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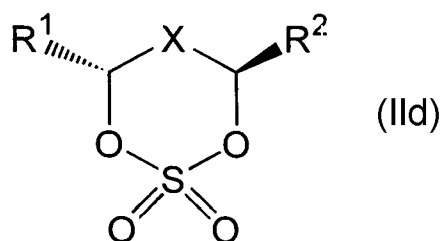
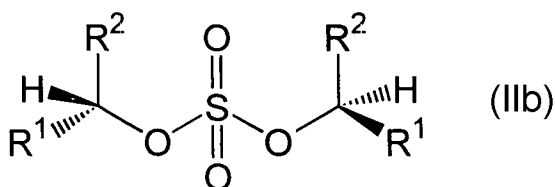
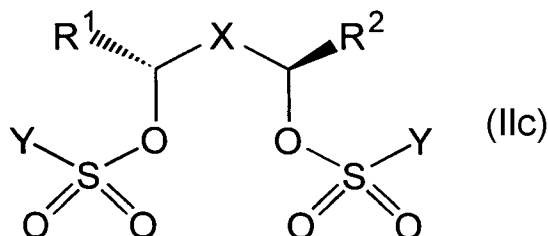
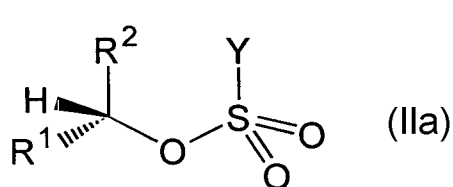
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- (88) **Date of publication of the international search report:**
4 September 2008

(54) **Title:** PREPARATION OF SECONDARY PHOSPHINES



(57) **Abstract:** The present invention relates to a method for preparing di- α -chiral and achiral di(sec. alkyl)phosphines of general formula Ia or Ib wherein a) R^1 , R^2 independently represent C1-C6 n-alkyl, optionally substituted with i) C1-C4-n-alkyl, ii) aryl selected from phenyl, p-tolyl or 2-naphthyl, iii) -OR³, with R³ being tetrahydropyran-2-yl, 1-ethoxy-ethyl, phenyl, p-tolyl, benzyl, 2-naphthyl, -CH₂-2-naphthyl, methyl, ethyl or 2-propyl, iv) CH₂OR⁴, with R⁴ being tetrahydropyran-2-yl, 1-ethoxy-ethyl, phenyl, p-tolyl, benzyl, 2-naphthyl, -CH₂-2-naphthyl, or v) dimethyl amine or di-(2-propyl)amine, or b) R¹CHR² in formula Ib together represents C5 or C6 cycloalkyl, and X represents (CH₂)_n with n = 1-3, CH₂OCH₂ or CH₂NR⁵CH₂ wherein R⁵ is C1-C4-alkyl or 2-propyl, which is characterized in that sulfonates of general formula (IIa) or (IIc) or sulfates of general formula (IIb) or (IIId), wherein Y is selected from methyl, phenyl, p-tolyl, and p-bromophenyl, and X, R¹ and R² are defined as above, are reacted with M₃P, wherein M is selected from Li, Na, K, and mixtures thereof, preferably Na.

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INTERNATIONAL SEARCH REPORT

International application No
PCT/AT2007/000263

A. CLASSIFICATION OF SUBJECT MATTER
INV. CO7F9/50 C07F9/O2

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
C07F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal , CHEM ABS Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	W. BRAUN ET AL. : "Opti cal ly Acti ve Phosphol anes as Substi tuents on Ferrocene and Chronri um-Arene Complexes" EUROPEAN JOURNAL OF INORGANIC CHEMISTRY, vol . 2004, no. 11, 1 April 2004 (2004-04-01), pages 2235-2243, XP002449236 cited in the application figures 2,3 page 2237	18
A	----- -/-	1

☒ Further documents are listed in the continuation of Box C.

D See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

3 December 2007

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INTERNATIONAL SEARCH REPORT

International application No

PCT/AT2007/000263

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	OHFF M ET AL: "Borane complexes of trivalent organophosphorus compounds. Versatile precursors for the synthesis of chiral phosphine ligands for asymmetric catalysts" SYNTHESIS, 6E0RG THIEME VERLAG, STUTTGART, DE, no. 10, 1998, pages 1391-1415, XP002366767 ISSN: 0039-7881 the whole document figure 43 -----	1, 18

INTERNATIONAL SEARCH REPORT

International Application No.

PCT/AT20Q7/00 263

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☒ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☒ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☒ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this international search report covers allsearchable claim.
2. ☒ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

see annex

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-18 (partly)

Compounds according to formula Ia with $R_1=R_2$ and their preparation.

2. claims : 1-18 (partly)

Compounds according to formula Ia or Ib with R_1 not equal R_2 and their preparation.
