



(72)

	,		
	,	- 34820	80
	,	- 34980	138
	,	- 34980	138
	,	- 34090	10
	,	- 31170	10
	,	- 31120	15
	,	- 34680	2
	,	- 34980	75
	,	- 31600	가

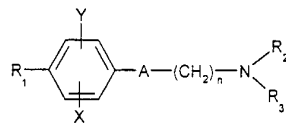
(74)

:

(54)

A, X, Y, n, R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>가 1 (I)

< I >



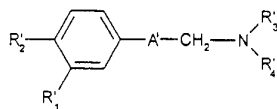
6,7 - SKF - 10,047,  
 (+) SKF - 10,047(W. R. Martin et al., J. Pharmacol. Exp. Ther. 1976, 197, 517 -  
 532; B. R. Martin et al., J. Pharmacol. Exp. Ther. 1984, 231, 539 - 544)  
 가 (+) N - (+) NANM (+)  
 (+) 3 - (3 - ) - 1 - (+) 3 - PPP (B.L.Largen  
 t et al., Proc. Nat. Acad. Sci. USA 1984, 81, 4983 - 4987).

USP 4,709,094  
 - (O - ) DTG [E. Weber et al., Proc. N  
 at. Acad. Sci. USA 1986, 83, 8784 - 8788] DTG [B. L. Largent et al., J. Pharma  
 col. Exp. Ther. USA 1986, 238, 739 - 748] (+) SKF - 10,047 (+) 3 - PPP

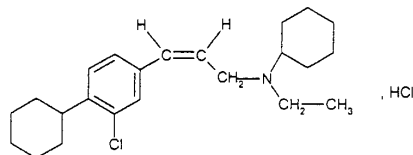
- 1 - 2 . (+) SKF - 10,047 가 - 1  
 DTG, (+) 3 - PPP - 1 - 2

EP 461,986 가 :

A



(Z) - [3 - (3 - - 4 - ) ]



[Biologicals Chemistry 1997, 272 (43), 27107 - 27115; Immunopharmacology and Immu  
 notoxicology 1996, 18(2), 179 - 191] (A)  
 가 , CYP 2D6

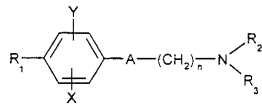
1957

(family) 가 . 15 P450(CYP)  
 (isoform) 가 P450 [Xe  
 nobiotica, 1986, 16, 367 - 378] , CYP 1A2, CYP 2A6, CYP 2C9, CYP 2D6, CYP 2C  
 19, CYP 2E1 CYP 3A4가 , CYP 3A4, CYP 2D6 CYP 2C9  
 ( ) 90% 가가 ,  
 , 가 ( , CYP 2C19 CYP 2D6).  
 , 4 - CYP 2D6 (Clin. Pharmacol. Ther. 19  
 91, 50, 233 - 238). CYP 2D6 30 가 , 10  
 % (Caucasian) ( 가 ) , -

가 .  
 , 가

가 ( ) CYP 2D6가 ,  
 가 ,  
 , 가 , 가  
 가 .  
 (I) , 가

I



( ,  
 A가 -C C - , -CH=CH - , -CH2 -CH2 - ,  
 n 1 2 ,  
 X가 ,

Y가 ,  
 R<sub>1</sub> ; , tert - ; [3.2.1] , 4 -  
 4 - R<sub>1</sub> 1 - 2 - - 2 - X Y가 가

R<sub>2</sub>가 (C<sub>1</sub> - C<sub>4</sub>) ,

R<sub>3</sub>가 (C<sub>5</sub> - C<sub>7</sub>) .)

" " 가 .

" (C<sub>1</sub> - C<sub>4</sub>) " 1 4 .

A가 -C C - , -CH=CH - , -CH<sub>2</sub> -CH<sub>2</sub> ,

n 1 2 ,

X가 ,

Y가 ,

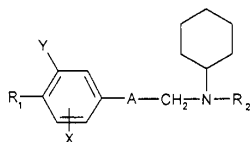
R<sub>1</sub> ; , tert - ; [3.2.1] , 4 -  
 4 - R<sub>1</sub> 1 - 2 - X Y가 가 R<sub>1</sub> ,

-R<sub>2</sub>가 (C<sub>1</sub> - C<sub>4</sub>) ,

-R<sub>3</sub>가 (C<sub>5</sub> - C<sub>7</sub>) (I) 가

(I.1) 가 ,

I.1



( ,

A가 -C C - , -CH=CH - ; -CH<sub>2</sub> -CH<sub>2</sub> ,



(I) 가 (I) 가  
 (phase)  
 / C<sub>18</sub> - 가  
 (I) - 14

(I) 가

[Protective Groups in Organic Synthesis, Greene T. W. and Wuts P. G. M., ed. John Wiley and Sons, 1991; Protecting Groups, Kocienski P. J., 1994, Georg Thieme Verlag.]

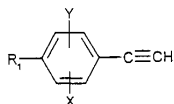
가 (I)

(I)

1) A가 -C C-

a) n=1 (Mannich) (1) HNR<sub>2</sub>R<sub>3</sub> (R<sub>2</sub> R<sub>3</sub>) (I)

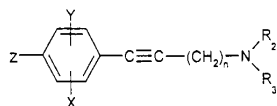
II



(R<sub>1</sub>, X, Y) (I)

b) Ia (Suzuki) R<sub>1</sub> - B(OR)<sub>2</sub> (R)

Ia



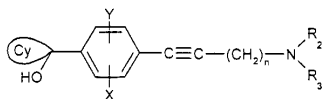
(X, Y, n, R<sub>2</sub>, R<sub>3</sub>) (I), Z, (OTf)

c) R<sub>1</sub>; 4- (Ia) (I')



R<sub>1</sub> (I') (3)

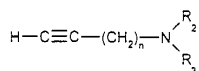
I'



( , X, Y, n, R<sub>2</sub>, R<sub>3</sub> (I) .)

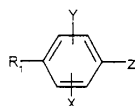
d) (4) (III) ,

4



( , n, R<sub>2</sub>, R<sub>3</sub> (I) .)

III



( , R<sub>1</sub>, X, Y (I) , Z  
( OTf) .)

2) A가 -CH=CH- (I) , Z E A가 (I) A가 -C C- (I) Z (I)  
(I) , A가 (I) -C C- ,

3) A가 -CH<sub>2</sub>-CH<sub>2</sub>- , A가 -CH=CH- -C C- (I)

(1a) 가 , 80 90 가 , 1,2- 1 (II)  
1,4- 2 (III) .

(1b) , Z가 OTf (la) , ,  
(2) . ( ) 가 , 60 80 가  
, 1,2- 가 (二相)

1993, 58 (8), 2201 - 2208] , [Synth. Commun. 1981, 11 (7), 513 - 519 J. Org. Chem. tert -  
 (2) R<sub>1</sub> - B(OH)<sub>2</sub>

R<sub>1</sub> Br

(1c) , - 80 - 70 , (1a) ,  
 , n- Z가 / [Tetrahedron, 1995, 51, 11043 - 11062]  
 (I') (I)

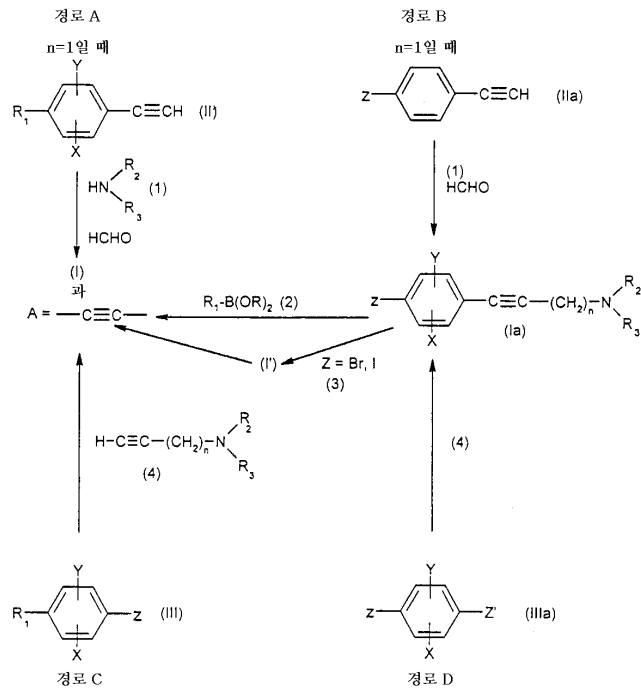
(1d) , (III) ( )  
 Z가 ( )  
 . Z가

가 (Sonogashira)  
 [J. Org. Chem. 1993, 58, 7368 - 7376 and 1998, 63, 1109 - 1118; Syn. Lett. 1995,  
 1115 - 1116 Synthesis, 1987, 981]

A가 Z -CH=CH- (I) , (Raney) , E  
 (Lindlar) ,  
 (I) ,  
 (DIBALH)

A가 -CH<sub>2</sub>-CH<sub>2</sub>- (I) ,  
 , [" Catalytic Hydrogenation. Techniques and App  
 lications in Organic Chemistry" , Robert L. Augustine, 1965, Marcel Dekker, Inc. New York]

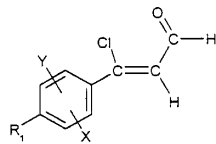
A가 -C C- (I) 1 .



1, A -C≡C-, X, Y, n, R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub> (I)  
 , Z , Z' , R , Z가  
 , Z' , D  
 Z Z'

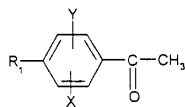
(II) (IV)  
 1,4 -

IV



( , X, Y R<sub>1</sub> (I) .)  
 (IV) (V) (Vilsmeier)

V



( , X, Y R<sub>1</sub> (I) .)

- 20

40

- 10

10

1,2 -

[J. Chem. Soc. (C) 1970, 2484 - 2488 Agnew. Chem. Internat. E

d. 1963, 2, 98 - 99]

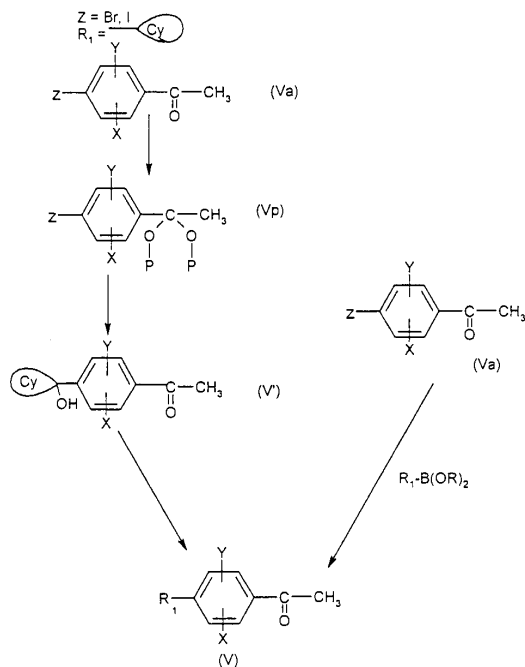
(V)

[Gazz. Chim. Ital. 1949, 79, 453 - 457 and J. Am. Chem. Soc. 1

947, 69, 1651 - 1652]

2 (V)

2



2, X, Y, R<sub>1</sub>  
OTf

(I), R, Cy, (I')

, P, Z

(V), (Va), (Ia)

(I), (Va)

R<sub>1</sub> - B(OR)<sub>2</sub> (2)



(V')

(I')

(Vp), (Ia), (I')

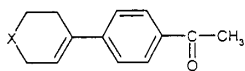
가

(V')

(I)

, R<sub>1</sub> 4,4 - 4 - (VI)  
( ) (V)

VI



( , X=O -C(CH<sub>3</sub>)<sub>2</sub>)

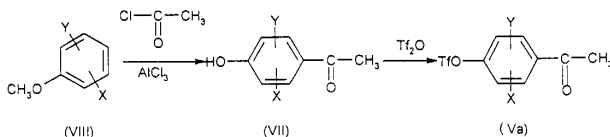
X ( ) Y가 가 (V) 가 X = Y =  
(V) , X ( ) Y가 ,

0

(Va) 가

, Z가 (Va) 3

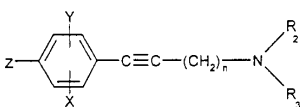
3



3 , X Y (I) (VIII)

(Ia)

< Ia >

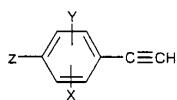


( , X, Y, n, R<sub>2</sub> R<sub>3</sub> (I) , Z OTf .)

(I)

n=1 (IIa) (1) HNR<sub>2</sub>R<sub>3</sub>

IIa

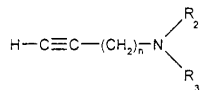


( , X Y (I) , Z OTf .)

(4) (IIIa)

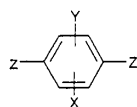
(Ia)

< 4 >



( , R<sub>2</sub>, R<sub>3</sub> n (I) .)

IIIa



( , X Y (I) , Z , Z' , Z' .)

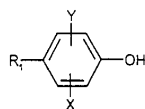
(II) (I)

Z가 (III) (4) 가 (IIIa) (4) , Z'가 , Z'가 , Z'가 가 . , Z가

(4) (n=1 ) [Tetrahedron Lett. 1989, 30 (13), 1679 - 1682]  
 (1) HNR<sub>2</sub>R<sub>3</sub> 3- 50 80

Z=OTf (III) (IX)

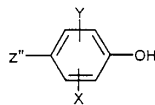
IX



( , X, Y R<sub>1</sub> (I) .)

(IX) (Ia) (I) (Va) (V)  
(IXa)

IXa

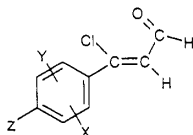


( , Z'' .)

(IXa) , 가

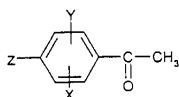
(IIa) (IV) (II) (V) (IV)  
(IVa) (IVa) (Va)

IVa



( , X, Y Z (I) , Z OTf .)

Va



( , X Y (IVa) .)

(I)

-2

[De Haven - Hudkins et al., Life Science 1993, 53, 41 - 48]

- 1  
<sup>3</sup>H - (+) - 3PP . (+) -  
 1 (0.3mg  
 /ml) 0.5nM [<sup>3</sup>H] - (+) - 150 37 . 10 μ M (+) -  
 3 [ <sup>3</sup>H] -  
 100 nM IC<sub>50</sub> 가 ( ) 0.1nM

unology 1994, 52, 183 - 192] [R. Paul et al., Journal of Neuroimm  
 (1ml) 2nM [<sup>3</sup>H] - DTG 90 [ <sup>3</sup>H] - DTG 20 10 μ M DTG  
 2 , [<sup>3</sup>H] - DTG  
 1nM 500nM -2 가

1 -  
 (Sigma Chemical Co.) ( ) D - , SEB LPS  
 . SEB 0.00029% ( " )  
 (limulus amoebocyte lysate; LAL)" )  
 5% , 5% Tween 80 90%

Balb/C (Charles River breeding stock; ) 6 8  
 IFFA CREDO (Domaine des Oncins, BP 0109, 69592 L'Arbresle Cedex, France)  
 8 C57BL/6 B6D2F1

30 : 5 LPS(10μg/ , )  
 眼窩後方) (穿刺) LPS 1 30 ( - 80  
 . TNF - IL - 10 ELISA ( (Genzyme) , )

: 10 . 30 , SEB(  
 B) 10μg/ , D - (20mg/ )

48  
 GVH( (移植片對宿主) : ( ) B6D2F1 (H2b × H2d)  
 . 4 , GVH 7.5 × 10<sup>7</sup>C57BL6(H2b)  
 . 1 , GVH 가 가  
 1

1

$$I = \frac{\text{시험동물의비장무게/시험동물의무게}}{\text{대조구동물의비장무게/대조구동물의무게}}$$

2

2

$$PS = \frac{I_{exp} - 1}{I_{contr} - 1} \times 100$$

PS: (脾腫)

T : Balb/C  
 pH 6.6 (2% 가 , 2mM  
 L - , 1mM , 100 UI/ml , 100µg/ml 15mM PIPES  
 RPMI 1640) ( ) 2 . ,  
 95%

6 × 10<sup>6</sup> /ml 96 - ( )  
 (Falcon) ) 2µg/ml SEB ( : 95% + 5% CO<sub>2</sub>) 4  
 . 4 37 ( (Amersham) ) , 2 µCi  
 ( (Filtermat A) ) ( 가 . 4 , ( (Pharmacia)  
 LKB) ( ( LKB  
 (Betaplate))

2 -  
 MDA/MB231 ( ) : MDA/MB231 10% 가 , 1  
 mM , 100UI/ml 100µg/ml DMEM ( )  
 (Gibco Laboratories))

, 2 × 10<sup>5</sup> /ml 96 - ( )  
 ) 10 µg/ml ( ) 10µg/ml ( ) RPMI  
 . 3 + 5% CO<sub>2</sub>) , 2 µCi ( ) : 95  
 가 . 24 , - EDTA( ) ( )  
 ) ( LKB)  
 ( LKB )

3 -  
 (再注射輸血)  
 250 300g (Sprague Dawley) . IFFA  
 CREDO , (AO4(UAR)) :  
 (Manning) (Circ. Res. 1984, 55, 5  
 45 - 548) (Kane) (Br. J. Pharmacol. 1984, 82, 349 - 357)

60mg/kg (Harward) ) (PE10) (心電  
 圖)(ECG), DII(Gould ES1000 Astromed 7400 )  
 가  
 5 ,  
 37 .

0.6% 0.1ml/100g 75% PEG - 400/ 120 5  
1ml/100g

(Lambeth Conventions) (Cardiovasc. Res., 1988, 22, 447 - 455) ECG

(10 )

- (期外收縮)(VES),
- (頻脈)(TV)(VT가 4 VES )
- (心室細動),

( )

4 10 VF 1  
VT VES ( )

CYP 2D6 K<sub>i</sub> (K<sub>i</sub>) 20

CYP 2D6

(NADPH) CYP 2D6 K<sub>i</sub> 20  
가

CYP 2D6 ( ) 가

P - 450 ( (GENTEST Corp.)) 가

I II CYP 2D6 ) 24 (

[J. Pharm. Exp. Ther. 1996, 277, 321 - 332]

:

- NADPH ( )  
CYP 2D6  
가 ( , 10% )



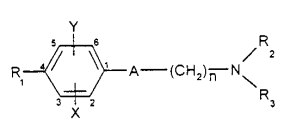
0.2mg 15mg/ (kg)  
 10mg 300mg. 25mg 75mg  
 10mg 1,500mg, 25mg 375mg  
 1 5  
 가 □

( )  
 가 가  
 ( )  
 (I)

(Micro - Koefler)  
 200MHz ppm

s= ; m= ; d= ; t= ; q=

(I)



1

1 - 4 - (1,1 - ) , Vp

(Vp): X=Y=H; Z=Br; P=CH<sub>3</sub>

19.905g 1 - (4 - ) , 101.4ml , 0.22g 19.9ml  
 6 , 1%  
 IVp ; =96%; b.p. = 82 (0.03mbar ).

2

4,4 - , 3.1

a) 4,4 - -2 -

1ml 450ml 81ml -3 - -2 - 88ml 2 -  
 가 , 12 ,  
 , 31.1g ; b.p.=78 ( 22mbar ).

b) 100ml 31.1g 4,4 - -2 - 가 1.6g 5%

3

4 - -3,5 - , IXa.1

a) N - (3,5 - )

200ml 3,000ml 100g 3,5 - 가 , 90ml  
 가 , 12 ,  
 1,000ml ; m.p.=182 .

b) N - (4 - -3,5 - )

82ml 21.3ml 6 420ml 84.86g N - (3,5 -  
 ) 34g 가 , 12 , 5 50  
 ; m.p.=224 .

c) 4 - -3,5 -

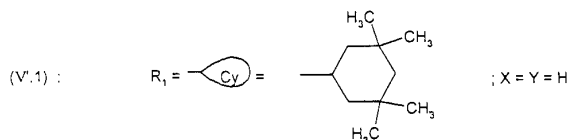
670ml 202g N - (4 - -3,5 - ) 220g (5  
 0% ) 120 5 . 3,000ml 가 , ,  
 ; m.p.=132 .

d) 100g 4- - 3,5- 5 125ml 90ml  
 가 . 230g 가 , 70ml 29g 가 ,  
 15 가 , 160 가 280ml 200ml  
 160 1 /  
 4/6 (v/v) /

<sup>1</sup>H NMR : 10.5 (s, 1H) ; 7.0 (s, 2H).

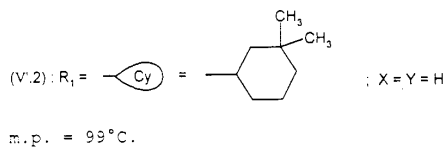
4

1 - [4 - (1 - - 3,3,5,5 - ) ] , V'.1

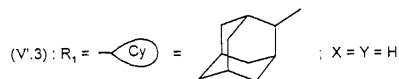


1.6M n- 27.5ml 100ml 10g 1 - - 4 - (1,1 -  
 ) ( Vp) - 78 가 . 2 20ml  
 6.92ml 3,3,5,5 - 20 가 , 가  
 - 78 1 가 , 140ml 가  
 95/5(v/v) /  
 ; =88%; m.p.=135 .

1 - [4 - ( - 3,3 - ) ] , V'.2



1 - [4 - ( - 2 - ) ] , V'.3





m.p.=75

6

1 - [4 - (4,4 - ) ] , VI.1

a) 1 - [4 - (1,1 - ) ] - 4,4 -

328ml 1.6M 가 , - 78 1,100ml 117g 1 - -  
 4 - (1,1 - ) 가 , - 78 2 . 210ml  
 66g 4,4 - 가 , - 78 1  
 가 가 가 . 500ml n - ; m.

p.=88 .

b) 300ml 99.32g 1 - [4 - (1,1 - ) ] - 4,4 - , 151g  
 600ml 가 , 30 가 . 102  
 ml 가 , 65 300ml 47ml  
 가 , 12  
 99/1(v/v) /

7

1 - [4 - (4,4 - ) ] , V.4

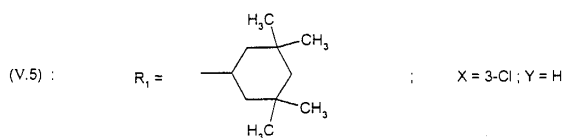
a) 1 - (1,1 - ) - 4 - (4,4 - - 1 - )

250ml 36.13g 1 - [4 - (4,4 - - 1 - ) ] ( VI.1) 0.5g  
 - (PTSA) 13ml - - 12  
 . 50% 가 , .

b) 250ml a) 3g 5% .  
 12 , , 99/1(v/v) /  
 ; m.p.=60 .

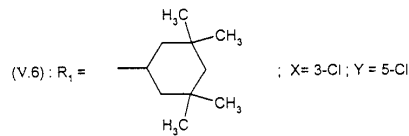
8

1 - [3 - ( - 4 - (3,3,5,5 - ) ) ] , V.5



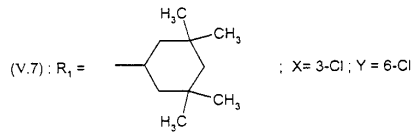
40.25g 0 350ml 가 ,  
 5g 1 - [ 4 - ( 3,3,5,5 - ) ] ( V.1) 가 . 0 2  
 , 17.1ml (d=1.565, - 78 )  
 가 , / 가 . ,  
 / ; m.p.=64 . 7/3 (v/v)

1 - [ 3,5 - - 4 - ( 3,3,5,5 - ) ] , V.6



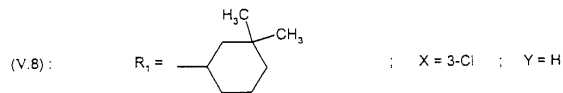
<sup>1</sup>H NMR: 7.9 (s, 1H); 7.8 (s, 1H); 3.9 (m, 1H); 2.5 (s, 3H); 2.1 (m, 2H); 1.2 (m, 4H); 1.0 (s, 6H); 0.9 (s, 6H).

1 - [ 3,6 - - 4 - ( 3,3,5,5 - ) ] , V.7



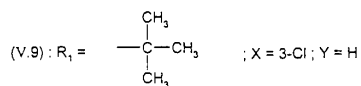
<sup>1</sup>H NMR: 7.6 (s, 1H); 7.2 (s, 1H); 3.3 (m, 1H); 2.6 (s, 3H); 1.5 (m, 2H); 1.2 (m, 4H); 1.1 (s, 6H); 0.9 (s, 6H).

1 - [ 3 - - 4 - ( 3,3 - ) ] , V.8



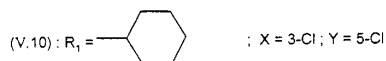
<sup>1</sup>H NMR: 7.9 (1H, s); 7.8 (d, 1H); 7.4 (d, 1H); 3.1 (m, 1H); 2.5 (s, 3H); 1.8-1.1 (m, 8H); 0.9 (s, 3H); 0.8 (s, 3H).

1 - ( 3 - - 4 - tert - ) , V.9

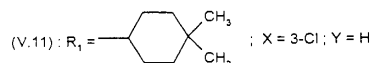


<sup>1</sup>H NMR: 7.8 (s, 1H); 7.7 (d, 1H); 7.5 (d, 1H); 2.5 (s, 3H); 1.4 (s, 9H).

1 - (3,5 - 4 - ) , V.10



1 - [3 - (4,4 - ) ] , V.11



<sup>1</sup>H NMR: 7.9 (s, 1H); 7.8 (d, 1H); 7.5 (d, 1H); 2.8 (m, 1H); 2.5 (s, 3H); 1.8-1.1 (m, 8H); 0.95 (s, 3H); 0.9 (s, 3H)

9

1 - [(3 - 4 - ) ] , VII. 1

(VII.1): X=3 - Cl; Y=H.

167g 가 , 200ml 1,2 - 500ml 1,2 - 63.5ml 2 - - 1 -  
 45 48 가 . / 가 .  
 90/10(v/v) /  
 VII.1 ; m.p.=107 .

10

- , (4.1)

20ml 80% 3 - 300ml 30.3ml 29.7g  
 가 . 12 50 가 , 80 6 가 .  
 V.1 .

<sup>1</sup>H NMR: 3.3 (s, 2H); 3.0 (s, 1H); 2.5 (q, 2H); 2.4 (m, 1H); 1.8-1.1 (m, 10H); 1.0 (t, 3H).

:

- 2 - , 4.2

- 2 - , 4.3

11

- 3 - , (4,4)

a) - 3 - (4 - )

74.8g 80 36ml 가 . 15 , 25g  
- 3 - - 1 - 가 . 12 , 70ml 가 ,

<sup>1</sup>H NMR: 7.8 (d, 2H); 7.4 (d, 2H); 4.0 (t, 2H); 3.8 (s, 1H); 2.5 (t, 2H); 2.4 (s, 3H)

b) 100ml a) 57.9g , 21.7g 35.7ml  
12 . , ; b.p.=92 - 94 ( 13m  
bar )

12

4 - - 2 - , Va.1

(Va.1): X=3 - Cl; Y=H; Z=OTf

26.2ml 0 700ml 26.7g 1 - [(3 - - 4 - ) ] ( VII.1) 가 . 0 36 , , 95/5 (v/v) / , 0.1N .

<sup>1</sup>H NMR: 8.2 (s, 1H); 8.0 (d, 1H); 7.8 (d, 1H).

:

4 - - 2,6 - , Va.2

(Va.2) : X=3 - Cl; Y=6 - Cl; Z=OTf

<sup>1</sup>H NMR:8.2 (s, 2H); 2.6(s, 3H)

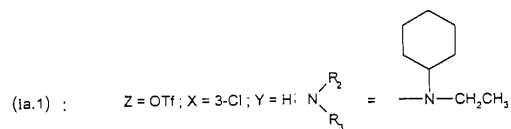
4 - - 2 - , IIIa.1

4 - - 2 - (IIIa.1) : X=3-Cl; Y=H

<sup>1</sup>H NMR: 8.1(s, 1H); 7.7(d, 1H); 7.6 (d, 1H).

13

2 - - 4 - [3 - ( ) - 1 - ] , Ia.1

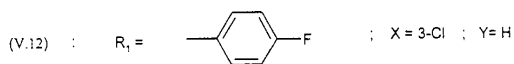


2.14g - 2 - ( VII.1) , 4g 4 - - 3 -  
 가 , 0.413g ( IIIa.1), 0.06g , 10ml 20ml  
 , 12 ( ) VI 가 , 2  
 00/0 99/1(v/v) / , ; =76%  
 . , , ; =76%

<sup>1</sup>H NMR: 7.8 (s, 1H); 7.6 (d, 1H); 7.5 (d, 1H); 3.6 (s, 2H); 2.6 (q, 2H); 2.4 (m, 1H); 1.9-1.1 (m, 10H); 0.9 (t, 3H).

14

1 - [3 - - 4 - (4 - ) ] , V.12



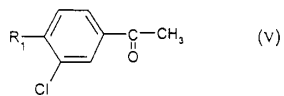
84.5ml 19.7g 4 - - 2 - ( X.1), 10g 4 -  
 , 2g ( ) , 17.9g , 591ml , 200ml 5.5  
 1g 60 8 . 12  
 /v) / , ; =94%.  
 ; =94%.

<sup>1</sup>H NMR: 8.0 (s, 1H); 7.9 (d, 1H); 7.5 (m, 3H); 7.3 (m, 2H); 2.6 (s, 3H).

1

V.13 V.17

&lt; 1 &gt;

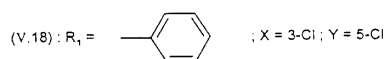


화합물	R <sub>1</sub>	<sup>1</sup> H NMR
V.13		8.1 (s, 1H); 7.9 (d, 1H); 7.5 (m, 2H); 7.2 (m, 3H); 2.6 (s, 3H)
V.14		8.0 (s, 1H); 7.9 (d, 1H); 7.6 (m, 3H); 7.3 (m, 1H); 2.6 (s, 3H)
V.15		8.0 (s, 1H); 7.9 (d, 1H); 7.6 (d, 1H); 7.4-7.1 (m, 3H) 2.6 (s, 3H)
V.16		8.0 (s, 1H); 7.9 (d, 1H); 7.5 (m, 5H); 2.6 (s, 3H)
V.17		8.0 (s, 1H); 7.9 (d, 1H); 7.5 (d, 1H); 7.4 (m, 2H); 7.0 (m, 2H); 3.8 (s, 3H); 2.6 (s, 3H)

1 - (2,6 -

- 4 - )

, V.18



<sup>1</sup>H NMR: 8.0 (s, 2H); 7.4 (m, 3H); 7.2 (m, 2H); 2.6 (s, 3H).

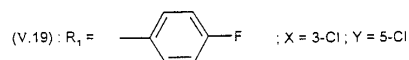
1 - (2,6 -

- 4' -

- 4 - )

,

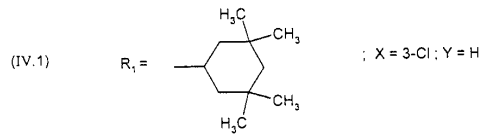
V.19



<sup>1</sup>H NMR: 8.0 (s, 2H); 7.3 (m, 4H); 2.6 (s, 3H).

15

3- -3 - [3 - -4 - (3,3,5,5 - ) ] , IV.1

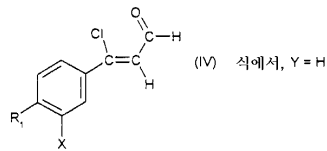


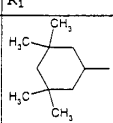
3.51ml 가 , -5 2 3.72ml 20ml  
 92g 1 - [3 - -4 - (3,3,5,5 - ) ] ( V.6) 가 , 3.  
 12 / , 10ml  
 가 . 50ml 50ml , 20ml 2.84M  
 / , , 97/3 (v/v)









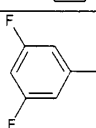
$^1H$  NMR: 10.2 (d, 1H); 7.7 (s, 1H); 7.5 (d, 1H); 7.3 (d, 1H); 6.6 (d, 1H); 3.4 (m, 1H); 1.5 (m, 2H); 1.3 (m, 4H); 1.1 (s, 6H); 0.9 (s, 6H).

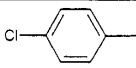
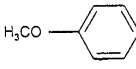
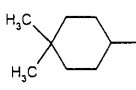
2 IV.2 IV.17 .

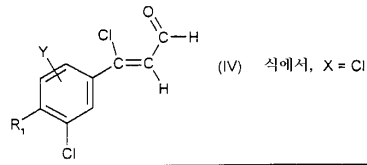
< 2 >



화합물	R <sub>1</sub>	X	m.p.; °C 또는 $^1H$ NMR
IV.2		H	10.1 (d, 1H); 7.8 (m, 2H); 7.4 (m, 2H); 6.9 (m, 1H); 2.9 (m, 1H); 1.4-0.8 (18H)

화합물	R <sub>1</sub>	X	m.p. ; °C 또는 <sup>1</sup> H NMR
IV.3		H	146
IV.4		H	
IV.5		H	
IV.6		Cl	10.0 (d, 1H); 7.8 (s, 1H); 7.7 (d, 1H); 7.4 (d, 1H); 7.0 (d, 1H); 3.1 (m, 1H); 1.8-1.1 (m, 8H); 1.0 (s, 3H); 0.9 (s, 3H)
IV.7		Cl	
IV.8		Cl	139
IV.9		Cl	
IV.10		Cl	
IV.11		Cl	

IV.12		Cl	
IV.13		Cl	10.1 (d, 1H); 8.0 (s, 1H); 7.9 (d, 1H); 7.6-7.3 (m, 3H); 7.1 (m, 2H); 7.0 (d, 1H); 3.8 (s, 3H)
IV.14		Cl	10 (d, 1H); 7.9 (s, 1H); 7.8 (d, 1H); 7.5 (d, 1H); 7.0 (d, 1H); 4.8 (m, 1H); 1.7-1.1 (m, 8H); 0.95 (s, 3H); 0.9 (s, 3H)



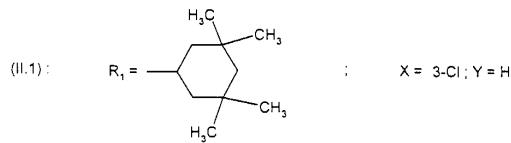
화합물	R <sub>1</sub>	Y	m.p. ; °C 또는 <sup>1</sup> H NMR
IV.15		5-Cl	10.1 (d, 1H); 8.0 (s, 1H); 7.9 (s, 1H); 7.1 (d, 1H); 3.9 (m, 1H); 2.1

			(m, 2H); 1.3 (m, 4H); 1.1 (s, 6H); 0.9 (s, 6H)
IV.16		6-Cl	10.0 (d, 1H); 7.8-7.4 (m, 2H); 6.6 (d, 1H); 3.2 (m, 1H); 1.6-1.2 (m, 6H); 1.0 (s, 6H); 0.9 (s, 6H)
IV.17		5-Cl	108

16

3 - 4 - (3,3,5,5 -

) , II.1



가 , 5.3g 가 . 130ml 1,4 - 150ml 15g 3 - . 80ml 1,4 -  
3,3,5,5 - ) ] ( IV.1) 가 , - 3 - [3 - - 4 - (  
1  
; =80%.

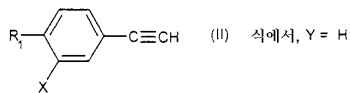
$^1\text{H NMR}$ : 7.5 (s, 1H); 7.3 (m, 2H); 4.2 (s, 1H); 3.2 (m, 1H); 1.4 (m, 2H); 1.2 (m, 4H); 1.0 (s, 6H); 0.9 (s, 6H).

4 5

II.2 II.15

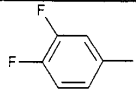
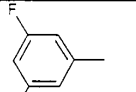
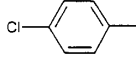
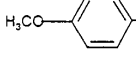
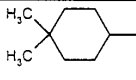
:

&lt; 4 &gt;

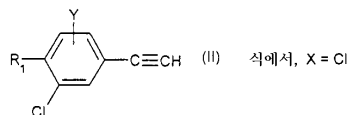


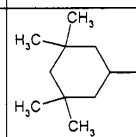
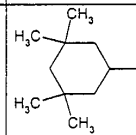
화합물	R <sub>1</sub>	X	m.p.; °C 또는 $^1\text{H NMR}$
II.2		H	7.3 (d, 2H); 7.2 (d, 2H); 4.1 (s, 1H); 2.9 (m, 1H);


			1.5-1.1 (m, 6H); 1.0 (s, 6H); 0.9 (s, 6H)
II.3		H	
II.4		Cl	7.4 (s, 1H); 7.3 (d, 1H); 7.2 (d, 1H); 4.0 (s, 1H); 3.0 (m, 1H); 1.7-1.0 (m, 8H); 0.9 (s, 3H); 0.8 (s, 3H)
II.5		Cl	7.4 (m, 3H); 4.2 (s, 1H); 1.3 (s, 9H)
II.6		Cl	7.6 (s, 1H); 7.4 (m, 6H); 4.3 (s, 1H)
II.7		Cl	7.7 (s, 1H); 7.5 (m, 3H); 7.3 (m, 3H); 4.3 (s, 1H)

II.8		Cl	7.7 (s, 1H); 7.5 (m, 4H); 7.3 (m, 1H); 4.3 (s, 1H)
II.9		Cl	
II.10		Cl	78
II.11		Cl	7.6 (s, 1H); 7.4 (d, 1H); 7.3 (m, 3H); 7.0 (d, 2H); 4.3 (s, 1H); 3.8 (s, 3H)
II.12		Cl	7.5 (s, 1H); 7.4 (m, 2H); 4.2 (s, 1H); 2.8 (m, 1H); 1.7-1.2 (m, 8H); 0.95 (s, 3H); 0.9 (s, 3H)

&lt; 5 &gt;



화합물	R <sub>1</sub>	Y	m.p.; °C 또는 <sup>1</sup> H NMR
II.13		5-Cl	7.6 (s, 1H); 7.5 (s, 1H); 4.4 (s, 1H); 3.9 (m, 1H); 2.0 (t, 2H); 1.2 (m, 4H); 1.1 (s, 6H); 0.9 (s, 6H)
II.14		6-Cl	7.6 (s, 1H); 7.4 (s, 1H); 4.6 (s, 1H); 3.2 (m, 1H); 1.5-1.1 (m, 6H); 1.0 (s, 6H); 0.9 (s, 6H)

II.15		5-Cl	7.7 (s, 2H); 7.4 (m, 3H); 7.2 (d, 2H); 4.5 (s, 1H)
-------	---	------	--

17

3,5- , 2.1

91.5ml tert - -78 300ml 20g 1 - -3,5- 가  
 1 -78 -78 1 , 14.2ml , 200ml 1N 가 .

<sup>1</sup>H NMR: 7.4 (m, 3H); 7.2 (m, 2H).

18

4- -3- , Va.3

(Va.3); X=3 - Cl; Y=H; Z=Br

250ml 100g 4- 0 600ml 133.34g  
 가 .0 2 , 28.3ml (-75 ) 0  
 12 , 가 . ,  
 ; =57%; m.p.=80 .

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3- -3- (4- -3- ) , IVa.1

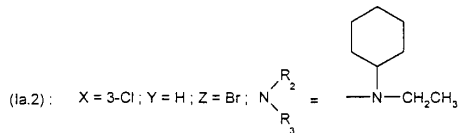
(IVa.1); X=3 - Cl; Y=H; Z=Br

15.08ml 3 6 200ml 16ml  
 가 . 가 , 30 , 40ml 13.4g  
 4- -3- ( Va.3) 가 . 12  
 50ml 18.9g 가 가 . 30 ,

; =87%; m.p.=134 .

20

[3 - (4 - -3 - ) -2 - ] , la.2.



a) 1 - -2 - -4 -

80 가 , 40g 230ml , 120ml 1,4 - 가 ,  
 가 , 400ml 1,4 - 17.5g 3 - -3 - (4 - -3 - )  
 가 , 80 30 , , , ,  
 /1,4 - , 2,300ml

b) [3 - (4 - -3 - ) -2 - ]

36% 400ml 1,2 - 10.36ml 가 . 0.54  
 g II 가 . 4  
 (v/v) / , , 99/1

<sup>1</sup>H NMR:

7.7 (d, 1H); 7.6 (s, 1H); 7.2 (d, 1H); 3.5 (s, 2H); 2.6 (q, 2H); 2.4 (m, 1H); 1.8-1.1 (m, 10H); 0.9 (t, 3H).

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2 - -4 - (4,4 - ) , IX.1

a) 2 - -4 - (1 - -4,4 - )

100ml 1.6M n - -78 150ml 15.1g 4 - -2 -  
 가 , -78 1 . 10.1g 4,4 - ( 3.1)  
 가 , 가 30 -78 , 12

1N 가 , 98/2 90/10(v/v) /  
 . 11.8g .

<sup>1</sup>H NMR: 7.4(s, 1H); 7.2(d, 2H); 6.9(d, 2H); 4.5 (s, 1H);  
 1.9-1.1 (m, 8H); 0.9 (s, 6H)

b) 50l 57% 200ml 11.8g 2- -4-(1- -4,4- )  
 가 3 , 가 , .40% ,  
 , 95/5 (v/v) /

<sup>1</sup>H NMR: 9.8 (s, 1H); 7.1 (s, 1H); 7 (d, 1H); 6,9 (d,  
 1H); 1.9 (m, 1H); 1.6-1.2 (m, 8H); 0.9 (s, 6H)

IX.2 IX.4 :

4-( -2- )-3,5- , IX.2

IXa.1 -2-

<sup>1</sup>H NMR: 10.1 (s, 1H); 6.8 (s, 2H); 3.4 (s, 1H); 2.4 (s,  
 2H); 2.3-1.4 (m, 12H)

4-( -2- ) , IX.3

<sup>1</sup>H NMR: 9.1 (s, 1H); 7.1 (d, 2H); 6.7 (d, 2H); 2.8 (s,  
 1H); 2.4 (s, 2H); 1.9-1.4 (m, 12H)

4-( -2- )-3- , IX.4

<sup>1</sup>H NMR: 9.8 (s, 1H); 7.1 (s, 1H); 7.0 (d, 1H); 6.9 (d,  
 1H); 2.8 (s, 1H); 2.3 (m, 2H); 1.9 (m, 5H); 1.7 (m,  
 5H); 1.5 (m, 2H)

22

4-( -4- ) , IX.5

a) 4-(3,6- -4- )

- 40 150ml 12.7g 4- 가 , 100ml 1.  
 6M , 1N 가 , 8.1g 4- 가 . 18  
 , 90/10 80/20 ,

<sup>1</sup>H NMR: 9.4 (s, 1H); 7.2 (d, 1H); 6.7 (d, 1H); 6.0 (t, 1H); 4.1 (d, 2H); 3.7 (t, 2H); 2.4 (t, 2H)

b) 5.5g 4 - (3,6 - - 4 - ) 100ml 10% 550mg 3

<sup>1</sup>H NMR: 9.1 (s, 1H); 7 (d, 2H); 6.6 (d, 2H); 3.9 (m, 2H); 3.4 (m, 2H); 2.6 (m, 1H); 1.6 (m, 4H)

4 - (4,4 - ) , IX.6

<sup>1</sup>H NMR: 9 (s, 1H); 7 (d, 2H); 6.7 (d, 2H); 2.2 (m, 1H); 1.6-1.2 (m, 8H); 0.9 (s, 6H)

23

4 - ( - 2 - ) - 3,5 - , IX.7

a) 2 - (2,6 - - 4 - ) - 2 -

22 a) 1 n - 4 - - 3,5 -

b) 19g , 200ml 200ml . 1N ,

24

2 - - 4 - (4,4 - ) , III.1

8.2ml 60ml 9.7g 2 - - 4 - (4,4 - ) ( IX.1)  
 가 , 0 30 , 12 가  
 , 100/0 99/1  
 / . 15g

## III.2 III.7

$^1\text{H NMR}$ : 7.7 (s, 1H); 7.5 (d, 1H); 7.4 (d, 1H); 2.5 (m, 1H); 1.6-1.2 (m, 8H); 0.92 (s, 3H); 0.86 (s, 3H).

4 - ( - 2 - ) - 3,5 - , III.2

$^1\text{H NMR}$ : 7.7 (d, 1H); 7.6 (d, 1H); 3.6 (m, 1H); 3.0-1.0 (m, 14H)

4 - ( - 2 - ) , III.3

$^1\text{H NMR}$ : 7.5 (d, 2H); 7.4 (d, 2H); 3.0 (s, 1H); 2.4 (s, 2H); 1.9 (m, 5H); 1.8-1.5 (m, 7H)

4 - ( - 2 - ) - 3 - , III.4

$^1\text{H NMR}$ : 7.6-7.4 (m, 3H); 3.0 (s, 1H); 2.4 (m, 2H); 1.9 (m, 5H); 1.8-1.4 (m, 7H)

4 - ( - 1 - ) III.5

$^1\text{H NMR}$ : 7.5 (d, 2H); 7.3 (d, 2H); 2.1 (m, 3H); 1.8 (m, 6H); 1.7 (m, 6H)

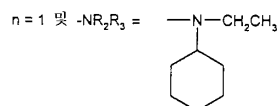
4 - ( - 4 - ) III.6

$^1\text{H NMR}$ : 7.4 (s, 4H); 3.9 (m, 2H); 3.4 (m, 2H); 2.8 (m, 1H); 1.7 (m, 4H)

4 - (4,4 - ) III.7

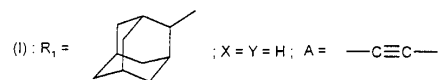
$^1\text{H NMR}$ : 7.4-7.3 (m, 4H); 2.6 (m, 1H); 1.6-1.2 (m, 8H); 0.93 (s, 3H); 0.90 (s, 3H)

(I)



1

[3 - (4 -                    - 2 -                    )                    - 2 -                    ]

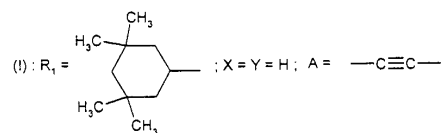


8.6ml 36%                    100ml 1,2 -                    11.2ml                    가 ,  
 2                    .                    400ml 1,2 -                    16g 2 - (4 -                    )                    (                    II.  
 3) 0.58g                    II                    가                    .                    2                    ,                    ,                    ,  
 ; m.p. = 124 (HCl · 0.5H<sub>2</sub>O).

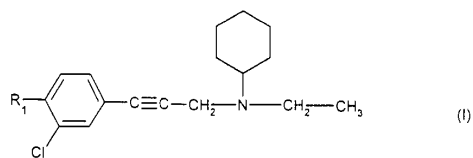
2                    12

2

{3 - [4 - (3,3,5,5 -                    )                    ]                    - 2 -                    }

m.p. = 150°C (HCl · 0.1 H<sub>2</sub>O)

&lt; 6 &gt;

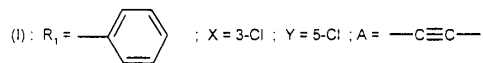


실시예	R <sub>1</sub>	m.p. ; °C (염, 수화물)
3		99 HCl
4		137 HCl
5		156 HCl 0.1 H <sub>2</sub> O
6		148 HCl 0.2 H <sub>2</sub> O
7		130 HCl 0.2 H <sub>2</sub> O

8		0.96 (t, 3H) ; 1.2-1.8 (m, 11H) ; 2.6 (q, 2H) ; 3.6 (s, 1H) 7.1-7.4 (m, 5H) ; 7.6 (s, 1H)
9		172 HCl
10		50 (pasty) HCl 0.7 H <sub>2</sub> O
11		(a) HCl

(a) <sup>1</sup>H NMR: 7.4 (m, 2H) ; 7.3 (d, 1H) ; 3.6 (s, 2H) ; 3.4  
(m, 1H) ; 2.8 (m, 1H) ; 2.6 (q, 2H) ; 1.3-0.9 (m, 27H)

[3 - (2,6- ) - 4 - ) - 2 - ]

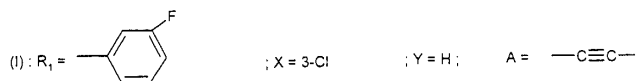


m.p. = 205°C (HCl).

13

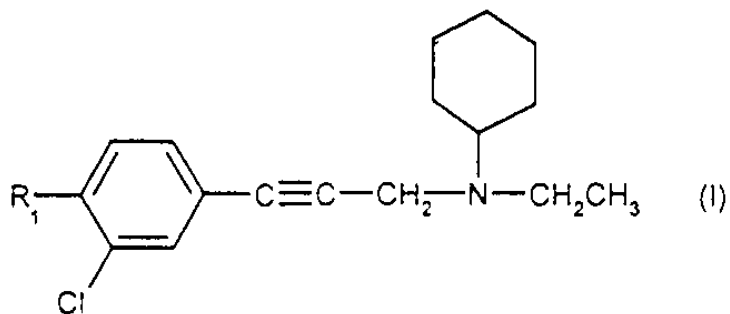
7

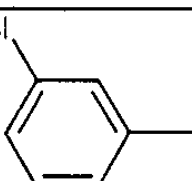
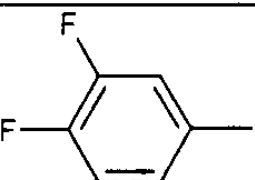
3 - (2 - - 3' - - 4 - ) - 2 - ]



10.4ml 3.4g 2 - - 4 - [3 - ( ) - 1 - ] ( )  
 Ia.1), 1.23g 3 - , 2.2g , 0.68g , 75ml , 25ml  
 0.7g ( ) , 99/1(v/v) /  
 ; m.p. = 130 (HCl · 0.2H<sub>2</sub>O)

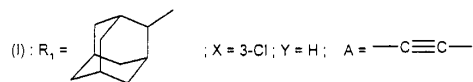
14 15



실시예	R <sub>1</sub>	m.p. ; °C (염, 수화물)
14		155 HCl
15		139 HCl 0.3 H <sub>2</sub> O

16

[3 - (4 - 2 - 3 - ) - 2 - ] -



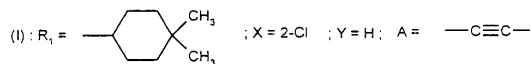
a) 2 - { 2 - 4 - [ 3 - ( ) - 1 - ] } - 2 - ,

[ 3 - ( 4 - 3 - ) - 2 - ] 1N  
 17.5g [ 3 - ( 4 - 3 - ) - 2 - ] 15% n - 30.5ml - 75 200ml  
 30 - 75 100ml 7.51g - 2 - 가 , 75 1  
 - 75 2 가 , 1 가 , 100/0 99/1(v/v)

b) 9.78g 50ml 25ml 11.12g  
 가 , 6.63g 가 30 2 , 25ml  
 5.12g 2.99ml 가 80 3 가 ,  
 97/3 (v/v) / , 92.5/7.5 (v/v) /  
 ; m.p. = 110 (HCl · 0.3 H<sub>2</sub>O).

17

{ 3 - [ 4 - ( 4,4 - ) - 2 - ] - 2 - }



1.42g ( ) 200ml 100ml  
 8.03g - 2 - ( 4.1), 15g [ 4 - ( 4,4 - ) - 2 - ]  
 ( III.1), 0.19g , 3.4g 가 .  
 12 , 95/5 90/10(v/v)  
 /

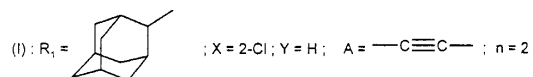
$^1\text{H NMR}$ : 1.1 (s, 1H); 7.6-7.4 (m, 2H); 7.3 (d, 1H); 4.3 (s, 2H); 3.2 (m, 2H); 1.5 (m, 1H); 2.2-1.1 (m, 22H); 0.9 (d, 6H).

18 28

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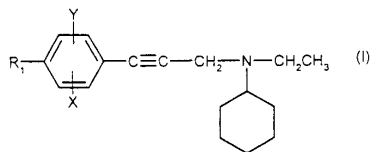
18

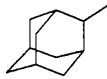
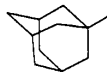

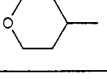
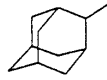
[4 - (4 - -2 - -2 - ) -3 - ]



$^1\text{H NMR}$ : 7.5 (d, 1H); 7.4 (s, 1H); 7.3 (d, 1H); 3.4-3.2 (m, 4H); 3.1 (m, 2H); 3.0 (s, 1H); 2.4 (s, 2H); 2.0-2.1 (m, 26H).

&lt; 8 &gt;



실시예	$\text{R}_1$	X	Y	m.p.; °C 또는 $^1\text{H NMR}$ (염, 수화물)
19		3-Cl	5-Cl	7.5 (d, 1H) ; 7.2 (d, 1H); 4.3 (s, 2H); 3.3 (m, 3H) 2.6-1.1 (m, 28H) HCl
20		H	H	186 HCl 0.8 H <sub>2</sub> O
21		H	H	134
22		H	H	152 HCl
23 <sup>(a)</sup>		3-Cl	6-Cl	196 HCl

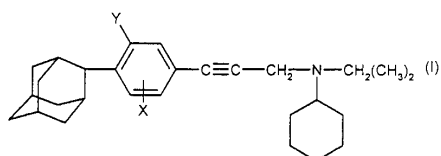
24		3-F	5-F	132 HCl
25		3-Cl	5-Cl	210 HCl

(a) 17  
Chem. Soc. 1926, 48, 3129)

, 4 - - 3 -

(J. Am.

< 9 >

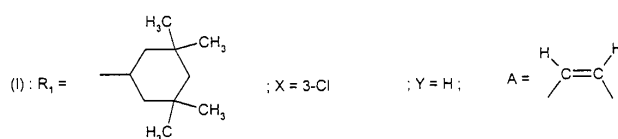


실시예	X	Y	염	<sup>1</sup> H NMR
26	H	H	HCl	10.3 (s, 1H); 7.4 (m, 4H); 4.3 (s, 2H); 3.8 (m, 1H); 2.4 (s, 2H); 2.1-1.1 (m, 30H)
27	2-Cl	H	HCl	10.4 (s, 1H); 7.6 (d, 1H); 7.5 (s, 1H); 7.4 (d, 1H); 4.4 (s, 2H); 3.8 (m, 1H); 3.4 (m, 1H); 2.9 (s, 1H); 2.4 (s, 2H); 2.1-1.2 (m,

				28H)
28	3-Cl	Cl	HCl	10.3 (s, 1H); 7.6 (s, 2H); 4.3 (s, 2H); 3.5-1.0 (m, 32H)

29

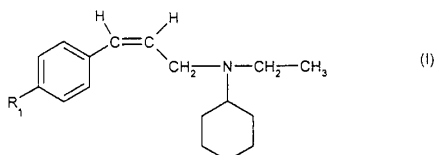
{(Z) - 3 - [3 - - 4 - (3,3,5,5 - ) ] - 2 - }



50ml (Lindlar) 가 3g 3, 3ml 3.5% ( 0.3g 95/5 (v/v) / . I · 0.1H<sub>2</sub>O). 29 83% ; m.p. = 158 (HC

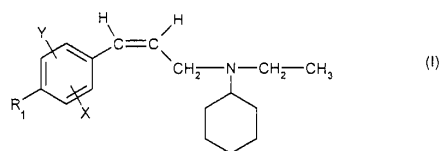
30 54 :

< 10 >



실시예	R <sub>1</sub>	m.p. ; °C (염, 수화물)
30		170 HCl
31		182 HCl
32		138 HCl 0.3 H <sub>2</sub> O
33		152
34		162 HCl

< 11 >



실시예	R <sub>1</sub>	X	Y	m.p. ; °C (염, 수화물)
35		3-Cl	H	155 HCl
36		3-Cl	H	114 HCl 0.5 H <sub>2</sub> O
37		3-Cl	H	144 HCl 0.3 H <sub>2</sub> O
38		3-Cl	H	105 HCl 1.1 H <sub>2</sub> O
39		3-Cl	H	108 HCl 0.6 H <sub>2</sub> O

실시예	R <sub>1</sub>	X	Y	m.p. ; °C (염, 수화물)
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40		3-Cl	H	138 HCl
41		3-Cl	H	160 HCl
42		3-Cl	H	70 HCl 0.7 H <sub>2</sub> O
43		3-Cl	H	102 HCl 0.4 H <sub>2</sub> O
44 <sup>(a)</sup>		3-Cl	5- Cl	188 HCl
45 <sup>(b)</sup>		3-Cl	H	161 HCl
46		2-Cl	H	195 HCl

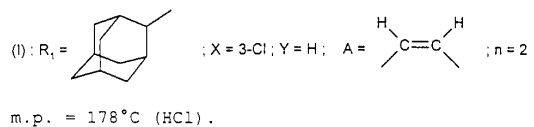
(a)

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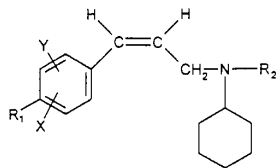
54

[(Z) - 4 - (4 - 2 - 3 - ) - 3 - ]

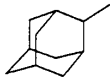
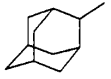


13

44



&lt; 13 &gt;

실시예	X	Y	R <sub>1</sub>	R <sub>2</sub>	m.p. ; °C 염, 수화물
55	3-F	5-F		-C <sub>2</sub> H <sub>5</sub>	182 HCl
56 <sup>(a)</sup>	3- OCH <sub>3</sub>	H		-C <sub>2</sub> H <sub>5</sub>	고무질 HO(O)CF <sub>3</sub>

57	3-Cl	5-Cl		-C <sub>2</sub> H <sub>5</sub>	210 HCl 0.2 H <sub>2</sub> O
58	3-Cl	6-Cl		-C <sub>2</sub> H <sub>5</sub>	165 HCl
59	3-Cl	-H		-C <sub>2</sub> H <sub>5</sub>	140 HCl
60 <sup>(b)</sup>	2-Cl	6-Cl		-C <sub>2</sub> H <sub>5</sub>	174 HCl
61	-H	-H		-C <sub>2</sub> H <sub>5</sub>	142 HCl
62	2-Cl	-H		-C <sub>2</sub> H <sub>5</sub>	208 HCl
63	3-Cl	5-Cl		-H	152 HCl

(a) 4 - - 3 -

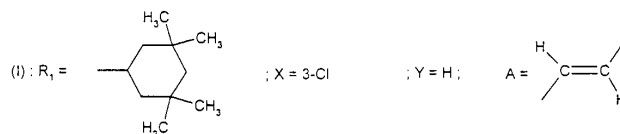
(J. Am. Chem. Soc. 1926, 48, 3129)

(b) 4 - - 2,6 -

(J. Am. Chem. Soc. 1933, 55, 2125 - 2126)

64

{ (E) - 3 - [ 3 - - 4 - (3,3,5,5 - ) - 2 - ] }

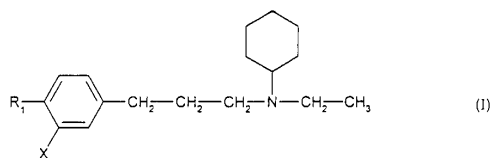


24.3ml 1M 가 (DIABALH) 40ml 4g  
 , pH 7 가 가 40 1 , /  
 ; m.p. = 169 (HCl · 0.2 H<sub>2</sub>O).

65 67 64

65



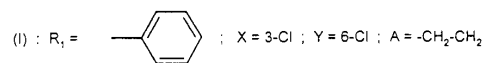


실시예	R <sub>1</sub>	X	m.p. ; °C (염, 수화물)
69		H	170 HCl 0.2 H <sub>2</sub> O
70		H	182 HCl 0.6 H <sub>2</sub> O
71		Cl	129 HCl
72		Cl	184 HCl
73		Cl	102 HCl 1.2 H <sub>2</sub> O

74		Cl	104 HCl
75		Cl	88 HCl 0.7 H <sub>2</sub> O
76		H	228 HCl

77

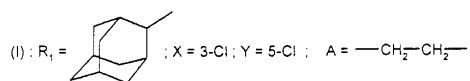
[3 - (2,6 -                      - 4 - )                      ]



m.p. = 128 °C (HCl)

78

{ - 3 - [4 -                      - 3,5 -                      ]                      }



m.p. = 220°C (HCl)

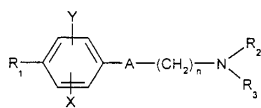
(57)

1.

(I)

가 ,

< I >



( ,

A가 -C C -, -CH=CH -, -CH<sub>2</sub> -CH<sub>2</sub> - ,

n 1 2 ,

X가 ,

Y가 ,

-R<sub>1</sub> , , ; , tert - , [3.2.1] , 4 -  
 , 4 - ; , 1 - 2 - , -2 - , X Y가  
 가 R<sub>1</sub> ,

R<sub>2</sub> 가 (C<sub>1</sub> - C<sub>4</sub>) ,

R<sub>3</sub> 가 (C<sub>5</sub> - C<sub>7</sub>) .)

2.

1 ,

A가 -C C -, -CH=CH -, -CH<sub>2</sub> -CH<sub>2</sub> ,

n 1 2 ,

X가 ,

Y가 ,



1 5 , R<sub>1</sub> 3,3,5,5 - 4, 4- 1- 2- 7.

1 6 ,  
 [(Z) - 3 - (4 - - 2 - - 3 - ) - 2 - ] ;  
 [(Z) - 3 - (4 - - 2 - ) - 2 - ] ;  
 {(Z) - 3 - [4 - (4,4 - ) - 2 - ] - 2 - } ;  
 [(Z) - 3 - (4 - - 1 - - 3 - ) - 2 - ] ;  
 [(Z) - 3 - (4 - - 2 - - 3,5 - ) - 2 - ] ;  
 [(Z) - 3 - (4 - - 2 - - 3,5 - ) - 2 - ] (2 - ) ;  
 가 , .

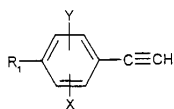
8.

7 , [(Z) - 3 - (4 - - 2 - - 3,5 - ) - 2 - ]  
 가 , .

9.

a) n=1 , (II) (Mannich) , (1) HNR<sub>2</sub>R<sub>3</sub> (R<sub>2</sub> R<sub>3</sub> (I)

< II >



( , R<sub>1</sub>, X Y (I) .)

b) , la (Suzuki) R<sub>1</sub> - B(OR)<sub>2</sub> (2)(R

< la >

