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(75) Inventor/Applicant (for US only): **XU, Jinsuo** [US/US]; 1259 Tressler Drive, Fort Washington, PA 19034 (US).(74) Agent: **HAYHURST, Paul, D.**; The Dow Chemical Company, P.O. Box 1967, Intellectual Property, Midland, MI 48641-1967 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM,

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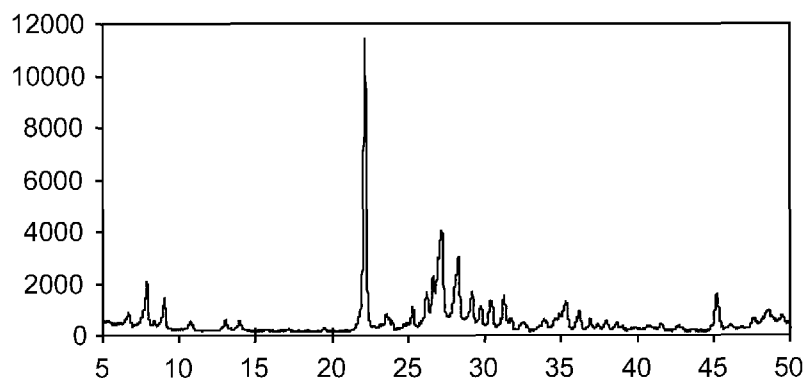
- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

(88) Date of publication of the international search report:

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(54) Title: STEAM RE-CALCINATION OF MIXED METAL OXIDE CATALYSTS

FIG. 1



(57) Abstract: A process for producing a catalyst for the (amm)oxidation of alkanes comprises calcination of a crystalline mixed metal oxide catalyst partially or wholly in the presence of steam.

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2012/029857

A. CLASSIFICATION OF SUBJECT MATTER

INV. B01J23/00 B01J23/20 B01J23/28 B01J23/652 B01J27/057
 B01J37/00 B01J37/10 C07C51/215 C07C253/24 B01J37/03

ADD.

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)

B01J C07C

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 practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 472 925 A (USHIKUBO TAKASHI [JP] ET AL) 5 December 1995 (1995-12-05) example 6 claim 1 column 4, line 8 - line 13 column 7, line 8 - line 12 ----- -/--	1,6,7



Further documents are listed in the continuation of Box C.



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 application or patent but published on or after the international filing date

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"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

21 June 2012

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Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

International application No

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2009/106474 A2 (TIMPE OLAF [DE]; SAKTHIVEL AYYAMPERUMAL [IN]; TRUNSCHKE ANNETTE [DE];) 3 September 2009 (2009-09-03) formula (I); page 6 page 6, line 6 - line 16 page 19, line 17 - line 26 page 20, line 15 - line 16 page 27, line 16 - line 19 page 34; example 1 page 35, line 19 - page 36, line 15 figure 3	1-8,10, 11
X	----- EP 0 962 253 A2 (ROHM & HAAS [US]) 8 December 1999 (1999-12-08) paragraphs [0006], [0020], [0034] claims 14, 15	1-8,10, 11
A	----- EP 1 193 240 A1 (ROHM & HAAS [US]) 3 April 2002 (2002-04-03) the whole document	1-8,10, 11
A	----- US 2007/179042 A1 (PESSOA CAVALCANTI FERNANDO ANT [US] ET AL CAVALCANTI FERNANDO ANTONIO) 2 August 2007 (2007-08-02) the whole document	1-8,10, 11
A	----- EP 1 260 495 A2 (ROHM & HAAS [US]) 27 November 2002 (2002-11-27) the whole document -----	1-8,10, 11

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2012/029857

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 all searchable claims.
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.:
1-8, 10, 11

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: 1-8, 10, 11

Process for preparing a catalyst

2. claim: 9

Process for the (amm)oxidation of alkanes

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2012/029857

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5472925	A	05-12-1995	NONE
WO 2009106474	A2	03-09-2009	DE 112009000404 T5 WO 2009106474 A2
EP 0962253	A2	08-12-1999	BR 9901568 A CA 2271397 A1 CN 1236672 A DE 69919416 D1 DE 69919416 T2 EP 0962253 A2 ES 2327475 T3 JP 4390906 B2 JP 2000024501 A TW 486383 B US 6180825 B1 US 6514901 B1 US 2001049336 A1
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