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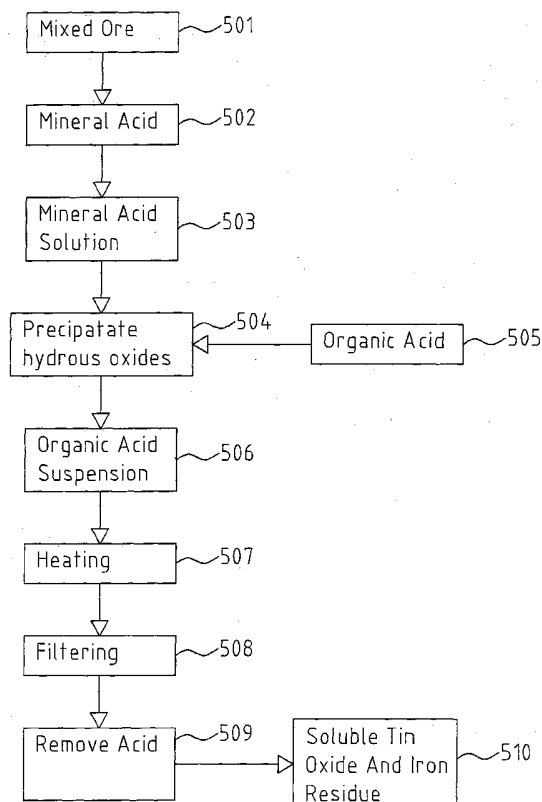
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- (71) Applicant (for all designated States except US): THE NATIONAL UNIVERSITY OF IRELAND, GALWAY [IE/IE]; College Road, Galway, County Galway (IE).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): CUNNINGHAM, Patrick, Desmond [IE/IE]; Furbo, Spiddal, County Galway (IE). MCMANUS, James [IE/IE]; Railway View, Athlone, County Westmeath (IE).
- (74) Agents: O'CONNOR, Donald, H. et al.; Cruickshank & Co., 1 Holles Street, Dublin 2 (IE).
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[Continued on next page]

(54) Title: METHOD FOR SOLUBILIZING METAL OXIDES BY SURFACE TREATMENT, SURFACE TREATED METAL OXIDE SOLUTIONS AND METHOD FOR SEPARATING METAL OXIDES



(57) Abstract: The invention relates to soluble metal oxides and mixed metal oxides and to solutions comprising metal oxides and mixed metal oxides. The invention further relates to a process for preparing a soluble metal oxide and a soluble mixed metal oxide and additionally relates to a process for modifying the solubility of a soluble metal oxide. The metal oxides, mixed metal oxides and solutions thereof have a number of applications and in particular are suitable for use as catalysts and also as precursors for the formation of metal films.



Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

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INTERNATIONAL SEARCH REPORT

 Intern ☐ Application No
 PCT/IE2004/000163

A. CLASSIFICATION OF SUBJECT MATTER

C09C3/08 C01G19/00 C09C1/36 C01G19/02

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)

C01G C09C

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	DE 43 38 361 A1 (INSTITUT FUER NEUE MATERIALIEN GEMEINNUETZIGE GMBH UNIVERSITAET DES SA) 11 May 1995 (1995-05-11) page 4, line 15 - line 34; examples I.1a, I.2b	1-10, 32-34
X	WO 00/14017 A (INSTITUT FUER NEUE MATERIALIEN GEM. GMBH; NONNINGER, RALPH; GOEBBERT, C) 16 March 2000 (2000-03-16) page 23, line 10 - line 29 page 24, line 2 - line 7	11-21, 35-38
P, X	US 2004/118332 A1 (TADAKUMA YOSHIO) 24 June 2004 (2004-06-24) paragraph '0033! - paragraph '0041!; example 1	22-25, 43



Further documents are listed in the continuation of box C.



Patent family members are listed in 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

18 November 2005

Date of mailing of the international search report

01/12/2005

Name and mailing address of the ISA

 European Patent Office, P.B. 5818 Patentlaan 2
 NL - 2280 HV Rijswijk
 Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
 Fax: (+31-70) 340-3016

Authorized officer

Siebel, E

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IE2004/000163

Box 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:
see FURTHER INFORMATION sheet PCT/ISA/210
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 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:

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
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.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box II.2

Claims Nos.: -

1.1. The present claim 1 relates to an extremely large number of possible compounds (i.e. metal oxides). Support and disclosure in the sense of Article 6 and 5 PCT is to be found however for only a very small proportion of the compounds claimed, see 'p.1, line 15 to page 2, line 9; p.11, line 19 to line 32; page 25, line 27 to page 26, line 1; examples 1-8!. The non compliance with the substantive provisions is to such an extent, that the search was performed taking into consideration the non compliance in determining the extent of the search (PCT Guidelines 9.19 and 9.23).

1.2. This reasons applies mutatis mutandis for the subject-matter of claims 1-9, 11-20, 22-47.

2.1. The soluble metal oxide compound of claim 4 comprises the ligands X and Y. X represents an inner, Y an outer organic binding group. X represents the inner organic binding group of the general formula of claim 5, whereas Y represents the outer organic binding group of the general formula of claim 7.

These ligands X and Y are not clearly defined because their definition throughout claims 4-8 relates to an extremely large number of possible compounds. This would require an equally unquantifiable and thus unreasonable amount of experimentation, imposing a severe and undue burden on all those wishing to ascertain the scope of the claim, which is not in compliance with the clarity requirement of Article 6 PCT. The non compliance with the substantive provisions is to such an extent, that the search was performed taking into consideration the non compliance in determining the extent of the search (PCT Guidelines, 9.19 and 9.24).

2.2. This arguments applies mutatis mutandis to the claims 1-49.

3.1. The process for preparing a soluble metal oxide according to claim 32 relates to an extremely large number of possible compounds, i.e. solvents and organic binding groups. Furthermore, the process of claim 32 does not indicate which properties of the solvent has to be taken into account, when choosing the organic binding group. Therefore, it would require an equally unquantifiable and thus unreasonable amount of experimentation, imposing a severe and undue burden on all those wishing to ascertain the scope of the claim, which is not in compliance with the clarity requirement of Article 6 PCT. The non compliance with the substantive provisions is to such an extent, that the search was performed taking into consideration the non compliance in determining the extent of the search (PCT Guidelines, 9.19 and 9.24).

4.1. Consequently, the search of claim 1-49 was restricted to those claimed metal oxide compounds which appear to be supported, i.e. metal oxides comprising the metal moiety selected from the group comprising tin or titanium (see claim 10) and those mixed metal oxide comprising additionally a metal M' according the formula of claim 14 the

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

metal M' being chosen from the list of cited in claim 15.

4.2. Furthermore, the extent of the search of claims 1-49 in view of the organic binding groups was consequently limited to the clearly defined examples in the description, i.e. formic acid, acetic acid, trifluoroacetic acid, propanoic acid and their anionic ions or salts.

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guideline C-VI, 8.5), should the problems which led to the Article 17(2) declaration be overcome.

INTERNATIONAL SEARCH REPORT

Information on patent family members

 Inte | Application No
 PCT/IE2004/000163

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			EP 0728164 A1	28-08-1996
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