.22(t, J=7.4Hz, 3H).

Step 3: Synthesis of 2-[3-(ethylsulfonyl)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-b]pyridine (compound No. 1-1-002a of the present invention)

To a solution of 645 mg of 2-[3-(ethylthio)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-b]pyridine in 15 ml of chloroform, 961 mg of 65 weight% m-chloroperbenzoic acid (containing about 30 weight% of water) was added under cooling with ice. After the addition, the reaction mixture was stirred at room temperature for 2.5 hours. After the reaction, the reaction mixture was mixed with a saturated sodium thiosulfate aqueous solution and extracted with chloroform (10 ml). The resulting organic layer was washed with a 1M sodium hydroxide aqueous solution and dried over anhydrous sodium sulfate, and the solvent was evaporated under reduced pressure. The resulting residue was purified by preparative medium pressure liquid chromatograph using n-hexane/ethyl acetate (with a gradient of from 100:0 to 50:50) as the eluent to obtain 660 mg of the desired product as a white solid.

Melting point: 203-205°C

$^1$H-NMR($CDCl_3$) : δ9.42(d, J=7.5Hz, 1H), 8.77(s, 1H), 8.36(d, J=1.7Hz, 1H), 8.16(s, 1H), 7.32(dd, J=7.5, 1.7Hz, 1H), 4.18(s, 3H), 4.11(q, J=7.5Hz, 2H), 1.47(t, J=7.5Hz, 3H).

Synthetic Example 3: Synthesis of 2-[3-(ethylthio)-6-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-5-[(trifluoromethyl)thio]benz[d]oxazole (compound No. 1-2-003b of the present invention), 2-[3-(ethylsulfonyl)-6-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-5-[(trifluoromethyl)sulfinyl]benz[d]oxazole (compound No. 1-2-002a of the present invention) and 2-[3-(ethylsulfonyl)-6-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-5-[(trifluoromethyl)sulfonyl]benz[d]oxazole (compound No. 1-2-001a of the present invention)

Step 1: Synthesis of 3-(ethylthio)-N-{2-hydroxy-5-[(trifluoromethyl)thio]phenyl}-6-(trifluoromethyl)imidazo[1,2-a]pyridine-2-carboxamide

466 mg of 2-amino-4-[(trifluoromethyl)thio]phenol was dissolved in 10 ml of pyridine, and 356 mg of 3-(ethylthio)-6-(trifluoromethyl)imidazo[1,2-a]pyridine-2-carboxylic acid, 471 mg of 1-ethyl-3-(3-dimethylaminopropyl)carbodiimide hydrochloride and 75 mg of 4-(dimethylamino)pyridine were added. After the addition, the reaction mixture was stirred at room temperature overnight. After the reaction, the solvent was evapoarated under reduced pressure. The resulting residue was purified by preparative medium pressure liquid chromatography using n-hexane/ethyl acetate (with a gradient of from 100:0 to 0:100) as the eluent to obtain 100 mg of the desired product as a reddish brown solid.

Step 2: Synthesis of 2-[3-(ethylthio)-6-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-5-[(trifluoromethyl)thio]benz[d]oxazole (compound No. 1-2-003b of the present invention)

A solution of 89 mg of 3-(ethylthio)-N-{2-hydroxy-5-[(trifluoromethyl)thio]phenyl}-6-(trifluoromethyl)imidazo[1,2-a]pyridine-2-carboxamide in 5 ml of tetrahydrofuran was warmed to 50°C, and 65 mg of bis(2-methoxyethyl) azodicarboxylate and 73 mg of triphenylphosphine were added.

After the addition, the reaction mixture was stirred at 50°C for 3 hours. After the stirring, the reaction mixture was stirred at room temperature overnight. After the reaction, the reaction mixture was mixed with 10 ml of water and extracted with ethyl acetate (10 ml×2). The resulting organic layer was dehydrated with saturated aqueous sodium chloride and dried over anhydrous sodium sulfate, and the solvent was evaporated under reduced pressure. The resulting residue was purified by preparative medium pressure liquid chromatography using n-hexane/ethyl acetate (with a gradient of from 85:15 to 0:100) as the eluent to obtain 21 mg of the desired product as a pale

brown solid.

$^1$H-NMR($CDCl_3$) : δ8.96(s, 1H), 8.23(s, 1H), 8.00-7.45(m, 4H), 3.11(q, J=7.4Hz, 2H), 1.26(t, J=7.4Hz, 3H).

Step 3: Synthesis of 2-[3-(ethylsulfonyl)-6-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-5-[(trifluoromethyl)sulfinyl]benz[d]oxazole (compound No. 1-2-002a of the present invention) and 2-[3-(ethylsulfonyl)-6-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-5-[(trifluoromethyl)sulfonyl]benz[d]oxazole (compound No. 1-2-001a of the present invention)

To a solution of 21 mg of 2-[3-(ethylthio)-6-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-5-[(trifluoromethyl)thio]benz[d]oxazole in 5 ml of chloroform, 67 mg of 65 weight% m-chloroperbenzoic acid (containing about 30 weight% of water) was added. After the addition, the reaction mixture was stirred at room temperature overnight. After the stirring, the reaction mixture was stirred under reflux with heating for another 2 hours. After the reaction, the reaction mixture was mixed with a saturated sodium thiosulfate aqueous solution and extracted with chloroform (10 ml). The resulting organic layer was washed with a satrated sodium hydrogen carbonate aqueous solution and dried over anhydrous sodium sulfate, and the solvent was evaporated under reduced pressure. The resulting residue was purified by preparative medium pressure liquid chromatography using n-hexane/ethyl acetate (with a gradient of from 100:0 to 50:50) as the eluent to obtain 5 mg of the desired 2-[3-(ethylsulfonyl)-6-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-5-[(trifluoromethyl)sulfinyl]benz[d]oxazole as a desired product and 13 mg of the desired 2-[3-(ethylsulfonyl)-6-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-5-[(trifluoromethyl)sulfonyl]benz[d]oxazole respectively as a pale brown solid.

$^1$H-NMR ($CDCl_3$) of 2-[3-(ethylsulfonyl)-6-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-5-[(trifluoromethyl)sulfinyl]benz[d]oxazole: δ9.75(s, 1H), 8.37(s, 1H), 8.05-7.35(m, 4H), 4.09(q, J=7.5Hz, 2H), 1.48(t, J=7.5Hz, 3H).

$^1$H-NMR ($CDCl_3$) of 2-[3-(ethylsulfonyl)-6-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-5-[(trifluoromethyl)sulfonyl]benz[d]oxazole: δ9.74(s, 1H), 8.62(s, 1H), 8.25-7.40(m, 4H), 4.07(q, J=7.5Hz, 2H), 1.50(t, J=7.5Hz, 3H).

Synthetic Example 4: Synthesis of 5-(ethylthio)-6-[3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-b]pyridin-2-yl]-2-[(trifluoromethyl)imidazo[2,1-b]thiazole (compound No. 2-1-

001b of the present invention) and 5-(ethylsulfonyl)-6-[3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-b]pyridin-2-yl]-2-(trifluoromethyl)imidazo[2,1-b]thiazole (compound No. 2-1-001a of the present invention)

Step 1: Synthesis of 5-(ethylthio)-N-[2-(methylamino)-5-(trifluoromethyl)pyridin-3-yl]-2-(trifluoromethyl)imidazo[2,1-b]thiazole-6-carboxamide

242 mg of $N^2$-methyl-5-(trifluoromethyl)pyridine-2,3-diamine was dissolved in 10 ml of pyridine, and 250 mg of 5-(ethylthio)-2-(trifluoromethyl)imidazo[2,1-b]thiazole-6-carboxylic acid, 322 mg of 1-ethyl-3-(3-dimethylaminopropyl)carbodiimide hydrochloride and 10 mg of 4-(dimethylamino)pyridine were added at room temperature. After the addition, the reaction mixture was stirred at room temperature overnignt. After the reaction, the solvent was evaporated under reduced pressure. The resulting residue was mixed with 10 ml of water and extracted with ethyl acetate (10 ml×2). The resulting organic layer was washed with a 1M hydrochloric acid aqueous solution, and dehydrated with saturated aqueous sodium chloride and dried over anhydrous sodium sulfate, and the solvent was evaporated under reduced pressure to obtain crude 5-(ethylthio)-N-[2-(methylamino)-5-(trifluoromethyl)pyridin-3-yl]-2-(trifluoromethyl)imidazo[2,1-b]thiazole-6-carboxamide as the desired product. The crude product was used in the next step without further purification.

Step 2: Synthesis of 5-(ethylhio)-6-[3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-b]pyridin-2-yl]-2-(trifluoromethyl)imidazo[2,1-b]thiazole (compound No. 2-1-001b of the present invention)

The crude 5-(ethylthio)-N-[2-(methylamino)-5-(trifluoromethyl)pyridin-3-yl]-2-(trifluoromethyl)imidazo[2,1-b]thiazole-6-carboxamide obtained in Step 1 was dissolved in 10 ml of acetic acid, and the solution was stirred under reflux with heating for 4.5 hours. After the reaction, the solvent was evaporated under reduced pressure. The resulting residue was mixed with 10 ml of a 1M hydrochloric acid aqueous solution and extracted with ethyl acetate (10 ml×2). The resulting organic layer was dehydrated with saturated aqueous sodium chloride and dried over anhydrous sodium sulfate, and the solvent was evaporated under reduced pressure. The precipitated solid was collected by filtration. The obtained solid was washed with diisopropyl ether to obtain 332 mg of the desired product as a white solid.

Melting point: 200-203°C

$^1$H-NMR($CDCl_3$) : δ8.72-8.67(m, 1H), 8.37-8.33(m, 1H), 8.12-8.08(m, 1H), 4.25(s, 3H), 3.14(q, J=7.5Hz, 2H), 1.25(t, J=7.5Hz, 3H).

Step 3: Synthesis of 5-(ethylsulfonyl)-6-[3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-b]pyridin-2-yl]-2-(trifluoromethyl)imidazo[2,1-b]thiazole (compound No. 2-1-001a of the present invention)

To a solution of 132 mg of 5-(ethylthio)-6-[3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-b]pyridin-2-yl]-2-(trifluoromethyl)imidazo[2,1-b]thiazole in 3 ml of chloroform, 155 mg of 65 weight% m-chloroperbenzoic acid (containing about 30 weight% of water) was added under cooling with ice. After the addition, the reaction mixture was stirred at room temperature for 1.5 hours. After the reaction, the reaction mixture was mixed with a saturated sodium thiosulfate aqueous solution and extracted with chloroform (10 ml). The resulting organic layer was washed with a 1M sodium hydroxide aqueous solution and dried over anhydrous sodium sulfate, and the solvent was evaporated under reduced pressure. The resulting residue was purified by preparative medium pressure liquid chromatography using n-hexane/ethyl acetate (with a gradient of from 100:0 to 50:50) as the eluent to obtain 110 mg of the desired product as a white solid.

Melting point: 249-251°C

$^1$H-NMR($CDCl_3$) : δ8.76-8.71(m, 1H), 8.71-8.66(m, 1H), 8.36-8.32(m, 1H), 4.23(s, 3H), 4.19(q, J=7.5Hz, 2H), 1.45(t, J=7.5Hz, 3H).

Synthetic Example 5: Synthesis of 2-[3-(ethylsulfonyl)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-7-(trifluoromethyl)imidazo[1,2-b]pyridazine (compound No. 1-4-001a of the present invention)

82 mg of 5-(trifluoromethyl)pyridazin-3-amine was dissolved in 5 ml of chlorobenzene, and 200 mg of 2-bromo-1-[3-(ethylsulfonyl)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]ethanone was added at room temperature. After the addition, the reaction mixture was stirred under reflux with heating for 3 hours. After the reaction, the reaction mixture was mixed with 10 ml of a 1M sodium hydroxide aqueous solution and extracted with ethyl acetate (10 ml×2). The obtained organic layer was dehydrated with saturated aqueous sodium chloride and dried over anhydrous sodium sulfate, and the solvent was evaporated under reduced pressure. The resulting residue was purified by preparative medium pressure liquid chromatography using n-hexane/ethyl acetate (with a gradient of from 100:0 to 0:100)

as the eluent to obtain 142 mg of the desired product as a brown solid.

Melting point: 214-218°C

$^1$H-NMR($CDCl_3$) : δ9.40(d, J=7.5Hz, 1H), 8.94(s, 1H), 8.58(d, J=2.0Hz, 1H), 8.34-8.30(m, 1H), 8.11-8.09(m, 1H), 7.24(dd, J=7.5, 2.0Hz, 1H), 3.79(q, J=7.4Hz, 2H), 1.36(t, J=7.4Hz, 3H).

Synthetic Example 6: Synthesis of 2-[3-(ethylthio)-6-(trifluoromethyl)imidazo[1,2-a]pyrazin-2-yl]-3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-b]pyridine (compound No. 1-1-029b of the present invention) and 2-[3-(ethylsulfonyl)-6-(trifluoromethyl)imidazo[1,2-a]pyrazin-2-yl]-3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-b]pyridine (compound No. 1-1-029a of the present invention)

Step 1: Synthesis of 3-(ethylthio)-N-[2-(methylamino)-5-(trifluoromethyl)pyridin-3-yl]-6-(trifluoromethyl)imidazo[1,2-a]pyrazine-2-carboxamide

271 mg of $N^2$-methyl-5-(trifluoromethyl)pyridine-2,3-diamine was dissolved in 10 ml of pyridine, and 270 mg of 3-(ethylthio)-6-(trifluoromethyl)imidazo[1,2-a]pyrazine-2-carboxylic acid and 357 mg of 1-ethyl-3-(3-dimethylaminopropyl)carbodiimide hydroxhloride were added. After the addition, the reaction mixture was stirred at room temperature for 2 hours. After the reaction, the solvent was evaporated under reduced pressure. The resulting residue was mixed with 10 ml of water and extracted with ethyl acetate (10 ml×2). The resulting organic layer was dehydrated with saturated aqueous sodium chloride and dried over anhydrous sodium sulfate, and the solvent was evaporated under reduce pressure to obtain crude 3-(ethylthio)-N-[2-(methylamino)-5-(trifluoromethyl)pyridin-3-yl]-6-(trifluoromethyl)imidazo[1,2-a]pyrazine-2-carboxamide. The crude product was used in the next step without further purification.

Step 2: Synthesis of 2-[3-(ethylthio)-6-(trifluoromethyl)imidazo[1,2-a]pyrazin-2-yl]-3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-b]pyridine (compound No. 1-1-029b of the present invention)

The crude 3-(ethylthio)-N-[2-(methylamino)-5-(trifluoromethyl)pyridin-3-yl]-6-(trifluoromethyl)imidazo[1,2-a]pyrazine-2-carboxamide obtained in Step 1 was dissolved in 10 ml of acetic acid, and the solution was stirred under reflux with heating for 17 hours. After the reaction, the solvent was evaporated under reduced pressure. The resulting residue was mixed with 10 ml of water and extracted with ethyl acetate (10 ml×2). The resulting organic layer was dehydrated with saturated aqueous sodium

chloride and dried over anhydrous sodium sulfate, and the solvent was evaporated under reduced pressure. The resulting residue was purified by preparative medium pressure liquid chlromatography using n-hexane/ethyl acetate (with a gradient of from 100:0 to 80:20) as the eluent to obtain 257 mg of the desired product as a white solid.

Melting point: 220-222°C

$^1$H-NMR($CDCl_3$) : δ9.24(s, 1H), 8.99(s, 1H), 8.76(d, J=1.5Hz, 1H), 8.42(d, J=1.5Hz, 1H), 4.37(s, 3H), 3.26(q, J=7.5Hz, 2H), 1.25(t, J=7.5Hz, 3H).

Step 3: Synthesis of 2-[3-(ethylsulfonyl)-6-(trifluoromethyl)imidazo[1,2-a]pyrazin-2-yl]-3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-b]pyridine (compound No. 1-1-029a of the present invention)

To a solution of 232 mg of 2-[3-(ethylthio)-6-(trifluoromethyl)imidazo[1,2-a]pyrazin-2-yl]-3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-b]pyridine in 5 ml of chloroform, 326 mg of 65 weight% m-chloroperbenzoic acid (containing about 30 weight% of water) was added under cooling with ice. After the addition, the reaction mixture was stirred at room temperature for 2 hours. After the reaction, the reaction mixture was mixed with a saturated sodium thiosulfate aqueous solution and extracted with chloroform (10 ml). The resulting organic layer was washed with a saturated sodium hydrogen carbonate aqueous solution and dried over anhydrous sodium sulfate, and the solvent was evaporated under reduced pressure. The obtained solid was mixed with 10 ml of diisopropyl ether, followed by filtration to obtain 203 mg of the desired product as a white solid.

Melting point: 234-236°C

$^1$H-NMR($CDCl_3$) : δ9.63(s, 1H), 9.39(s, 1H), 8.81-8.77(m, 1H), 8.39-8.36(m, 1H), 4.25(s, 3H), 4.23(q, J=7.5Hz, 2H), 1.49(t, J=7.5Hz, 3H).

Synthetic Example 7: Synthesis of 2-[6-bromo-3-(ethylthio)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-b]pyridine (compound No. 1-1-023b of the present invention) and 2-[6-bromo-3-(ethylsulfonyl)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-b]pyridine (compound No. 1-1-023a of the present invention)

Step 1: Synthesis of 6-bromo-N-[2-(methylamino)-5-(trifluoromethyl)pyridin-3-yl]-7-(trifluoromethyl)imidazo[1,2-a]pyridine-2-carboxamide

1.51 g of $N^2$-methyl-5-(trifluoromethyl)pyridine-2,3-diamine was dissolved in 20 ml

of pyridine, and 2.04 g of 6-bromo-7-(trifluoromethyl)imidazo[1,2-a]pyridine-2-carboxylic acid and 2.53 g of 1-ethyl-3-(3-dimethylaminopropyl)carbodiimide hydrochloride were added. After the addition, the reaction mixture was stirred at room temperature for 3 hours. After the reaction, 20 ml of water was added to the reaction mixture, and the precipitated solid was collected by filtration to obtain 2.98 g of desired product as a flesh-colored solid.

Melting point: 200-205°C

$^1$H-NMR($CDCl_3$) : δ8.77(brs, 1H), 8.54(s, 1H), 8.40-8.36(m, 1H), 8.28(s, 1H), 8.04(s, 1H), 7.85(d, J=2.0Hz, 1H), 5.20(brs, 1H), 3.10(d, J=4.8Hz, 3H).

Step 2: Synthesis of 2-[6-bromo-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-b]pyridine

2.93 g of 6-bromo-N-[2-(methylamino)-5-(trifluoromethyl)pyridin-3-yl]-7-(trifluoromethyl)imidazo[1,2-a]pyridine-2-carboxamide was dissolved in 15 ml of acetic acid, and the solution was stirred under reflux with heating for 2 hours. After the reaction, the solvent was evaporated under reduced pressure. The resulting residue was mixed with 10 ml of water and extracted with chloroform (10 ml×2). The resulting organic layer was dried over anhydrous sodim sulfate, and the solvent was evaporated under reduced pressure. The resulting residue was purified by preparative medium pressure liquid chromatography using n-hexane/ethyl acetate (with a gradient of from 100:0 to 0:100) as the eluent to obtain 2.82 g of the desired product as a pale brown solid.

Melting point: 220-225°C

$^1$H-NMR($CDCl_3$) : δ8.71(d, J=1.4Hz, 1H), 8.55(s, 1H), 8.51(s, 1H), 8.27(d, J=1.4Hz, 1H), 8.14(s, 1H), 4.47(s, 3H).

Step 3: Synthesis of 2-[6-bromo-3-(ethylthio)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-b]pyridine (compound No. 1-1-023b of the present invention)

518 mg of N-chlorosuccinimide was dissolved in 5 ml of 1,2-dichloroethane, and 321 mg of ethanethiol was added at -40°C. After the addition, the reaction mixture was stirred at room temperature for 30 minutes. After the stirring, to the reaction mixture, a solution of 300 mg of 2-[6-bromo-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-b]pyridine in 2 ml of 1,2-dichloroethane was added at

room temperature. After the addition, the reaction mixture was stirred under reflux with heating for 3 hours. After the stirring, to the reaction mixture, a solution of 1.04 g of N-chlorosuccinimide and 642 mg of ethanethiol in 5 ml of 1,2-dichloroethane prepared in a separate container was added at room temperature. After the addition, the reaction mixture was stirred under reflux with heating for 3 hours. After the reaction, the reaction mixture was mixed with 10 ml of water and extracted with chloroform (10 ml×2). The resulting organic layer was dried over anhydrous sodium sulfate, and the solvent was evaporated under reduced pressure. The resulting residue was purified by preparative medium pressure liquid chromatography using n-hexane/ethyl acetate (with a gradient of from 100:0 to 0:100) as the eluent to obtain 212 mg of the desired product as a white solid.

Melting point: 214-215°C

$^1$H-NMR($CDCl_3$) : δ8.93(s, 1H), 8.74(d, J=1.4Hz, 1H), 8.40(d, J=1.4Hz, 1H), 8.13(s, 1H), 4.33(s, 3H), 3.18(q, J=7.4Hz, 2H), 1.24(t, J=7.4Hz, 3H).

Step 4: Synthesis of 2-[6-bromo-3-(ethylsulfonyl)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-b]pyridine (compound No. 1-1-023a of the present invention)

To a solution of 150 mg of 2-[6-bromo-3-(ethylthio)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-b]pyridine in 5 ml of chloroform, 175 mg of 65 weight% m-chloroperbenzoic acid (containing about 30 weight% of water) was added under cooling with ice. After the addition, the reaction mixture was stirred at room temperature for 2 hours. After the reaction, the reaction mixture was mixed with a saturated sodium thiosulfate aqueous solution and extracted with chloroform (10 ml). The resulting organic layer was washed with a 1M sodium hydroxide aqueous solution and dried over anhydrous sodium sulfate, and the solvent was evaporated under reduced pressure. The resulting residue was purified by preparative medium pressure liquid chromatography using n-hexane/ethyl acetate (with a gradient of from 100:0 to 0:100) as the eluent to obtain 142 mg of the desired product as a white solid.

Melting point: 226-228°C

$^1$H-NMR($CDCl_3$) : δ9.60(s, 1H), 8.77(d, J=1.4Hz, 1H), 8.36(d, J=1.4Hz, 1H), 8.23(s, 1H), 4.19(s, 3H), 4.15(q, J=7.5Hz, 2H), 1.49(t, J=7.5Hz, 3H).

Synthetic Example 8: Synthesis of 2-[3-(ethylthio)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-5-(trifluoromethyl)-3H-imidazo[4,5-b]pyridine (compound No. 1-1-031b of the present invention), 2-[3-(ethylthio)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-1-methyl-5-(trifluoromethyl)-1H-imidazo[4,5-b]pyridine (compound No. 1-7-001b of the present invention) and 2-[3-(ethylthio)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-3-methyl-5-(trifluoromethyl)-3H-imidazo[4,5-b]pyridine (compound No. 1-1-030b of the present invention)

Step 1: Synthesis of N-[2-amino-6-(trifluoromethyl)pyridin-3-yl]-3-ethylthio-7-(trifluoromethyl)imidazo[1,2-a]pyridine-2-carboxamide

712 mg of 6-(trifluoromethyl)pyridine-2,3-diamine was dissolved in 10 ml of pyridine, and 972 mg of 3-(ethylthio)-7-(trifluoromethyl)imidazo[1,2-a]pyridine-2-carboxylic acid and 1.32 g of 1-ethyl-3-(3-dimethylaminopropyl)carbodiimide hydrochloride were added at room temperature. After the addition, the reaction mixture was stirred at room temperature overnight. After the reaction, 20 ml of water was added to the reaction mixture, and the precipitated solid was collected by filtration to obtain 1.20 g of the desired crude product as a reddish brown solid. The crude product was used in the next step without further purification.

Step 2: Synthesis of 2-[3-(ethylthio)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-5-(trifluoromethyl)-3H-imidazo[4,5-b]pyridine (compound No. 1-1-031b of the present invention)

1.2 g of the crude N-[2-amino-6-(trifluoromethyl)pyridin-3-yl]-3-ethylthio-7-(trifluoromethyl)imidazo[1,2-a]pyridine-2-carboxamide obtained in Step 1 was dissolved in 10 ml of propionic acid, and the solution was stirred under reflux with heating for 3 hours. After the reaction, the solvent was evaporated under reduced pressure. The resulting residue was mixed with 10 ml of water and extracted with ethyl acetate (10 ml×2). The resulting organic layer was washed with a 1M sodium hydroxide aqueous solution and dried over anhydrous sodium sulfate, and the solvent was evaporated under reduced pressure to obtain 1.0 g of the desired product as a brown solid. The product was used in the next step without further purification.

$^1$H-NMR($CDCl_3$) : δ8.59(d, J=7.2Hz, 1H), 8.03(d, J=7.8Hz, 1H), 7.83(s, 1H), 7.36(d, J=7.8Hz, 1H), 7.04-6.98(m, 1H), 3.02(q, J=7.4Hz, 2H), 1.05(t, J=7.4Hz, 3H) (no peak of proton of NH was observed).

Step 3: Synthesis of 2-[3-(ethylthio)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-1-methyl-5-(trifluoromethyl)-1H-imidazo[4,5-b]pyridine (compound No. 1-7-001b of the present invention) and 2-[3-(ethylthio)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-3-methyl-5-(trifluoromethyl)-3H-imidazo[4,5-b]pyridine (compound No. 1-1-030b of the present invention)

To a solution of 66 mg of 63 weight% sodium hydride (dispersed in mineral oil) in 3 ml of N,N-dimethylformamide, a solution of 500 mg of 2-[3-(ethylthio)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-5-(trifluoromethyl)-3H-imidazo[4,5-b]pyridine in 7 ml of N,N-dimethylformamide was added under cooling with ice. After the addition, the reaction mixture was stirred under cooling with ice for 30 minutes. After the stirring, to the reaction mixture, 286 mg of methyl trifluoromethanesulfonate was added under cooling with ice. After the addition, the reaction mixture was stirred at room temperature for 1.5 hours. After the reaction, the reaction mixture was mixed with 10 ml of water and extracted with ethyl acetate (10 ml×2). The resulting organic layer was dehydrated with saturated aqueous sodium chloride and dried over anhydrous sodium sulfate, and the solvent was evaporated under reduced pressure. The resulting residue was purified by preparative medium pressure liquid chromatography using n-hexane/ethyl acetate (with a gradient of from 100:0 to 50:50) as the eluent to obtain 150 mg of the desired 2-[3-(ethylthio)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-1-methyl-5-(trifluoromethyl)-1H-imidazo[4,5-b]pyridine and 218 mg of the desired 2-[3-(ethylthio)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-3-methyl-5-(trifluoromethyl)-3H-imidazo[4,5-b]pyridine respectively as a brown solid and as a white solid.

Melting point of 2-[3-(ethylthio)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-1-methyl-5-(trifluoromethyl)-1H-imidazo[4,5-b]pyridine: 164-166°C

$^1$H-NMR($CDCl_3$) : δ8.81(d, J=7.5Hz, 1H), 8.03(s, 1H), 7.91(d, J=8.2Hz, 1H), 7.70(d, J=8.2Hz, 1H), 7.20(dd, J=7.5, 1.7Hz, 1H), 4.31(s, 3H), 3.35(q, J=7.4Hz, 2H), 1.24(t, J=7.4Hz, 3H).

Melting point of 2-[3-(ethylthio)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-3-methyl-5-(trifluoromethyl)-3H-imidazo[4,5-b]pyridine: 163-165°C

$^1$H-NMR($CDCl_3$) : δ8.77(d, J=7.2Hz, 1H), 8.26(d, J=8.2Hz, 1H), 8.06(s, 1H), 7.68(d, J=8.2Hz, 1H), 7.21(dd, J=7.2, 1.5Hz, 1H), 4.33(s, 3H), 3.12(q, J=7.4Hz, 2H), 1.20(t, J=7.4Hz, 3H).

Synthetic Example 9: Synthesis of 2-[3-(ethylthio)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-c]pyridine (compound No. 1-8-005b of the present invention) and synthesis of 2-[3-(ethylsulfonyl)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-c]pyridine (compound No. 1-8-005a of the present invention)

Step 1: Synthesis of 3-(ethylthio)-N-[5-(methylamino)-2-(trifluoromethyl)pyridin-4-yl]-7-(trifluoromethyl)imidazo[1,2-a]pyridine-2-carboxamide

303 mg of $N^3$-methyl-6-(trifluoromethyl)pyridine-3,4-diamine was dissolved in 15 ml of pyridine, and 552 mg of 3-(ethylthio)-7-(trifluoromethyl)imidazo[1,2-a]pyridine-2-carboxylic acid and 732 mg of 1-ethyl-3-(3-dimethylaminopropyl)carbodiimide hydrochloride were added at room temperature. After the addition, the reaction mixture was stirred at room temperature overnight. After the reaction, the solvent was evaporated under reduced pressure. The obtained residue was mixed with 10 ml of water and extracted with chloroform (10 ml×2). The resulting organic layer was dried over anhydrous sodium sulfate, and the solvent was evaporated under reduced pressure to obtain 986 mg of the desired crude product. The crude product was used in the next step without further purification.

Step 2: Synthesis of 2-[3-(ethylthio)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-c]pyridine (compound No. 1-8-005b of the present invention)

986 mg of the crude 3-(ethylthio)-N-[5-(methylamino)-2-(trifluoromethyl)pyridin-4-yl]-7-(trifluoromethyl)imidazo[1,2-a]pyridine-2-carboxamide obtained in Step 1 was dissolved in 15 ml of acetic acid, and the solution was stirred under reflux with heating for 22 hours. After the stirring, the reaction mixture was stirred at room temperature overnight. After the reaction, the solvent was evaporated under reduced pressure. The resulting residue was mixed with 10 ml of water and extracted with chloroform (10 ml×2). The resulting organic layer was dried over anhydrous sodium sulfate, and the solvent was evaporated under reduced pressure. The resulting residue was purified by preparative medium pressure liquid chromatography using n-hexane/ethyl acetate (with a gradient of from 100:0 to 70:30) as the eluent to obtain 358 mg of the desired product as a yellow solid.

Melting point: 217-219°C

$^1$H-NMR($CDCl_3$) : δ8.97(s, 1H), 8.78(d, J=7.2Hz, 1H), 8.20(s, 1H), 8.05(s, 1H), 7.22(d, J=7.2Hz, 1H), 4.37(s, 3H), 3.15(q, J=7.5Hz, 2H), 1.22(t, J=7.5Hz, 3H).

Step 3: Synthesis of 2-[3-(ethylsulfonyl)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-c]pyridine (compound No. 1-8-005a of the present invention)

To a solution of 258 mg of 2-[3-(ethylthio)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-c]pyridine in 8 ml of chloroform, 323 mg of 65 weight% m-chloroperbenzoic acid (containing about 30 weight% of water) was added under cooling with ice. After the addition, the reaction mixture was stirred at room temperature for one hour. After the reaction, the reaction mixture was mixed with a saturated sodium thiosulfate aqueous solution and extracted with chloroform (10 ml). The resulting organic layer was washed with a saturated sodium hydrogen carbonate aqueous solution and dried over anhydrous sodium sulfate, and the solvent was evaporated under reduced pressure. The resulting residue was purified by preparative medium pressure liquid chromatography using n-hexane/ethyl acetate (with a gradient of from 100:0 to 50:50) as the eluent. 10 ml of diisopropyl ether was added to the obtained solid, follwed by filtration to obtain 200 mg of the desired product as a yellow solid.

Melting point: 245-247°C

$^1$H-NMR($CDCl_3$) : δ9.39(d, J=7.2Hz, 1H), 9.00(s, 1H), 8.14(s, 2H), 7.33(d, J=7.2Hz, 1H), 4.20(s, 3H), 4.07(q, J=7.5Hz, 2H), 1.46(t, J=7.5Hz, 3H).

Synthetic Example 10: Synthesis of 2-[3-(ethylthio)-6-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-3,4-dimethyl-6-(trifluoromethyl)-3H-imidazo[4,5-c]pyridine (compound No. 1-8-003b of the present invention) and 2-[3-(ethylsulfonyl)-6-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-3,4-dimethyl-6-(trifluoromethyl)-3H-imidazo[4,5-c]pyridine (compound No. 1-8-003a of the present invention)

Step 1: Synthesis of 3-(ethylthio)-N-[2-methyl-3-(methylamino)-6-(trifluoromethyl)pyridin-4-yl]-6-(trifluoromethyl)imidazo[1,2-a]pyridine-2-carboxamide

212 mg of $N^3$,2-dimethyl-6-(trifluoromethyl)pyridine-3,4-diamine was dissolved in 10 ml of pyridine, and 200 mg of 3-(ethylthio)-6-(trifluoromethyl)imidazo[1,2-a]pyridine-2-carboxylic acid, 264 mg of 1-ethyl-3-(3-dimethylaminopropyl)carbodiimide hydrochloride and 9 mg of 4-(dimethylamino)pyridine were added at room temperature.

After the addition, the reaction mixture was stirred at room temperature overnight. After the reaction, the solvent was evaporated under reduced pressure. The resulting residue was mixed with 10 ml of water and extracted with ethyl acetate (10 ml×2). The resulting organic layer was dried over anhydrous sodium sulfate, and the solvent was evaporated under reduced pressure to obtain crude 3-(ethylthio)-N-[2-methyl-3-(methylamino)-6-(trifluoromethyl)pyridin-4-yl]-6-(trifluoromethyl)imidazo[1,2-a]pyridine-2-carboxamide. The crude product was used in the next step without further purification.

Step 2: Synthesis of 2-[3-(ethylthio)-6-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-3,4-dimethyl-6-(trifluoromethyl)-3H-imidazo[4,5-c]pyridine (compound No. 1-8-003b of the present invention)

The crude 3-(ethylthio)-N-[2-methyl-3-(methylamino)-6-(trifluoromethyl)pyridin-4-yl]-6-(trifluoromethyl)imidazo[1,2-a]pyridine-2-carboxamide obtained in Step 1 was dissolved in 10 ml of acetic acid, and the solution was stirred under reflux with heating for 3 hours. After the reaction, the solvent was evaporated under reduced pressure. The resulting residue was mixed with 10 ml of water and extracted with ethyl acetate (10 ml×2). The resulting organic layer was dehydrated with saturated aqueous sodium chloride and dried over anhydrous sodium sulfate, and the solvent was evaporated under reduced pressure. The resulting residue was purified by preparative medium pressure liquid chromatography using n-hexane/ethyl acetate (with a gradient of from 100:0 to 70:30) as the eluent to obtain 85 mg of the desired product as a white solid.

Melting point: 169-171°C

$^1$H-NMR($CDCl_3$) : δ9.01(s, 1H), 8.03(s, 1H), 7.83(d, J=9.3Hz, 1H), 7.54(dd, J=9.3, 1.8Hz, 1H), 4.41(s, 3H), 3.10(q, J=7.5Hz, 2H), 3.08(s, 3H), 1.22(t, J=7.5Hz, 3H).

Step 3: Synthesis of 2-[3-(ethylsulfonyl)-6-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-3,4-dimethyl-6-(trifluoromethyl)-3H-imidazo[4,5-c]pyridine (compound No. 1-8-003a of the present invention)

To a solution of 49 mg of 2-[3-(ethylthio)-6-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-3,4-dimethyl-6-(trifluoromethyl)-3H-imidazo[4,5-c]pyridine in 3 ml of chloroform, 57 mg of 65 weight% m-chloroperbenzoic acid (containing about 30 weight% of water) was added under cooling with ice. After the addition, the reaction mixture was stirred at room temperature for 2 hours. After the reaction, the reaction mixture was mixed with a saturated sodium thiosulfate aqueous solution and extracted with chloroform (10 ml).

The resulting organic layer was washed with a saturated sodium hydrogen carbonate aqueous solution and dried over anhydrous sodium sulfate, and the solvent was evaporated under reduced pressure. The resulting residue was purified by preparative medium pressure liquid chromatography using n-hexane/ethyl acetate (with a gradient of from 100:0 to 50:50) as the eluent to obtain 37 mg of the desired product as a white solid.

Melting point: 200-205°C

$^1$H-NMR($CDCl_3$) : δ9.59(s, 1H), 7.97(s, 1H), 7.96(d, J=9.6Hz, 1H), 7.74(dd, J=9.6, 1.5Hz, 1H), 4.25(s, 3H), 3.96(q, J=7.5Hz, 2H), 3.08(s, 3H), 1.45(t, J=7.5Hz, 3H).

Synthetic Example 11: Synthesis of 3-(ethylsulfonyl)-6,7'-bis(trifluoromethyl)-2,2'-biimidazo[1,2-a]pyridine (compound No. 1-5-002a of the present invention)

102 mg of 4-(trifluoromethyl)pyridin-2-amine was dissolved in 4 ml of bromobenzene, and 300 mg of 2-bromo-1-[3-(ethylsulfonyl)-6-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]ethanone was added at room temperature. After the addition, the reaction mixture was stirred under reflux with heating for 5 hours. After the reaction, the reaction mixture was mixed with 10 ml of a 1M sodium hydroxide aqueous solution and extracted with ethyl acetate (10 ml×2). The resulting organic layer was dehydrated with saturated aqueous sodium chloride and dried over anhydrous sodium sulfate, and the solvent was evaporated under reduced pressure. The resulting residue was purified by preparative medium pressure liquid chromatography using n-hexane/ethyl acetate (with a gradient of from 100:0 to 50:50) as the eluent to obtain 168 mg of the desired product as a white solid.

Melting point: 245-248°C

$^1$H-NMR($CDCl_3$) : δ9.65(s, 1H), 8.57(s, 1H), 8.30(d, J=7.2Hz, 1H), 8.01(s, 1H), 7.90(d, J=9.6Hz, 1H), 7.63(dd, J=9.6, 1.8Hz, 1H), 7.03(dd, J=7.2, 1.8Hz, 1H), 3.73(q, J=7.5Hz, 2H), 1.33(t, J=7.5Hz, 3H).

Synthetic Example 12: Synthesis of 2-[3-(ethylsulfonyl)-6-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-7-(perfluoroethyl)imidazo[1,2-c]pyridine (compound No. 1-3-008a of the present invention) and 3-bromo-2-[3-(ethylsulfonyl)-6-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-7-(perfluoroethyl)imidazo[1,2-c]pyrimidine (compound No. 1-3-010a of the present invention)

Step 1: Synthesis of 2-[3-(ethylsulfonyl)-6-(trifluoromethyl)imidazo[1,2-a]pyridin-2-

yl]-7-(perfluoroethyl)imidazo[1,2-c]pyrimidine (compound No. 1-3-008a of the present invention)

800 mg of 6-(perfluoroethyl)pyrimidin-4-amine was dissolved in 10 ml of chlorobenzene, and 1,780 mg of 2-bromo-1-[3-(ethylsulfonyl)-6-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]ethanone was added at room temperature. After the addition, the reaction mixture was stirred under reflux with heating for 3 hours. After the reaction, the reaction mixture was mixed with 10 ml of a 1M sodium hydroxide aqueous solution and extracted with ethyl acetate (10 ml×2). The resulting organic layer was dehydrated with saturated aqueous sodium chloride and dried over anhydrous sodium sulfate, and the solvent was evaporated under reduced pressure. The resulting residue was purified by preparative medium pressure liquid chromatography using n-hexane/ethyl acetate (with a gradient of from 100:0 to 50:50) as the eluent to obtain 926 mg of the desired product as a pale solid.

Melting point: 233-239°C

$^1$H-NMR($CDCl_3$) : δ9.63(s, 1H), 9.19(s, 1H), 8.64(s, 1H), 8.05(s, 1H), 7.92(d, J=9.6Hz, 1H), 7.66(dd, J=9.6, 1.5Hz, 1H), 3.72(q, J=7.5Hz, 2H), 1.35(t, J=7.5Hz, 3H).

Step 2: Synthesis of 3-bromo-2-[3-(ethylsulfonyl)-6-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-7-(perfluoroethyl)imidazo[1,2-c]pyrimidine (compound No. 1-3-010a of the present invention)

To a solution of 150 mg of 2-[3-(ethylsulfonyl)-6-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-7-(perfluoroethyl)imidazo[1,2-c]pyrimidine in 2 ml of N,N-dimethylformamide, 57 mg of N-bromosuccinimide was added under cooling with ice. After the addition, the reaction mixture was stirred at room temperature for 2 hours. After the reaction, the reaction mixture was mixed with 10 ml of water and extracted with diethyl ether (10 ml×2). The resulting organic layer was washed with a saturated sodium thiosulfate aqueous solution and then with saturated sodium hydrogen carbonate, dehydrated with saturated aqueous sodium chloride and dried over anhydrous sodium sulfate, and the solvent was evaporated under reduced pressure. The resulting residue was purified by preparative medium pressure liquid chromatography using n-hexane/ethyl acetate (with a gradient of from 100:0 to 0:100) as the eluent to obtain 127 mg of the desired product as a white solid.

Melting point: 200-205°C

$^1$H-NMR($CDCl_3$) : δ9.61(s, 1H), 9.20(s, 1H), 7.99(s, 1H), 7.96(d, J=9.6Hz, 1H), 7.68(d, J=9.6Hz, 1H), 4.00(q, J=7.5Hz, 2H), 1.46(t, J=7.5Hz, 3H).

Synthetic Example 13: Synthesis of 2-[3-(ethylsulfonyl)-6-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-5-methyl-7-(perfluoroethyl)imidazo[1,2-c]pyrimidine (compound No. 1-3-007a of the present invention)

143 mg of 2-methyl-6-(perfluoroethyl)pyrimidin-4-amine was dissolved in 4 ml of bromobenzene, and 300 mg of 2-bromo-1-[3-(ethylsulfonyl)-6-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]ethanone was added at room temperature. After the addition, the reaction mixture was stirred under reflux with heating for 5 hours. After the reaction, the reaction mixture was mixed with 10 ml of a 1M sodium hydroxide aqueous solution and extracted with ethyl acetate (10 ml×2). The resulting organic layer was dehydrated with saturated aqueous sodium chloride and dried over anhydrous sodium sulfate, and the solvent was evaporated under reduced pressure. The resulting residue was purified by preparative medium pressure liquid chromatography using n-hexane/ethyl acetate (with a gradient of from 100:0 to 50:50) as the eluent to obtain 82 mg of the desired product as a pale yellow solid.

Melting point: 224-226°C

$^1$H-NMR($CDCl_3$) : δ9.66(s, 1H), 8.46(s, 1H), 7.94(s, 1H), 7.90(d, J=9.6Hz, 1H), 7.66(dd, J=9.6, 1.8Hz, 1H), 3.85(q, J=7.5Hz, 2H), 2.97(s, 3H), 1.37(t, J=7.5Hz, 3H).

Synthetic Example 14: Synthesis of 6-[3-(ethylsulfonyl)-6-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-2-(trifluoromethyl)imidazo[2,1-b]thiazole (compound No. 1-12-001a of the present invention)

106 mg of 5-(trifluoromethyl)thiazol-2-amine was dissolved in 4 ml of bromobenzene, and 300 mg of 2-bromo-1-[3-(ethylsulfonyl)-6-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]ethanone was added at room temperature. After the addition, the reaction mixture was stirred under reflux with heating for 5 hours. After the reaction, the reaction mixture was mixed with 10 ml of a 1M sodium hydroxide aqueous solution and extracted with ethyl acetate (10 ml×2). The resulting organic layer was dehydrated with saturated aqueous sodium chloride and dried over anhydrous sodium sulfate, and the solvent was evaporated under reduced pressure. The resulting residue was purified by preparative medium pressure liquid chromatography using n-hexane/ethyl acetate (with a gradient of from 100:0 to 50:50)

as the eluent to obtain 153 mg of the desired product as a white solid.

Melting point:219-220°C

$^1$H-NMR($CDCl_3$) : δ9.60(s, 1H), 8.44(s, 1H), 7.97-7.94(m, 1H), 7.87(d, J=9.6Hz, 1H), 7.62(dd, J=9.6, 1.5Hz, 1H), 3.59(q, J=7.5Hz, 2H), 1.30(t, J=7.5Hz, 3H).

Synthetic Example 15: Synthesis of 2-[3-(ethylthio)-1-methyl-5-(trifluoromethyl)-1H-indol-2-yl]-3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-b]pyridine (compound No. 3-1-001b of the present invention) and 2-[3-(ethylsulfonyl)-1-methyl-5-(trifluoromethyl)-1H-indol-2-yl]-3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-b]pyridine (compound No. 3-1-001a of the present invention)

Step 1: Synthesis of 1-methyl-N-[2-(methylamino)-5-(trifluoromethyl)pyridin-3-yl]-5-(trifluoromethyl)-1H-indole-2-carboxamide

573 mg of $N^2$-methyl-5-(trifluoromethyl)pyridine-2,3-diamine was dissolved in 10 ml of pyridine, and 608 mg of 1-methyl-5-(trifluoromethyl)-1H-indole-2-carboxylic acid, 959 mg of 1-ethyl-3-(3-dimethylaminopropyl)carbodiimide hydrochloride and 31 mg of 4-(dimethylamino)pyridine were added at room temperature. After the addition, the reaction mixture was stirred at room temperature overnight. After the reaction, 20 ml of water was added to the reaction mixture, and the precipitated solid was collected by filtration to obtain 1.02 g of the desired crude product as a gray solid. The crude product was used in the next step without further purification.

Step 2: Synthesis of 3-methyl-2-[1-methyl-5-(trifluoromethyl)-1H-indol-2-yl]-6-(trifluoromethyl)-3H-imidazo[4,5-b]pyridine

968 mg of the crude 1-methyl-N-[2-(methylamino)-5-(trifluoromethyl)pyridin-3-yl]-5-(trifluoromethyl)-1H-indole-2-carboxamide obtained in Step 1 was dissolved in 10 ml of acetic acid, and the solution was stirred under reflux with heating for 3 hours. After the reaction, the solvent was evaporated under reduced pressure. The resulting residue was mixed with 10 ml of water and extracted with ethyl acetate (10 ml×2). The resulting organic layer was dehydrated with saturated aqueous sodium chloride and dried over anhydrous sodium sulfate, and the solvent was evaporated under reduced pressure. The resulting residue was purified by preparative medium pressure liquid chromatography using n-hexane/ethyl acetate (with a gradient of from 100:0 to 0:100) as the eluent to obtain 638mg of the desired product as a flesh-colored solid.

Melting point: 200-202°C

$^1$H-NMR(DMSO-d6) : δ8.84(d, J=1.4Hz, 1H), 8.64(d, J=1.4Hz, 1H), 8.15(s, 1H), 7.86(d, J=8.9Hz, 1H), 7.63(dd, J=8.9, 1.4Hz, 1H), 7.46(s, 1H), 4.12(s, 3H), 4.06(s, 3H).

Step 3: Synthesis of 2-[3-iodo-1-methyl-5-(trifluoromethyl)-1H-indol-2-yl]-3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-b]pyridine

To a solution of 478 mg of 3-methyl-2-[1-methyl-5-(trifluoromethyl)-1H-indol-2-yl]-6-(trifluoromethyl)-3H-imidazo[4,5-b]pyridine in 8 ml of N,N-dimethylformamide, 405 mg of N-iodosuccinimide was added at room temperature. After the addition, the reaction mixture was stirred under reflux with heating for 7 hours. After the reaction, a saturated sodium thiosulfate aqueous solution was added to the reaction mixture, and the precipitated solid was collected by filtration to obtain 675 mg of the desired product as a white solid.

Melting point: 165-167°C

$^1$H-NMR($CDCl_3$) : δ8.82(d, J=1.4Hz, 1H), 8.43(d, J=1.4Hz, 1H), 7.90-7.87(m, 1H), 7.66(dd, J=8.7, 1.4Hz, 1H), 7.52(d, J=8.7Hz, 1H), 3.97(s, 3H), 3.85(s, 3H).

Step 4: Synthesis of 2-[3-(ethylthio)-1-methyl-5-(trifluoromethyl)-1H-indol-2-yl]-3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-b]pyridine (compound No. 3-1-001b of the present invention)

To a solution of 626 mg of 2-[3-iodo-1-methyl-5-(trifluoromethyl)-1H-indol-2-yl]-3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-b]pyridine in 10 ml of 1,4-dioxane, 154 mg of diisopropylethylamine, 69 mg of 4,5'-bis(diphenylphosphino)-9,9'-dimethylxanthene, 54 mg of tris(dibenzylideneacetone)dipalladium(0) and 111 mg of ethanethiol were successively added at room temperature. After the addition, the atmosphere in the reaction vessel was replaced by nitrogen gas, and the mixture was stirred under reflux with heating for 1.5 hours. After the reaction, the reaction mixture was subjected to filtration through Celite™,

and the Celite was washed with chloroform. The resulting filtrate and washing solution were put together, and the solvent was evaporated under reduced pressure. The resulting residue was purified by preparative medium pressure liquid chromatography using n-hexane/ethyl acetate (with a gradient of from 100:0 to 50:50) as the eluent to obtain 545 mg of the desired product as a pale yellow solid.

Melting point: 153-155°C

$^1$H-NMR($CDCl_3$) : δ8.80(s, 1H), 8.40(s, 1H), 8.19(s, 1H), 7.65(d, J=8.5Hz, 1H), 7.55(d, J=8.5Hz, 1H), 3.95(s, 3H), 3.85(s, 3H), 2.59(q, J=7.4Hz, 2H), 1.00(t, J=7.4Hz,

3H).

Step 5: Synthesis of 2-[3-(ethylsulfonyl)-1-methyl-5-(trifluoromethyl)-1H-indol-2-yl]-3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-b]pyridine (compound No. 3-1-001a of the present invention)

To a solution of 250 mg of 2-[3-(ethylthio)-1-methyl-5-(trifluoromethyl)-1H-indol-2-yl]-3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-b]pyridine in 5 ml of chloroform, 333 mg of 65 weight% m-chloroperbenzoic acid (containing about 30 weight% of water) was added under cooling with ice. After the addition, the reaction mixture was stirred at room temperature for 2 hours. After the reaction, the reaction mixture was mixed with a saturated sodium thiosulfate aqueous solution and extracted with chloroform (10 ml). The resulting organic layer was washed with a 1M sodium hydroxide aqueous solution and dried over anhydrous sodium sulfate, and the solvent was evaporated under reduced pressure. The resulting residue was purified by preparative medium pressure liquid chromatography using n-hexane/ethyl acetate (with a gradient of from 100:0 to 0:100) as the eluent to obtain 245 mg of the desired product as a white solid.

Melting point: 143-146°C

$^1$H-NMR($CDCl_3$) : δ8.83(s, 1H), 8.50(s, 1H), 8.40(d, =1.7Hz, 1H), 7.75(dd, J=8.5, 1.7Hz, 1H), 7.63(d, J=8.5Hz, 1H), 3.88(s, 3H), 3.73(s, 3H), 3.30-3.11(m, 2H), 1.27(t, J=7.2Hz, 3H).

Synthetic Example 16: Synthesis of 2-[3-(ethylthio)-5-(trifluoromethyl)benzo[b]thiophen-2-yl]-3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-b]pyridine (compound No. 3-1-002b of the present invention) and 2-[3-(ethylsulfonyl)-5-(trifluoromethyl)benzo[b]thiophen-2-yl]-3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-b]pyridine (compound No. 3-1-002a of the present invention)

Step 1: Synthesis of N-[2-(methylamino)-5-(trifluoromethyl)pyridin-3-yl]-5-(trifluoromethyl)benzo[b]thiophene-2-carboxamide

573 mg of $N^2$-methyl-5-(trifluoromethyl)pyridine-2,3-diamine was dissolved in 10 ml of pyridine, and 615 mg of 5-(trifluoromethyl)benzo[b]thiophene-2-carboxylic acid, 959 mg of 1-ethyl-3-(3-dimethylaminopropyl)carbodiimide hydrochloride and 31 mg of 4-(dimethylamino)pyridine were added at room temperature. After the addition, the reaction mixture was stirred at room temperature overnight. After the reaction, 20 ml of water was added to the reaction mixture, and the precipitated solid was collected by

filtration to obtain 939 mg of the desired crude product as a gray solid. The crude product was used in the next step without further purification.

Step 2: Synthesis of 3-methyl-6-(trifluoromethyl)-2-[5-(trifluoromethyl)benzo[b]thiophen-2-yl]-3H-imidazo[4,5-b]pyridine

877 mg of the crude N-[2-(methylamino)-5-(trifluoromethyl)pyridin-3-yl]-5-(trifluoromethyl)benzo[b]thiophene-2-carboxamide obtained in Step 1 was dissolved in 10 ml of acetic acid, and the solution was stirred under reflux with heating for 3 hours. After the reaction, the solvent was evaporated under reduced pressure. The resulting residue was mixed with 10 ml of water and extracted with ethyl acetate (10 ml×2). The resulting organic layer was dehydrated with saturated aqueous sodium chloride and dried over anhydrous sodium sulfate, and the solvent was evaporated under reduced pressure. The resulting residue was purified by preparative medium pressure liquid chromatography using n-hexane/ethyl acetate (with a gradient of from 100:0 to 0:100) as the eluent to obtain 683 mg of the desired product as a flesh-colored solid.

Melting point: 191-193°C

$^1$H-NMR(DMSO-d6) : δ8.83-8.79(m, 1H), 8.62-8.59(m, 1H), 8.53(s, 1H), 8.44(s, 1H), 8.36(d, J=8.5Hz, 1H), 7.80(d, J=8.5Hz, 1H), 4.24(s, 3H).

Step 3: Synthesis of 2-[3-chloro-5-(trifluoromethyl)benzo[b]thiophen-2-yl]-3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-b]pyridine

To a solution of 400 mg of 3-methyl-6-(trifluoromethyl)-2-[5-(trifluoromethyl)benzo[b]thiophen-2-yl]-3H-imidazo[4,5-b]pyridine in 5 ml of N,N-dimethylformamide, 590 mg of 1,3-dichloro-5,5-dimethylhydantoin was added at 80°C. After the addition, the reaction mixture was stirred at 80°C for 1.5 hours. After the reaction, a saturated sodium thiosulfate aqueous solution was added to the reaction mixture, and the precipitated solid was collected by filtration to obtain 390 mg of the desired product as a white solid.

Melting point: 158-160°C

$^1$H-NMR($CDCl_3$) : δ8.81-8.77(m, 1H), 8.41-8.38(m, 1H), 8.29-8.26(m, 1H), 8.06(d, J=8.5Hz, 1H), 7.80(d, J=8.5Hz, 1H), 4.04(s, 3H).

Step 4: Synthesis of 2-[3-(ethylthio)-5-(trifluoromethyl)benzo[b]thiophen-2-yl]-3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-b]pyridine (compound No. 3-1-002b of the present invention)

To a solution of 370 mg of 2-[3-chloro-5-(trifluoromethyl)benzo[b]thiophen-2-yl]-3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-b]pyridine in 5 ml of N,N-dimethylformamide, 119 mg of sodium ethanethiolate was added at 80°C. After the addition, the reaction mixture was stirred at 80°C for 1.5 hours. After the stirring, 159 mg of sodium ethanethiolate was added to the reaction mixture at 80°C. After the reaction, the reaction mixture was mixed with 20 ml of water and extracted with ethyl acetate (20 ml×2). The resulting organic layer was dehydrated with saturated aqueous sodium chloride and dried over anhydrous sodium sulfate, and the solvent was evaporated under reduced pressure. The resulting residue was purified by silica gel column chromatography using n-hexane/ethyl acetate (with a gradient of from 100:0 to 0:100) as the eluent to obtain 186 mg of the desired product as a yellow solid.

Melting point: 120-122°C

$^1$H-NMR($CDCl_3$) : δ8.78(s, 1H), 8.41(s, 1H), 8.38(d, J=1.8Hz, 1H), 8.06(d, J=8.6Hz, 1H), 7.77-7.74(m, 1H), 3.96(s, 3H), 2.69(q, J=7.4Hz, 2H), 1.05(t, J=7.4Hz, 3H).

Step 5: Synthesis of 2-[3-(ethylsulfonyl)-5-(trifluoromethyl)benzo[b]thiophen-2-yl]-3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-b]pyridine (compound No. 3-1-002a of the present invention)

To a solution of 147 mg of 2-[3-(ethylthio)-5-(trifluoromethyl)benzo[b]thiophen-2-yl]-3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-b]pyridine in 3 ml of chloroform, 195 mg of 65 weight% m-chloroperbenzoic acid (containing about 30 weight% of water) was added under cooling with ice. After the addtion, the reaction mixture was stirred at room temperature for 4 hours. After the reaction, the reaction mixture was mixed with a saturated sodium thiosulfate aqueous solution and extracted with chloroform (10 ml). The resulting organic layer was washed with a 1M sodium hydorxide aqueous solution and dried over anhydrous sodium sulfate, and the solvent was evaporated under reduced pressure. The resulting residue was purified by preparative medium pressure liquid chromatography using n-hexane/ethyl acetate (with a gradient of from 100:0 to 0:100) as the eluent to obtain 104 mg of the desired product as a white solid.

Melting point: 70-75 °C

$^1$H-NMR($CDCl_3$) : δ8.85(s, 1H), 8.79(d, J=1.5Hz, 1H), 8.35(d, J=1.8Hz, 1H), 8.13(d, J=8.6Hz, 1H), 7.85(dd, J=8.6, 1.8Hz, 1H), 3.89(s, 3H), 3.38(q, J=7.5Hz, 2H), 1.32(t, J=7.5Hz, 3H).

Synthetic Example 17: Synthesis of 2-[3-(ethylthio)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-6-(trifluoromethyl)-2H-pyrazolo[4,3-b]pyridine (compound No. 1-10-002b of the present invention) and 2-[3-(ethylsulfonyl)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-6-(trifluoromethyl)-2H-pyrazolo[4,3-b]pyridine (compound No. 1-10-002a of the present invention)

Step 1: Synthesis of 2-[3-(ethylthio)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-6-(trifluoromethyl)-2H-pyrazolo[4,3-b]pyridine (compound No. 1-10-002b)

A solution of 400 mg of 3-nitro-5-(trifluoromethyl)picolinaldehyde and 522 mg of 3-(ethylthio)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-amine in 5 ml of xylene was stirred under reflux with heating for one hour. After the stirring, 1.50 g of triethyl phosphite was added to the reaction mixture at room temperature. After the addition, the reaction mixture was stirred under reflux with heating for one hour. After the reaction, the solvent was evaporated from the reaction mixture. The resulting residue was purified by preparative medium pressure liquid chromatography using n-hexane/ethyl acetate (with a gradient of from 100:0 to 50:50) as the eluent to obtain 613 mg of the desired product as a pale yellow solid.

Melting point: 161-163°C

$^1$H-NMR($CDCl_3$) : δ9.43-9.41(m, 1H), 8.85(d, J=2.1Hz, 1H), 8.76(d, J=7.4Hz, 1H), 8.53-8.49(m, 1H), 8.05-8.00(m, 1H), 7.30-7.20(m, 1H), 2.99(q, J=7.5Hz, 2H), 1.21(t, J=7.5Hz, 3H).

Step 2: Synthesis of 2-[3-(ethylsulfonyl)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-6-(trifluoromethyl)-2H-pyrazolo[4,3-b]pyridine (compound No. 1-10-002a of the present invention)

To a solution of 150 mg of 2-[3-(ethylthio)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-6-(trifluoromethyl)-2H-pyrazolo[4,3-b]pyridine in 5 ml of chloroform, 204 mg of m-chloroperbenzoic acid (containing 35 weight% of water) was added under cooling with ice. After the addition, the reaction mixture was stirred at room temperature for 2 hours. After the stirring, 40 mg of m-chloroperbenzoic acid (containing 35 weight% of water) was added to the reaction mixture at room temperature. After the addition, the reaction mixture was stirred at room temeprature for 2 hours. After the reaction, the reaction mixture was mixed with 3 ml of a saturated sodium thiosulfate aqueous solution and extracted with chloroform (10 ml×2). The resulting organic layer was washed with a

1M sodium hydroxide aqueous solution and dried over anhydrous sodium sulfate, and the solvent was evaporated under reduced pressure. The resulting residue was purified by preparative medium pressure liquid chromatography using n-hexane/ethyl acetate (with a gradient of from 100:0 to 0:100) as the eluent to obtain 61 mg of the desired product as a white solid.

Melting point: 245-247°C

$^1$H-NMR($CDCl_3$) : δ9.44(d, J=7.2Hz, 1H), 9.17-9.15(m, 1H), 8.86(d, J=1.8Hz, 1H), 8.48-8.43(m, 1H), 8.13-8.09(m, 1H), 7.35-7.30(m, 1H), 4.04(q, J=7.5Hz, 2H), 1.48(t, J=7.5Hz, 3H).

Synthetic Example 18: Synthesis of 2-[3-(ethylthio)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-6-(trifluoromethyl)-2H-pyrazolo[4,3-c]pyridine (compound No. 1-11-001b of the present invention) and 2-[3-(ethylsulfonyl)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-6-(trifluoromethyl)-2H-pyrazolo[4,3-c]pyridine (compound No. 1-11-001a of the present invention)

Step 1: Synthesis of 4-azido-6-(trifluoromethyl)nicotinaldehyde

To a solution of 1.50 g of 4-chloro-6-(trifluoromethyl)nicotinaldehyde in 10 ml of N,N-dimethylformamide, 511 mg of sodium azide was added under cooling with ice. After the addition, the reaction mixture was stirred at room temperature for 3 hours. After the reaction, the reaction mixture was mixed with 10 ml of water and extracted with diethyl ether (20 ml×2). The resulting organic layer was dehydrated with saturated aqueous sodium chloride and dried over anhydrous sodium sulfate, and the solvent was evaporated under reduced pressure. The resulting residue was purified by silica gel column chromatography using n-hexane/ethyl acetate (with a gradient of from 100:0 to 80:20) as the eluent to obtain 2.13 g of the desired product as a white solid.

Melting point: 54-56°C

$^1$H-NMR($CDCl_3$) : δ10.39(s, 1H), 9.06(s, 1H), 7.54(s, 1H).

Step 2: Synthesis of 2-[3-(ethylthio)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-6-(trifluoromethyl)-2H-pyrazolo[4,3-c]pyridine (compound No. 1-11-001b of the present invention)

To a solution of 200 mg of 4-azido-6-(trifluoromethyl)nicotinaldehyde and 266 mg of 3-(ethylthio)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-amine in 5 ml of dichloromethane, 282 mg of triethylamine and 1 ml of 0.56 ml of about 1M titanium(IV)

chloride in dichloromethane were successively added. After the addition, the reaction mixture was stirred at room temperature for one hour. After the reaction, the solvent was evaporated from the reaction mixture under reduced pressure. The resulting residue was subjected to filtration through Celite, and the Celite was washed with 20 ml of xylene. The resulting washing solution was stirred under reflux with heating for 2 hours. After the reaction, the reaction mixture was mixed with 10 ml of water and extracted with ethyl acetate (20 ml×2). The resulting organic layer was washed with saturated aqueous sodium chloride and dried over anhydrous sodium sulfate, and the solvent was evaporated under reduced pressure. The resulting residue was purified by silica gel chromatography using n-hexane/ethyl acetate (with a gradient of from 100:0 to 50:50) as the eluent to obtain 250 mg of the desired product as a pale yellow solid.

Melting point: 183-185°C

$^1$H-NMR($CDCl_3$) : δ9.40-9.37(m, 1H), 9.29(d, J=0.9Hz, 1H), 8.77(d, J=7.4Hz, 1H), 8.14(s, 1H), 8.04-7.99(m, 1H), 7.30-7.25(m, 1H), 3.02(q, J=7.4Hz, 2H), 1.21(t, J=7.4Hz, 3H).

Step 3: Synthesis of 2-[3-(ethylsulfonyl)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-6-(trifluoromethyl)-2H-pyrazolo[4,3-c]pyridine (compound No. 1-11-001a of the present invention)

To a solution of 120 mg of 2-[3-(ethylthio)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-6-(trifluoromethyl)-2H-pyrazolo[4,3-c]pyridine in 5 ml of chloroform, 164 mg of 65 weight% m-chloroperbenzoic acid (containing about 30 weight% of water) was added under cooling with ice. After the addition, the reaction mixture was stirred at room temperature overnight. After the reaction, the reaction mixture was mixed with a saturated sodium thiosulfate aqueous solution and extracted with chloroform (10 ml×2). The resulting organic layer was washed with the saturated sodium hydrogen carbonate aqueous solution and dried over anhydrous sodium sulfate, and the solvent was evaporated under reduced pressure. The resulting residue was purified by preparative medium pressure liquid chromatography using n-hexane/ethyl acetate (with a gradient of from 100:0 to 0:100) as the eluent to obtain 63 mg of the desired product as a white solid.

Melting point: 230-233°C

$^1$H-NMR($CDCl_3$) : δ9.43(d, J=7.4Hz, 1H), 9.41-9.37(m, 1H), 9.07(s, 1H), 8.12-

8.06(m, 2H), 7.36(dd, J=7.4, 1.8Hz, 1H), 4.03(q, J=7.4Hz, 2H), 1.48(t, J=7.4Hz, 3H).

Synthetic Example 19: Synthesis of 2-[3-(ethylthio)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-6-(trifluoromethyl)thiazolo[5,4-b]pyridine (compound No. 1-13-001b of the present invention) and 2-[3-(ethylsulfonyl)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-6-(trifluoromethyl)thiazolo[5,4-b]pyridine (compound No. 1-13-001a of the present invention)

Step 1: Synthesis of 3-(ethylthio)-N-[2-mercapto-5-(trifluoromethyl)pyridin-3-yl]-7-(trifluoromethyl)imidazo[1,2-a]pyridine-2-carboxamide

500 mg of 3-amino-5-(trifluoromethyl)pyridine-2-thiol was dissolved in 5 ml of pyridine, and 621 mg of 3-(ethylthio)-7-(trifluoromethyl)imidazo[1,2-a]pyridine-2-carboxylic acid, 820 mg of 1-ethyl-3-(3-dimethylaminopropyl)carbodiimide hydrochloride and 10 mg of 1-hydroxybenzotriazole were added at room temperature. After the addition, the reaction mixture was stirred at room temperature overnight. Afte the reaction, water was added to the reaction mixture, and the precipitated solid was collected by filtration to obtain 234 mg of the desired crude product as a brown solid. The crude product was used in the next step without further purification.

Step 2: Synthesis of 2-[3-(ethylthio)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-6-(trifluoromethyl)thiazolo[5,4-b]pyridine (compound No. 1-13-001b of the present invention)

214 mg of the crude 3-(ethylthio)-N-[2-mercapto-5-(trifluoromethyl)pyridin-3-yl]-7-(trifluoromethyl)imidazo[1,2-a]pyridine-2-carboxamide obtained in Step 1 was dissolved in 5 ml of propionic acid, and the solution was stirred under reflux with heating for 4 hours. After the stirring, the reaction mixture was stirred at room temeprature overnignt. After the reaction, water was added to the reaction mixture and extracted with ethyl acetate (10 ml×2). The resulting organic layer was washed with a 1M sodium hydroxide aqueous solution and dried over anhydrous sodium sulfate, and the solvent was evaporated under reduced pressure. The resulting residue was purified by preparative medium pressure liquid chromatography using n-hexane/ethyl acetate (with a gradient of from 100:0 to 0:100) as the eluent to obtain 20 mg of the desired product as a white solid.

Melting point: 150-160°C

$^1$H-NMR($CDCl_3$) : δ8.91-8.87(m, 1H), 8.71(d, J=7.5Hz, 1H), 8.65-8.61(m, 1H),

8.06(s, 1H), 7.20(dd, J=7.5, 1.5Hz, 1H), 3.08(q, J=7.4Hz, 2H), 1.27(t, J=7.4Hz, 3H).

Step 3: Synthesis of 2-[3-(ethylsulfonyl)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-6-(trifluoromethyl)thiazolo[5,4-b]pyridine (compound No. 1-13-001a of the present invention)

To a solution of 20 mg of 2-[3-(ethylthio)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-6-(trifluoromethyl)thiazolo[5,4-b]pyridine in 3 ml of chloroform, 27 mg of 65 weight% *m*-chloroperbenzoic acid (containing about 30 weight% of water) was added under cooling with ice. After the addition, the reaction mixture was stirred at room temperature for 2 hours. After the reaction, the reaction mixture was mixed with a saturated sodium thiosulfate aqueous solution and extracted with chloroform (10 ml×2). The resulting organic layer was washed with a 1M sodium hydroxide aqueous solution and dried over anhydrous sodium sulfate, and the solvent was evaporated under reduced pressure. The resulting residue was purified by preparative medium pressure liquid chromatography using n-hexane/ethyl acetate (with a gradient of from 100:0 to 50:50) as the eluent to obtain 15 mg of the desired product as a white solid.

Melting point: 243-245°C

$^1$H-NMR($CDCl_3$) : δ9.53(d, J=7.5Hz, 1H), 8.95-8.93(m, 1H), 8.63-8.61(m, 1H), 8.17-8.14(m, 1H), 7.30(dd, J=7.5, 1.9Hz, 1H), 4.10(q, J=7.5Hz, 2H), 1.45(t, J=7.5Hz, 3H).

Synthetic Example 20: Synthesis of 2-[3-(ethylthio)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-6-iodo-3-methyl-3H-imidazo[4,5-b]pyridine (compound No. 1-1-026b of the present invention), 2-ethylhexyl-3-((2-(3-(ethylthio)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl)-3-methyl-3H-imidazo[4,5-b]pyridin-6-yl)thio)propanoate (compound No. 1-1-028b of the present invention), 2-[3-(ethylthio)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-3-methyl-6-((trifluoromethyl)thio)-3H-imidazo[4,5-b]pyridine (compound No. 1-1-027b of the present invention) and 2-[3-(ethylsulfonyl)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-3-methyl-6-((trifluoromethyl)thio)-3H-imidazo[4,5-b]pyridine (compound No. 1-1-027a of the present invention)

Step 1: Synthesis of 3-(ethylthio)-N-[5-iodo-2-(methylamino)pyridin-3-yl]-7-(trifluoromethyl)imidazo[1,2-a]pyridine-2-carboxamide

1.59 g of 5-iodo-$N^2$-methylpyridine-2,3-diamine was dissolved in 15 ml of pyridine, and 1.54 g of 3-(ethylthio)-7-(trifluoromethyl)imidazo[1,2-a]pyridine-2-carboxylic acid

and 2.45 g of 1-ethyl-3-(3-dimethylaminopropyl)carbodiimide hydrochloride were added at room temperature. After the addition, the reaction mixture was stirred at room temperature overnight. After the reaction, water was added to the reaction mixture, and the precipitated solid was collected by filtration to obtain 2.49 g of the desired crude product as a gray solid. The crude product was used in the next step without further purification.

$^1$H-NMR($CDCl_3$) : δ8.97(brs, 1H), 8.71(d, J=7.2Hz, 1H), 8.27(d, J=2.0Hz, 1H), 8.07(d, J=2.0Hz, 1H), 7.96(s, 1H), 7.19(dd, J=7.2, 2.0Hz, 1H), 4.78(brs, 1H), 3.08(q, J=7.4Hz, 2H), 3.03(d, J=4.8Hz, 3H), 1.22(t, J=7.4Hz, 3H).

Step 2: Synthesis of 2-[3-(ethylthio)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-6-iodo-3-methyl-3H-imidazo[4,5-b]pyridine (compound No. 1-1-026b of the present invention)

2.49 g of the crude 3-(ethylthio)-N-[5-iodo-2-(methylamino)pyridin-3-yl]-7-(trifluoromethyl)imidazo[1,2-a]pyridine-2-carboxamide obtained in Step 1 was dissolved in 15 ml of acetic acid, and the solution was stirred under reflux with heating for 3.5 hours. After the reaction, water was added to the reaction mixture, and the precipitated solid was collected by filtration. The resulting solid was washed with n-hexane to obtain 2.02 g of the desired product as a brown solid.

Melting point: 230-233°C

$^1$H-NMR($CDCl_3$) : δ8.76(d, J=7.2Hz, 1H), 8.62(d, J=1.7Hz, 1H), 8.47(d, J=1.7Hz, 1H), 8.03(s, 1H), 7.19(dd, J=7.2, 1.7Hz, 1H), 4.25(s, 3H), 3.11(q, J=7.5Hz, 2H), 1.20(t, J=7.5Hz, 3H).

Step 3: Synthesis of 2-ethylhexyl 3-((2-(3-(ethylthio)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl)-3-methyl-3H-imidazo[4,5-b]pyridin-6-yl)thio)propanoate (compound No. 1-1-028b of the present invention)

To a solution of 503 mg of 2-[3-(ethylthio)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-6-iodo-3-methyl-3H-imidazo[4,5-b]pyridine in 10 ml of 1,4-dioxane, 387 mg of diisopropylethylamine, 58 mg of 4,5'-bis(diphenylphosphino)-9,9'-dimethylxanthene, 92 mg of tris(dibenzylideneacetone)dipalladium(0) and 262 mg of 2-ethylhexyl 3-mercaptopropionate were successively added at room temperature. After the addition, the atmosphere in the reaction vessel was replaced by nitrogen gas, and the mixture was stirred under reflux with heating for 4 hours. After the reaction, the reaction

mixture was mixed with 10 ml of water and extracted with diethyl ether (10 ml×2). The resulting organic layer was dehydrated with saturated aqueous sodium chloride and dried over anhydrous sodium sulfate, and the solvent was evaporated under reduced pressure. The resulting residue was purified by preparative medium pressure liquid chromatography using n-hexane/ethyl acetate (with a gradient of from 100:0 to 80:20) as the eluent to obtain 599 mg of the desired product as a yellow solid.

Melting point: 94-96°C

$^1$H-NMR($CDCl_3$) : δ8.76(d, J=7.2Hz, 1H), 8.53(d, J=2.0Hz, 1H), 8.27(d, J=2.0Hz, 1H), 8.03(s, 1H), 7.18(dd, J=7.2, 1.9Hz, 1H), 4.27(s, 3H), 4.01(dd, J=5.8, 1.7Hz, 2H), 3.20-3.05(m, 4H), 2.62(t, J=7.3Hz, 2H), 1.45-1.20(m, 12H), 0.89(t, J=7.5Hz, 6H).

Step 4: Synthesis of 2-[3-(ethylthio)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-3-methyl-6-((trifluoromethyl)thio)-3H-imidazo[4,5-b]pyridine (compound No. 1-1-027b of the present invention)

Under a nitrogen atmosphere, to a solution of 560 mg of 2-ethylhexyl 3-((2-(3-(ethylthio)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl)-3-methyl-3H-imidazo[4,5-b]pyridin-6-yl)thio)propanoate in 5 ml of tetrahydrofuran, 159 mg of potassium tert-butoxide was added under cooling with ice. After the addition, the reaction mixture was stirred under cooling with ice for 30 minutes. After the stirring, to the reaction mixture, 756 mg of S-(trifluoromethyl)dibenzothiophenium trifluoromethanesulfonate was added under cooling with ice. After the addition, the reaction mixture was stirred at room temperature overnight. After the reaction, the reaction mixture was mixed with water and extracted with chloroform (10 ml×2). The resulting organic layer was washed with a saturated sodium hydrogen carbonate aqueous solution and dried over anhydrous sodium sulfate, and the solvent was evaporated under reduced pressure. The resulting residue was purified by thin layer chromatography using n-hexane/ethyl acetate (with a gradient of from 100:0 to 80:20) as the eluent to obtain 69 mg of the desired product as a pale yellow solid.

Melting point: 209-210°C

$^1$H-NMR($CDCl_3$) : δ8.77(d, J=7.2Hz, 1H), 8.66(d, J=2.0Hz, 1H), 8.46(d, J=2.0Hz, 1H), 8.05-8.02(m, 1H), 7.20(dd, J=7.2, 1.9Hz, 1H), 4.31(s, 3H), 3.14(q, J=7.4Hz, 2H), 1.21(t, J=7.4Hz, 3H).

Step 5: Synthesis of 2-[3-(ethylsulfonyl)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-

yl]-3-methyl-6-((trifluoromethyl)thio)-3H-imidazo[4,5-b]pyridine (compound No. 1-1-027a of the present invention)

To a solution of 31 mg of 2-[3-(ethylthio)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-3-methyl-6-((trifluoromethyl)thio)-3H-imidazo[4,5-b]pyridine in 3 ml of chloroform, 38 mg of 65 weight% m-chloroperbenzoic acid (containing about 30 weight% of water) was added under cooling with ice. After the addition, the reaction mixture was stirred at room temperature for 2 hours. After the reaction, the reaction mixture was mixed with a saturated sodium thiosulfate aqueous solution and extracted with chloroform (10 ml×2). The resulting organic layer was washed with a 1M sodium hydroxide aqueous solution and dried over anhydrous sodium sulfate, and the solvent was evaporated under reduced pressure. The resulting residue was purified by preparative medium pressure liquid chromatography using n-hexane/ethyl acetate (with a gradient of from 100:0 to 50:50) as the eluent to obtain 34 mg of the desired product as a white solid.

Melting point: 220-223°C

$^1$H-NMR($CDCl_3$) : δ9.41(d, J=7.4Hz, 1H), 8.70(d, J=2.0Hz, 1H), 8.41(d.J=2.0Hz, 1H), 8.14(s, 1H), 7.31(dd, J=7.4, 1.6Hz, 1H), 4.16(s, 3H), 4.11(q, J=7.4Hz, 2H), 1.45(t, J=7.4Hz, 3H).

Synthetic Example 21: Synthesis of 2-[3-(ethylsulfonyl)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-b]pyridine 4-oxide (compound No. 1-14-001a of the present invention)

To a solution of 500 mg of 2-[3-(ethylsulfonyl)-7-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-b]pyridine in 15 ml of acetonitrile, 834 mg of 65 weight% m-chloroperbenzoic acid (containing about 30 weight% of water) was added under cooling with ice. After the addition, the reaction mixture was stirred at 50°C for 20 hours. After the stirring, 279 mg of 65 weight% m-chloroperbenzoic acid (containing about 30 weight% of water) was added to the reaction mixture at room temperature. After the addition, the reaction mixture was stirred at 50°C for 20 hours. After the stirring, 418 mg of 65 weight% m-chloroperbenzoic acid (containing about 30 weight% of water) was added to the reaction mixture at room temperature. After the addition, the reaction mixture was stirred to 50°C for 20 hours. After the reaction, the reaction mixture was mixed with a saturated sodium thiosulfate aqueous solution and extracted with chloroform (20 ml×2).

The resulting organic layer was washed with a 1M sodium hydroxide aqueous solution and dried over anhydrous sodium sulfate, and the solvent was evaporated under reduced pressure. The resulting residue was purified by preparative medium pressure liquid chromatography using n-hexane/ethyl acetate with a gradient of from 100:0 to 0:100) as the eluent to obtain 67 mg of the desired product as a white solid.

$^1$H-NMR($CDCl_3$) : δ9.35(d, J=7.2Hz, 1H), 8.48-8.46(m, 1H), 8.19-8.16(m, 1H), 7.96(s, 1H), 7.35(dd, J=7.2, 1.7Hz, 1H), 4.58(s, 3H), 3.94(q, J=7.4Hz, 2H), 1.46(t, J=7.4Hz, 3H).

Synthetic Example 22: Synthesis of 8-[3-(ethylthio)-6-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-9-methyl-(trifluoromethyl)-9H-imidazo[4,5-c]pyridazine (compound No. 1-16-001b of the present invention) and 8-[3-(ethylsulfonyl)-6-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-9-methyl-(trifluoromethyl)-9H-imidazo[4,5-c]pyridazine (compound No. 1-16-001a of the present invention)

Step 1: Synthesis of 3-(ethylthio)-N-[3-(methylamino)-6-(trifluoromethyl)pyridazin-4-yl]-6-(trifluoromethyl)imidazo[1,2-a]pyridine-2-carboxamide

300 mg of 4-bromo-N-methyl-6-(trifluoromethyl)pyridazin-3-amine, 509 mg of 3-(ethylthio)-6-(trifluoromethyl)imidazo[1,2-a]pyridine-carboxamide, 497 mg of potassium phosphate and 52 mg of N,N'-dimethylethylenediamine were dissolved in 4 ml of N,N-dimethylformamide, and 56 mg of copper(I) iodide was added at room temperature. After the addition, the atmosphere in the reaction vessel was replaced by nitrogen gas, and the mixture was stirred at 90°C for 9 hours. After the reaction, the reaction mixture was mixed with 10 ml of water and extracted with ethyl acetate (10 ml×2). The resulting organic layer was dehydrated with saturated aqueous sodium chloride and dried over anhydrous sodium sulfate, and the solvent was evaporated under reduced pressure to obtain crude 3-(ethylthio)-N-[3-(methylamino)-6-(trifluoromethyl)pyridazin-4-yl]-6-(trifluoromethyl)imidazo[1,2-a]pyridine-2-carboxamide as the desired product. The crude product was used in the next step without further purification.

Step 2: Synthesis of 8-[3-(ethylthio)-6-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-9-methyl-(trifluoromethyl)-9H-imidazo[4,5-c]pyridazine (compound No. 1-16-001b of the present invention)

The crude 3-(ethylthio)-N-[3-(methylamino)-6-(trifluoromethyl)pyridazin-4-yl]-7-(trifluoromethyl)imidazo[1,2-a]pyridine-2-carboxamide obtained in Step 1 was dissolved

in 10 ml of acetic acid, and the solution was stirred under reflux with heating for 7 hours. After the reaction, the solvent was evaporated under reduced pressure. The resulting residue was mixed with 10 ml of water and extracted with ethyl acetate (10 ml×2). The resulting organic layer was washed with a saturated sodium hydrogen carbonate aqueous solution and then with 28 weight% aqueous ammonia, dehydrated with saturated aqueous sodium chloride and dried over anhydrous sodium sulfate, and the solvent was evaporated under reduced pressure. The resulting residue was dehydrated with saturated aqueous sodium chloride and dried over anhydrous sodium sulfate, and the solvent was evaporated under reduced pressure. The resulting residue was purified by preparative medium pressure liquid chromatography using n-hexane/ethyl acetate (with a gradient of from 100:0 to 25:75) as the eluent to obtain 72 mg of the desired product as a pale yellow solid.

Melting point: 240-242°C

$^1$H-NMR($CDCl_3$) : δ9.05-9.00(m, 1H), 8.23(s, 1H), 7.85(d, J=9.8Hz, 1H), 7.56(dd, J=9.4, 1.6Hz, 1H), 4.55(s, 3H), 3.16(q, J=7.4Hz, 2H), 1.25(t, J=7.4Hz, 3H).

Step 3: Synthesis of 8-[3-(ethylsulfonyl)-6-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-9-methyl-(trifluoromethyl)-9H-imidazo[4,5-c]pyridazine (compound No. 1-16-001a of the present invention)

To a solution of 62 mg of 8-[3-(ethylthio)-6-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]-9-methyl-(trifluoromethyl)-9H-imidazo[4,5-c]pyridazine in 5 ml of chloroform, 81 mg of 65 weight% m-chloroperbenzoic acid (containing about 30 weight% of water) was added under cooling with ice. After the addition, the reaction mixture was stirred at room temperature for one hour. After the reaction, the reaction mixture was mixed with a saturated sodium thiosulfate aqueous solution and extracted with chloroform (10 ml). The resulting organic layer was washed with a saturated sodium hydrogen carbonate aqueous solution and dried over anhydrous sodium sulfate, and the solvent was evaporated under reduced pressure. The resulting residue was purified by preparative medium pressure liquid chromatography using n-hexane/ethyl acetate (with a gradient of from 100:0 to 25:75) as the eluent to obtain 66 mg of the desired product as a pale yellow solid.

Melting point: 274-276°C

$^1$H-NMR($CDCl_3$) : δ9.70-9.60(m, 1H), 8.22(s, 1H), 7.99(d, J=9.4Hz, 1H), 7.75(dd,

J=9.4, 1.6Hz, 1H), 4.38(s, 3H), 4.05(q, J=7.4Hz, 2H), 1.48(t, J=7.4Hz, 3H).

Synthetic Example 23: Synthesis of 2-[3-(ethylthio)-6-(trifluoromethyl)imidazo[1,2-a]pyrimidin-2-yl]-3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-b]pyridine (compound No. 1-1-054b of the present invention) and 2-[3-(ethylsulfonyl)-6-(trifluoromethyl)imidazo[1,2-a]pyrimidin-2-yl]-3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-b]pyridine (compound No. 1-1-054a of the present invention)

Step 1: Synthesis of 3-methyl-6-(trifluoromethyl)-2-[6-(trifluoromethyl)imidazo[1,2-a]pyrimidin-2-yl]-3H-imidazo[4,5-b]pyridine

250 mg of 5-(trifluoromethyl)pyrimidin-2-amine was dissolved in 10 ml of acetonitrile, and 550 mg of 2-bromo-1-[3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-b]pyridin-2-yl]ethanone was added at room temperature. After the addition, the reaction mixture was stirred under reflux with heating for 7.5 hours. After the reaction, 10 ml of water was added to the reaction mixture, and the precipitated solid was collected by filtration to obtain 445 mg of the desired product as a yellow solid.

Melting point: 283-285°C

$^1$H-NMR($CDCl_3$) : δ8.92-8.89(m, 1H), 8.84(d, J=2.4Hz, 1H), 8.73(s, 1H), 8.57(s, 1H), 8.29(s, 1H), 4.53(s, 3H).

Step 2: Synthesis of 2-[3-iodo-6-(trifluoromethyl)imidazo[1,2-a]pyrimidin-2-yl]-3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-b]pyridine

To a solution of 415 mg of 3-methyl-6-(trifluoromethyl)-2-[6-(trifluoromethyl)imidazo[1,2-a]pyrimidin-2-yl]-3H-imidazo[4,5-b]pyridine in 4 ml of N,N-dimethylformamide, 408 mg of 1,3-diiodo-5,5-dimethylhydantoin was added at 80°C. After the addition, the reaction mixture was stirred at 80°C for 3 hours. After the reaction, a saturated sodium thiosulfate aqueous solution was added to the reaction mixture, and the precipitated solid was collected by filtration to obtain 468 mg of the desired product as a yellow solid.

Melting point: 260-265°C

$^1$H-NMR($CDCl_3$) : δ9.00-8.86(m, 1H), 8.81(d, J=2.4Hz, 1H), 8.74(d, J=1.5Hz, 1H), 8.42(d, J=1.5Hz, 1H), 4.43(s, 3H).

Step 3: Synthesis of 2-[3-(ethylthio)-6-(trifluoromethyl)imidazo[1,2-a]pyrimidin-2-yl]-3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-b]pyridine (compound No. 1-1-054b of the present invention)

To a solution of 438 mg of 2-[3-iodo-6-(trifluoromethyl)imidazo[1,2-a]pyrimidin-2-yl]-3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-b]pyridine in 10 ml of 1,4-dioxane, 334 mg of diisopropylethylamine, 50 mg of 4,5'-bis(diphenylphosphino)-9,9'-dimethylxathene, 39 mg of tris(dibenzylideneacetone)dipalladium(0) and 106 mg of ethanethiol were successively added at room temperature. After the addition, the atmosphere in the reaction vessel was replaced by nitrogen gas, and the mixture was stirred under reflux with heating for 3 hours. After the reaction, water was added to the reaction mixture, and the precipitated solid was collected by filtration. The resulting solid was washed with diisopropyl ether to obtain 337 mg of the desired product as a yellow solid.

Melting point: 220-222°C

$^1$H-NMR($CDCl_3$) : δ9.27-9.23(m, 1H), 8.88(d, J=2.1Hz, 1H), 8.75(s, 1H), 8.42(s, 1H), 4.42(s, 3H), 3.25(q, J=7.5Hz, 2H), 1.26(t, J=7.5Hz, 3H).

Step 4: Synthesis of 2-[3-(ethylsulfonyl)-6-(trifluoromethyl)imidazo[1,2-a]pyrimidin-2-yl]-3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-b]pyridine (compound No. 1-1-054a of the present invention)

To a solution of 297 mg of 2-[3-(ethylthio)-6-(trifluoromethyl)imidazo[1,2-a]pyrimidin-2-yl]-3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-b]pyridine in 7 ml of chloroform, 371 mg of 65 weight% m-chloroperbenzoic acid (containing about 30 weight% of water) was added under cooling with ice. After the addition, the reaction mixture was stirred at room temperature for 3.5 hours. After the stirring, m-chloroperbenzoic acid (containing 35 weight% of water) was added to the reaction mixture at room temperature. After the addition, the reaction mixture was stirred at room temperature for one hour. After the stirring, 50 mg of m-chloroperbenzoic acid (containing 35 weight% of water) was added to the reaction mixture at room temperature. After the addition, the reaction mixture was stirred at room temperature for one hour. After the reaction, the reaction mixture was mixed with a saturated sodium thiosulfate aqueous solution and extracted with chloroform (10 ml×2). The resulting organic layer was washed with a saturated sodium hydrogen carbonate aqueous solution and dried over anhydrous sodium sulfate, and the solvent was evaporated under reduced pressure. The resulting residue was purified by preparative medium pressure liquid chromatography using n-hexane/ethyl acetate (with a gradient of from 100:0 to 50:50) as the eluent to obtain 150 mg of the desired product as a white

solid.

Melting point: 244-248°C

$^1$H-NMR($CDCl_3$) : δ10.00-9.95(m, 1H), 9.04(d, J=2.4Hz, 1H), 8.80(s, 1H), 8.41-8.37(m, 1H), 4.30(s, 3H), 4.27(q, J=7.5Hz, 2H), 1.49(t, J=7.5Hz, 3H).

Synthetic Example 24: Synthesis of 2-[3-(ethylthio)-7-(trifluoromethyl)imidazo[1,2-c]pyrimidin-2-yl]-3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-b]pyridine (compound No. 1-1-055b of the present invention) and 2-[3-(ethylsulfonyl)-7-(trifluoromethyl)imidazo[1,2-c]pyrimidin-2-yl]-3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-b]pyridine (compound No. 1-1-055a of the present invention)

Step 1: Synthesis of 3-methyl-6-(trifluoromethyl)-2-[7-(trifluoromethyl)imidazo[1,2-c]pyrimidin-2-yl]-3H-imidazo[4,5-b]pyridine

251 mg of 6-(trifluoromethyl)pyrimidin-4-amine was dissolved in 10 ml of acetonitrile, and 550 mg of 2-bromo-1-[3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-b]pyridin-2-yl]ethanone was added at room temperature. After the addition, the reaction mixture was stirred under reflux with heating for 7.5 hours. After the reaction, 10 ml of water was added to the reaction mixture, and the precipitated solid was collected by filtration to obtain 335 mg of the desired product as a yellow solid.

Melting point: 257-260°C

$^1$H-NMR($CDCl_3$) : δ9.22(s, 1H), 8.73(d, J=1.2Hz, 1H), 8.64(s, 1H), 8.29(d, J=1.8Hz, 1H), 8.05(s, 1H), 4.47(s, 3H).

Step 2: Synthesis of 2-[3-bromo-7-(trifluoromethyl)imidazo[1,2-c]pyrimidin-2-yl]-3-methyl-6-(trifluoromethyl)-3H-imidazo[4,5-b]pyridine

To a solution of 300 mg of 3-methyl-6-(trifluoromethyl)-2-[7-(trifluoromethyl)imidazo[1,2-c]pyrimidin-2-yl]-3H-imidazo[4,5-b]pyridine in 5 ml of N,N-dimethylformamide, 244 mg of 1,3-dibromo-5,5-dimethylhydantoin was added at 80°C. After the addition, the reaction mixture was stirred at 80°C for 30 minutes. After the reaction, a saturated sodium thiosulfate aqueous solution was added to the reaction mixture, and the precipitated solid was collected by filtration to obtain 468 mg of the desired crude product as a yellow solid. The crude product was used in the next step without further purification.

$^1$H-NMR($CDCl_3$) : δ9.27(s, 1H), 8.75(d, J=0.9Hz, 1H), 8.43(d, J=1.5Hz, 1H), 8.02(s, 1H), 4.37(s, 3H).

# DEMANDES OU BREVETS VOLUMINEUX

**LA PRÉSENTE PARTIE DE CETTE DEMANDE OU CE BREVETS COMPREND PLUS D'UN TOME.**

**CECI EST LE TOME __1___ DE __2___**

NOTE: Pour les tomes additionels, veillez contacter le Bureau Canadien des Brevets.

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# JUMBO APPLICATIONS / PATENTS

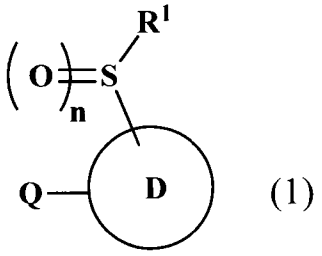
**THIS SECTION OF THE APPLICATION / PATENT CONTAINS MORE THAN ONE VOLUME.**

**THIS IS VOLUME __1___ OF __2___**

NOTE: For additional volumes please contact the Canadian Patent Office.

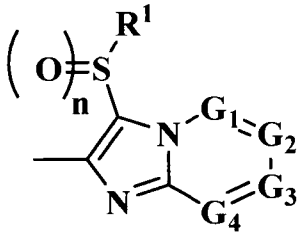
CLAIMS:

1. A condensed heterocyclic compound represented by the formula (1) or its salt or an N-oxide thereof:



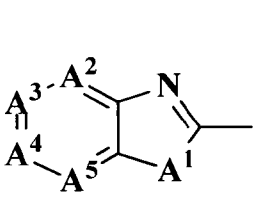
(1)

wherein D substituted with $-S(O)_nR^1$ is a ring represented by D1:

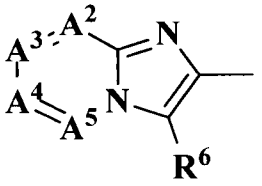


D1

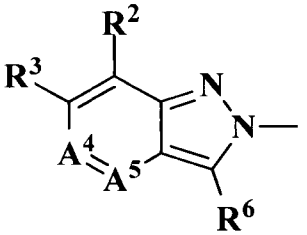
Q is a ring represented by any one of Q1, Q2, Q3 and Q4:



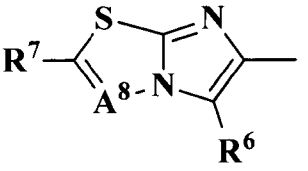
Q1



Q2



Q3



Q4

$G_1$ is a nitrogen atom or C(Y1),

$G_2$ is a nitrogen atom or C(Y2),

$G_3$ is a nitrogen atom or C(Y3),

$G_4$ is a nitrogen atom or C(Y4),

$A^1$ is $N(A^{1a})$, an oxygen atom or a sulfur atom,

$A^2$ is a nitrogen atom or $C(R^2)$,

$A^3$ is a nitrogen atom or $C(R^3)$,

$A^4$ is a nitrogen atom or $C(R^4)$,

$A^5$ is a nitrogen atom or $C(R^5)$,

$A^8$ is a nitrogen atom or $C(R^8)$,

$R^1$ is $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, ($C_1$-$C_6$) alkyl optionally substituted with $R^{1a}$, $C_2$-$C_6$ alkenyl, $C_2$-$C_6$ haloalkenyl, $C_2$-$C_6$ alkynyl, $C_2$-$C_6$ haloalkynyl, $C_3$-$C_6$ cycloalkyl, $C_3$-$C_6$ halocycloalkyl, $C_3$-$C_6$ cycloalkyl ($C_1$-$C_6$) alkyl, $C_3$-$C_6$ halocycloalkyl ($C_1$-$C_6$) alkyl or hydroxy ($C_1$-$C_6$) alkyl,

$R^{1a}$ is $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, $C_1$-$C_8$ alkoxycarbonyl, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ haloalkylthio, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ haloalkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl, $C_1$-$C_6$ haloalkylsulfonyl or cyano,

$R^2$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, $C_3$-$C_6$ cycloalkyl, $C_3$-$C_6$ halocycloalkyl, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ haloalkylthio, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ haloalkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl, $C_1$-$C_6$ haloalkylsulfonyl, $-C(O)R^{20a}$, -C(O)OH, hydroxy, $-NH_2$, $-NHR^{20g}$, $-N(R^{20h})R^{20g}$, mercapto, cyano or nitro,

$R^3$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_2$-$C_6$ haloalkenyl, $C_2$-$C_6$ haloalkynyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, $C_3$-$C_6$ cycloalkyl, $C_3$-$C_6$ halocycloalkyl, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ haloalkylthio, ($C_1$-$C_6$) alkylthio optionally substituted with $R^{3a}$, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ haloalkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl, $C_1$-$C_6$ haloalkylsulfonyl, $-C(O)R^{30a}$, -C(O)OH, hydroxy, $-OC(O)R^{30e}$, $-OS(O)_2R^{30f}$, $-NH_2$, $-NHR^{30g}$, $-N(R^{30h})R^{30g}$, mercapto, $-SC(O)R^{30i}$, $-SF_5$, cyano, nitro, phenyl, phenyl optionally substituted with $R^{3b}$, heterocyclyl or heterocyclyl optionally substituted with $R^{3b}$,

$R^{3a}$ is $C_1$-$C_8$ alkoxycarbonyl,

$R^{3b}$ is a halogen atom, a $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, cyano or nitro,

$R^4$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_2$-$C_6$ haloalkenyl, $C_2$-$C_6$ haloalkynyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, $C_3$-$C_6$ cycloalkyl,

$C_3$-$C_6$ halocycloalkyl, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ haloalkylthio, ($C_1$-$C_6$) alkylthio optionally substituted with $R^{4a}$, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ haloalkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl, $C_1$-$C_6$ haloalkylsulfonyl, -C(O)$R^{40a}$, -C(O)OH, hydroxy, -OC(O)$R^{40e}$, -OS(O)$_2R^{40f}$, -$NH_2$, -NH$R^{40g}$, -N($R^{40h}$)$R^{40g}$, mercapto, -SC(O)$R^{40i}$, -$SF_5$, cyano, nitro, phenyl, phenyl optionally substituted with $R^{4b}$, heterocyclyl or heterocyclyl optionally substituted with $R^{4b}$,

$R^{4a}$ is $C_1$-$C_8$ alkoxycarbonyl,

$R^{4b}$ is a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, cyano or nitro,

$R^5$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, $C_3$-$C_6$ cycloalkyl, $C_3$-$C_6$ halocycloalkyl, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ haloalkylthio, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ haloalkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl, $C_1$-$C_6$ haloalkylsulfonyl, -C(O)$R^{50a}$, -C(O)OH, hydroxy, -$NH_2$, -NH$R^{50g}$, -N($R^{50h}$)$R^{50g}$, mercapto, cyano or nitro,

$R^6$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, $C_3$-$C_6$ cycloalkyl, $C_3$-$C_6$ halocycloalkyl, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ haloalkylthio, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ haloalkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl, $C_1$-$C_6$ haloalkylsulfonyl, -C(O)$R^{60a}$, -C(O)OH, hydroxy, -$NH_2$, -NH$R^{60g}$, -N($R^{60h}$)$R^{60g}$, mercapto, cyano or nitro,

$R^7$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ haloalkylthio, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ haloalkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl, $C_1$-$C_6$ haloalkylsulfonyl, mercapto, -$SF_5$, cyano or nitro,

$R^8$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy or cyano,

$A^{1a}$ is a hydrogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, ($C_1$-$C_6$) alkyl optionally substituted with $A^{1a\text{-}a}$, ($C_1$-$C_6$) haloalkyl optionally substituted with $A^{1a\text{-}a}$, $C_2$-$C_6$ alkenyl, $C_2$-$C_6$ haloalkenyl, $C_2$-$C_6$ alkynyl, $C_2$-$C_6$ haloalkynyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy,

$C_3$-$C_6$ cycloalkyl, $C_3$-$C_6$ halocycloalkyl, $C_3$-$C_6$ cycloalkyl ($C_1$-$C_6$) alkyl, $C_3$-$C_6$ halocycloalkyl ($C_1$-$C_6$) alkyl, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ haloalkylthio, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ haloalkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl, $C_1$-$C_6$ haloalkylsulfonyl, $C(O)R^{10a}$, hydroxy or cyano,

$A^{1a-a}$ is $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, $C_1$-$C_8$ alkoxycarbonyl, $C_1$-$C_8$ haloalkoxycarbonyl, $C_1$-$C_6$ alkylcarbonyl, $C_1$-$C_6$ haloalkylcarbonyl, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ haloalkylthio, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ haloalkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl, $C_1$-$C_6$ haloalkylsulfonyl, hydroxy or cyano,

each of Y1, Y2, Y3 and Y4 is independently a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, ($C_1$-$C_6$) alkyl optionally substituted with $Y^a$, ($C_1$-$C_6$) haloalkyl optionally substituted with $Y^a$, $C_2$-$C_6$ alkenyl, $C_2$-$C_6$ haloalkenyl, ($C_2$-$C_6$) alkenyl optionally substituted with $Y^a$, $C_2$-$C_6$ alkynyl, $C_2$-$C_6$ haloalkynyl, ($C_2$-$C_6$) alkynyl optionally substituted with $Y^b$, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, ($C_1$-$C_8$) alkoxy optionally substituted with $Y^a$, $C_2$-$C_6$ alkenyloxy, $C_2$-$C_6$ haloalkenyloxy, ($C_2$-$C_6$) alkenyloxy optionally substituted with $Y^a$, $C_2$-$C_6$ alkynyloxy, $C_2$-$C_6$ haloalkynyloxy, ($C_2$-$C_6$) alkynyloxy optionally substituted with $Y^a$, $C_3$-$C_6$ cycloalkyl, $C_3$-$C_6$ halocycloalkyl, $C_3$-$C_6$ cycloalkyl ($C_1$-$C_6$) alkyl, $C_3$-$C_6$ halocycloalkyl ($C_1$-$C_6$) alkyl, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ haloalkylthio, ($C_1$-$C_6$) alkylthio optionally substituted with $Y^a$, $C_2$-$C_6$ alkenylthio, $C_2$-$C_6$ haloalkenylthio, $C_2$-$C_6$ alkynylthio, $C_2$-$C_6$ haloalkynylthio, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ haloalkylsulfinyl, ($C_1$-$C_6$) alkylsulfinyl optionally substituted with $Y^a$, $C_2$-$C_6$ alkenylsulfinyl, $C_2$-$C_6$ haloalkenylsulfinyl, $C_2$-$C_6$ alkynylsulfinyl, $C_2$-$C_6$ haloalkynylsulfinyl, $C_1$-$C_6$ alkylsulfonyl, $C_1$-$C_6$ haloalkylsulfonyl, ($C_1$-$C_6$) alkylsulfonyl optionally substituted with $Y^a$, $C_2$-$C_6$ alkenylsulfonyl, $C_2$-$C_6$ haloalkenylsulfonyl, $C_2$-$C_6$ alkynylsulfonyl, $C_2$-$C_6$ haloalkynylsulfonyl, $-C(O)R^{90a}$, $-C(O)NHR^{90b}$, $-C(O)N(R^{90c})R^{90b}$, $-C(O)OH$, $-C(=NOR^{90d})R^{90a}$, $-C(O)NH_2$, hydroxy, $-OC(O)R^{90e}$, $-OS(O)_2R^{90f}$, $-NH_2$, $-NHR^{90g}$, $-N(R^{90h})R^{90g}$, mercapto, $-SC(O)R^{90i}$, $-S(O)_2NHR^{90j}$, $-S(O)_2N(R^{90k})R^{90j}$, $-SF_5$, cyano, nitro, phenyl, phenyl optionally

substituted with $Y^c$, heterocyclyl or heterocyclyl optionally substituted with $Y^c$,

$Y^a$ is $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, $C_1$-$C_8$ alkoxycarbonyl, $C_1$-$C_8$ haloalkoxycarbonyl, $C_1$-$C_6$ alkylcarbonyl, $C_1$-$C_6$ haloalkylcarbonyl, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ haloalkylthio, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ haloalkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl, $C_1$-$C_6$ haloalkylsulfonyl, hydroxy or cyano,

$Y^b$ is $C_1$-$C_6$ alkyl, $C_3$-$C_6$ cycloalkyl, trimethylsilyl or phenyl,

$Y^c$ is a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, cyano or nitro,

each of $R^{10a}$, $R^{20a}$, $R^{30a}$, $R^{30e}$, $R^{40a}$, $R^{40e}$, $R^{50a}$, $R^{60a}$ and $R^{90a}$ is independently a hydrogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy or $C_1$-$C_8$ haloalkoxy,

each of $R^{20g}$, $R^{20h}$, $R^{30f}$, $R^{30g}$, $R^{30h}$, $R^{30i}$, $R^{40f}$, $R^{40g}$, $R^{40h}$, $R^{40i}$, $R^{50g}$, $R^{50h}$, $R^{60g}$, $R^{60h}$, $R^{90b}$, $R^{90c}$, $R^{90i}$, $R^{90j}$ and $R^{90k}$ is independently $C_1$-$C_6$ alkyl or $C_1$-$C_6$ haloalkyl,

$R^{90d}$ is a hydrogen atom, $C_1$-$C_6$ alkyl or $C_1$-$C_6$ haloalkyl,

$R^{90e}$ is a hydrogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, $C_1$-$C_6$ alkylamino, $C_1$-$C_6$ haloalkylamino, di($C_1$-$C_6$) alkylamino or di($C_1$-$C_6$) haloalkylamino,

$R^{90f}$ is $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_6$ alkylamino, $C_1$-$C_6$ haloalkylamino, di($C_1$-$C_6$) alkylamino or di($C_1$-$C_6$) haloalkylamino,

each of $R^{90g}$ and $R^{90h}$ is independently $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_6$ alkylcarbonyl, $C_1$-$C_6$ haloalkylcarbonyl, $C_1$-$C_8$ alkoxycarbonyl, $C_1$-$C_8$ haloalkoxycarbonyl, $C_1$-$C_6$ alkylaminocarbonyl, $C_1$-$C_6$ haloalkylaminocarbonyl, $C_1$-$C_6$ alkylaminothiocarbonyl, $C_1$-$C_6$ haloalkylaminothiocarbonyl, phenylcarbonyl, $C_1$-$C_6$ alkylsulfonyl, $C_1$-$C_6$ haloalkylsulfonyl, $C_1$-$C_6$ alkylaminosulfonyl or di($C_1$-$C_6$) alkylaminosulfonyl, and

n is an integer of 0, 1 or 2.

2. The condensed heterocyclic compound or its salt or an N-oxide thereof according to Claim 1, wherein

D substituted with $-S(O)_nR^1$ is a ring represented by D1,

$G_1$ is C(Y1),

$G_2$ is C(Y2),

$G_3$ is C(Y3),

$G_4$ is C(Y4),

$A^2$ is $C(R^2)$,

$A^3$ is $C(R^3)$,

$R^1$ is $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_2$-$C_6$ alkenyl, $C_2$-$C_6$ haloalkenyl, $C_2$-$C_6$ alkynyl, $C_2$-$C_6$ haloalkynyl, $C_3$-$C_6$ cycloalkyl ($C_1$-$C_6$) alkyl or $C_3$-$C_6$ halocycloalkyl ($C_1$-$C_6$) alkyl,

$R^2$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl or $C_1$-$C_6$ haloalkyl,

$R^3$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ haloalkylthio, ($C_1$-$C_6$) alkylthio optionally substituted with $R^{3a}$, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ haloalkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl or $C_1$-$C_6$ haloalkylsulfonyl,

$R^4$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ haloalkylthio, ($C_1$-$C_6$) alkylthio optionally substituted with $R^{4a}$, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ haloalkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl or $C_1$-$C_6$ haloalkylsulfonyl,

each of $R^5$, $R^6$ and $R^8$ is independently a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl or $C_1$-$C_6$ haloalkyl,

$R^7$ is a hydrogen atom, a halogen atom or $C_1$-$C_6$ haloalkyl,

$A^{1a}$ is a hydrogen atom, $C_1$-$C_6$ alkyl, ($C_1$-$C_6$) alkyl optionally substituted with $A^{1a\text{-}a}$, $C_2$-$C_6$ alkenyl, $C_2$-$C_6$ alkynyl, $C_1$-$C_8$ alkoxy, $C_3$-$C_6$ cycloalkyl or $C(O)R^{10a}$,

$A^{1a\text{-}a}$ is $C_1$-$C_8$ alkoxy, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl or cyano,

$R^{10a}$ is a hydrogen atom, $C_1$-$C_6$ alkyl or $C_1$-$C_8$ alkoxy,

each of Y1, Y2, Y3 and Y4 is independently a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_2$-$C_6$ alkenyl, $C_2$-$C_6$ alkynyl, ($C_2$-$C_6$) alkynyl optionally

substituted with $Y^b$, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ haloalkylthio, ($C_1$-$C_6$) alkylthio optionally substituted with $Y^a$, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ haloalkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl, $C_1$-$C_6$ haloalkylsulfonyl, $-C(O)R^{90a}$, $-C(O)NHR^{90b}$, $-C(O)N(R^{90c})R^{90b}$, -C(O)OH, hydroxy, $-OC(O)R^{90e}$, $-OS(O)_2R^{90f}$, $-NH_2$, $-NHR^{90g}$, $-N(R^{90h})R^{90g}$, mercapto, $-SC(O)R^{90i}$, $-S(O)_2NHR^{90j}$, $-S(O)_2N(R^{90k})R^{90j}$, $-SF_5$, cyano, nitro, phenyl, phenyl optionally substituted with $Y^c$, heterocyclyl or heterocyclyl optionally substituted with $Y^c$, and

$Y^a$ is $C_1$-$C_8$ alkoxycarbonyl.

3. The condensed heterocyclic compound or its salt or an N-oxide thereof according to Claim 2, wherein

Q is a ring represented by Q1,

$A^1$ is $N(A^{1a})$,

$R^1$ is $C_1$-$C_6$ alkyl,

$R^3$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ haloalkyl, $C_1$-$C_6$ haloalkylthio, ($C_1$-$C_6$) alkylthio optionally substituted with $R^{3a}$, $C_1$-$C_6$ haloalkylsulfinyl or $C_1$-$C_6$ haloalkylsulfonyl,

$R^4$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ haloalkyl, $C_1$-$C_6$ haloalkylthio, ($C_1$-$C_6$) alkylthio optionally substituted with $R^{4a}$, $C_1$-$C_6$ haloalkylsulfinyl or $C_1$-$C_6$ haloalkylsulfonyl, and

$A^{1a}$ is a hydrogen atom or $C_1$-$C_6$ alkyl.

4. The condensed heterocyclic compound or its salt or an N-oxide thereof according to Claim 3, wherein

$A^4$ is $C(R^4)$,

$A^5$ is a nitrogen atom,

$R^2$ is a hydrogen atom,

$R^4$ is a hydrogen atom or $C_1$-$C_6$ haloalkyl,

Y1 is a hydrogen atom, $C_1$-$C_6$ alkyl or $C_1$-$C_6$ haloalkyl,

Y2 is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl,

$C_2$-$C_6$ alkenyl, ($C_2$-$C_6$) alkynyl optionally substituted with $Y^b$, $C_1$-$C_8$ alkoxy, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ haloalkylthio, ($C_1$-$C_6$) alkylthio optionally substituted with $Y^a$, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl, $-NH_2$, $-NHR^{90g}$, nitro, phenyl, phenyl optionally substituted with $Y^c$, thiophen-2-yl, pyridin-3-yl or pyridin-4-yl,

Y3 is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_6$ alkylthio, ($C_1$-$C_6$) alkylthio optionally substituted with $Y^a$, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl, $-C(O)R^{90a}$, $-C(O)N(R^{90c})R^{90b}$, -C(O)OH, cyano or nitro,

Y4 is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ alkylsulfonyl, $-N(R^{90h})R^{90g}$ or cyano,

$Y^a$ is $C_1$-$C_8$ alkoxycarbonyl,

$Y^b$ is $C_3$-$C_6$ cycloalkyl or trimethylsilyl,

$Y^c$ is a halogen atom or $C_1$-$C_6$ haloalkyl,

$R^{90a}$ is $C_1$-$C_8$ alkoxy,

each of $R^{90b}$ and $R^{90c}$ is independently $C_1$-$C_6$ alkyl,

$R^{90g}$ is $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkylcarbonyl, $C_1$-$C_8$ alkoxycarbonyl or phenylcarbonyl, and

$R^{90h}$ is $C_1$-$C_6$ alkyl.

5. The condensed heterocyclic compound or its salt or an N-oxide thereof according to Claim 3, wherein

$A^4$ is a nitrogen atom,

$A^5$ is $C(R^5)$,

$R^2$ is a hydrogen atom,

$R^3$ is $C_1$-$C_6$ haloalkyl,

$R^5$ is a hydrogen atom or $C_1$-$C_6$ alkyl,

Y1 is a hydrogen atom,

Y2 is a hydrogen atom, a halogen atom or $C_1$-$C_6$ haloalkyl,

Y3 is a hydrogen atom, a halogen atom, $C_1$-$C_6$ haloalkyl or cyano, and

Y4 is a hydrogen atom, a halogen atom or $C_1$-$C_8$ alkoxy.

6. The condensed heterocyclic compound or its salt or an N-oxide thereof according to Claim 2, wherein

Q is a ring represented by Q2,

$A^4$ is a nitrogen atom or $C(R^4)$,

$A^5$ is a nitrogen atom or $C(R^5)$,

provided that both $A^4$ and $A^5$ are not nitrogen atoms,

$R^1$ is $C_1$-$C_6$ alkyl,

$R^2$ is a hydrogen atom,

$R^3$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ haloalkyl, $C_1$-$C_6$ haloalkylthio, ($C_1$-$C_6$) alkylthio optionally substituted with $R^{3a}$, $C_1$-$C_6$ haloalkylsulfinyl or $C_1$-$C_6$ haloalkylsulfonyl, and

$R^4$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ haloalkyl, $C_1$-$C_6$ haloalkylthio, ($C_1$-$C_6$) alkylthio optionally substituted with $R^{4a}$, $C_1$-$C_6$ haloalkylsulfinyl or $C_1$-$C_6$ haloalkylsulfonyl.

7. The condensed heterocyclic compound or its salt or an N-oxide thereof according to Claim 6, wherein

$A^4$ is a nitrogen atom,

$A^5$ is $C(R^5)$,

$R^3$ is $C_1$-$C_6$ haloalkyl,

$R^5$ is a hydrogen atom or $C_1$-$C_6$ alkyl,

$R^6$ is a hydrogen atom, a halogen atom or $C_1$-$C_6$ alkyl,

each of Y1 and Y4 is a hydrogen atom,

Y2 is a hydrogen atom, a halogen atom or $C_1$-$C_6$ haloalkyl, and

Y3 is a hydrogen atom or $C_1$-$C_6$ haloalkyl.

8. The condensed heterocyclic compound or its salt or an N-oxide thereof according to Claim 2, wherein

Q is a ring represented by Q3,

$A^4$ is a nitrogen atom or $C(R^4)$,

$A^5$ is a nitrogen atom or $C(R^5)$,

provided that both $A^4$ and $A^5$ are not nitrogen atoms,

$R^1$ is $C_1$-$C_6$ alkyl,

$R^2$ is a hydrogen atom,

$R^3$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ haloalkyl, $C_1$-$C_6$ haloalkylthio, ($C_1$-$C_6$)alkylthio optionally substituted with $R^{3a}$, $C_1$-$C_6$ haloalkylsulfinyl or $C_1$-$C_6$ haloalkylsulfonyl, and

$R^4$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ haloalkyl, $C_1$-$C_6$ haloalkylthio, ($C_1$-$C_6$) alkylthio optionally substituted with $R^{4a}$, $C_1$-$C_6$ haloalkylsulfinyl or $C_1$-$C_6$ haloalkylsulfonyl.

9. The condensed heterocyclic compound or its salt or an N-oxide thereof according to Claim 8, wherein

$A^4$ is a nitrogen atom,

$A^5$ is $C(R^5)$,

$R^3$ is $C_1$-$C_6$ haloalkyl,

$R^5$ is a hydrogen atom,

$R^6$ is a hydrogen atom,

Y1 is a hydrogen atom,

each of Y2 and Y3 is independently a hydrogen atom, a halogen atom or $C_1$-$C_6$ haloalkyl, and

Y4 is a hydrogen atom or a halogen atom.

10. The condensed heterocyclic compound or its salt or an N-oxide thereof according to Claim 2, wherein Q is a ring represented by Q4.

11. The condensed heterocyclic compound or its salt or an N-oxide thereof according to Claim 10, wherein

$R^1$ is $C_1$-$C_6$ alkyl,

$R^6$ is a hydrogen atom,

$R^7$ is $C_1$-$C_6$ haloalkyl,

$R^8$ is a hydrogen atom or $C_1$-$C_6$ alkyl,

each of Y1 and Y4 is a hydrogen atom,

Y2 is a hydrogen atom, a halogen atom or $C_1$-$C_6$ haloalkyl, and

Y3 is a hydrogen atom or $C_1$-$C_6$ haloalkyl.

12. The condensed heterocyclic compound or its salt or an N-oxide thereof according to Claim 2, wherein

$A^1$ is $N(A^{1a})$ or an oxygen atom,

$R^2$ is a hydrogen atom,

$R^3$ is $C_1$-$C_6$ haloalkyl, $C_1$-$C_6$ haloalkylthio, $C_1$-$C_6$ haloalkylsulfinyl or $C_1$-$C_6$ haloalkylsulfonyl,

$R^4$ is a hydrogen atom,

$R^5$ is a hydrogen atom or $C_1$-$C_6$ alkyl,

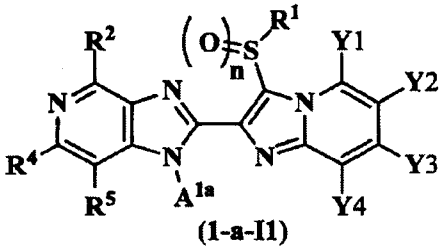
$R^6$ is a hydrogen atom,

$A^{1a}$ is $C_1$-$C_6$ alkyl,

each of Y1 and Y4 is a hydrogen atom, and

each of Y2 and Y3 is independently a hydrogen atom or $C_1$-$C_6$ haloalkyl.

13. The condensed heterocyclic compound or its salt or an N-oxide thereof according to Claim 1, wherein the formula (1) is the following formula (1-a-I1):



(1-a-I1)

wherein

$R^1$ is $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_2$-$C_6$ alkenyl, $C_2$-$C_6$ haloalkenyl, $C_2$-$C_6$ alkynyl or $C_2$-$C_6$ haloalkynyl,

$R^4$ is a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl, $C_1$-$C_6$ haloalkyl, $C_1$-$C_8$ alkoxy, $C_1$-$C_8$ haloalkoxy, $C_1$-$C_6$ alkylthio, $C_1$-$C_6$ haloalkylthio, $C_1$-$C_6$ alkylsulfinyl, $C_1$-$C_6$ haloalkylsulfinyl, $C_1$-$C_6$ alkylsulfonyl or $C_1$-$C_6$ haloalkylsulfonyl,

$A^{1a}$ is a hydrogen atom, $C_1$-$C_6$ alkyl, $C_2$-$C_6$ alkenyl or $C_2$-$C_6$ alkynyl, and each of $R^2$, $R^5$, Y1, Y2, Y3 and Y4 is independently a hydrogen atom, a halogen atom, $C_1$-$C_6$ alkyl or $C_1$-$C_6$ haloalkyl.

14. The condensed heterocyclic compound or its salt or an N-oxide thereof according to Claim 13, wherein

each of $R^1$ and $A^{1a}$ is independently $C_1$-$C_6$ alkyl,

$R^4$ is $C_1$-$C_6$ haloalkyl,

Y2 is a hydrogen atom or $C_1$-$C_6$ haloalkyl,

Y3 is a hydrogen atom, a halogen atom or $C_1$-$C_6$ haloalkyl, and

each of $R^2$, $R^5$, Y1 and Y4 is a hydrogen atom.

15. A pesticide containing one or more members selected from the condensed heterocyclic compounds and their salts as defined in any one of Claims 1 to 14 as active ingredient(s).

16. An agricultural chemical containing one or more members selected from the condensed heterocyclic compounds and their salts as defined in any one of Claims 1 to 14 as active ingredient(s).

17. A parasiticide against internal or external parasites in or on a mammal or bird, containing one or more members selected from the condensed heterocyclic compounds and their salts as defined in any one of Claims 1 to 14 as active ingredient(s).

18. The parasiticide according to Claim 17, wherein the external parasites are

Siphonaptera or ticks.

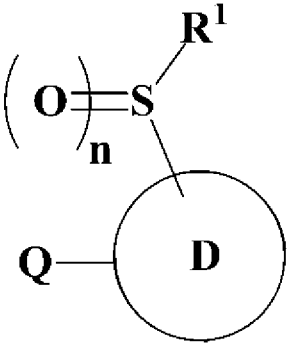
19. An insecticide or acaricide containing one or more members selected from the condensed heterocyclic compounds and their salts as defined in any one of Claims 1 to 14 as active ingredient(s).

20. A seed treatment agent containing one or more members selected from the condensed heterocyclic compounds and their salts as defined in any one of Claims 1 to 14 as active ingredient(s).

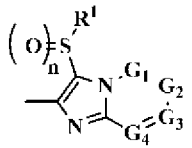
21. The seed treatment agent according to Claim 20, for use in the treatment of seeds by dipping.

22. A soil treatement agent containg one or more members selected from the condensed hetercyclic compounds as defined in Claims 1 to 14 as active ingredient(s).

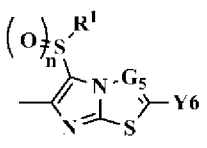
23. The soil treatment agent according to Claim 22, for use in the treatment of soil by irrigation.



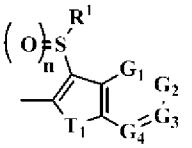
(1)



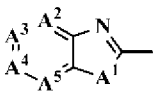
D1



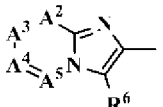
D2



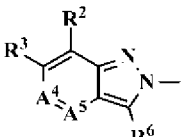
D3



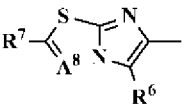
Q1



Q2



Q3



Q4