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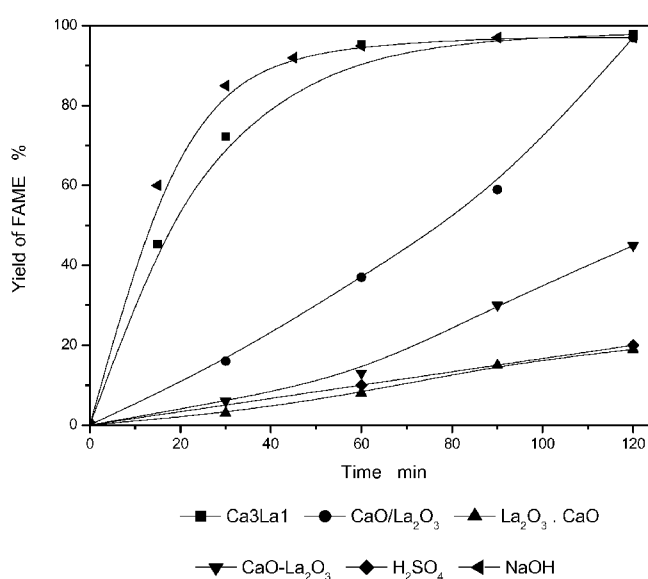
Published:

- 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))

[Continued on next page]

(54) Title: CALCIUM AND LANTHANUM SOLID BASE CATALYSTS FOR TRANSESTERIFICATION

FIGURE 2



(57) Abstract: In one aspect, a heterogeneous catalyst comprises calcium hydroxide and lanthanum hydroxide, wherein the catalyst has a specific surface area of more than about 10 m²/g. In another aspect, a heterogeneous catalyst comprises a calcium compound and a lanthanum compound, wherein the catalyst has a specific surface area of more than about 10 m²/g, and a total basicity of about 13.6 mmol/g. In further another aspect, a heterogeneous catalyst comprises calcium oxide and lanthanum oxide, wherein the catalyst has a specific surface area of more than about 10 m²/g. In still another aspect, a process for preparing a catalyst comprises introducing a base precipitant, a neutral precipitant, and an acid precipitant to a solution comprising a first metal ion and a second metal ion to form a precipitate. The process further comprises calcining the precipitate to provide the catalyst.



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INTERNATIONAL SEARCH REPORT

International application No

PCT/US2009/063363

A. CLASSIFICATION OF SUBJECT MATTER

INV. B01J23/10 B01J37/03 B01J35/10 B01D53/94

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 B01D

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, 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	COSTA C N ET AL: "The Selective Catalytic Reduction of Nitric Oxide with Methane over La2O3-CaO Systems: Synergistic Effects and Surface Reactivity Studies of NO, CH4, O2, and CO2 by Transient Techniques" JOURNAL OF CATALYSIS, ACADEMIC PRESS, DULUTH, MN, US, vol. 194, no. 2, 10 September 2000 (2000-09-10), pages 250-265, XP004437905 ISSN: 0021-9517 experimental, table 2 ----- -/-	1-10



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 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

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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	CHOUHARY V R ET AL: "SURFACE PROPERTIES OF CAO (OR BAO)-LA2O3-MGO CATALYSTS AND THEIR PERFORMANCE IN OXIDATIVE COUPLING OF METHANE" JOURNAL OF CHEMICAL TECHNOLOGY AND BIOTECHNOLOGY, BLACKWELL SCIENTIFIC PUBLICATIONS. OXFORD, GB, vol. 69, no. 1, 1 May 1997 (1997-05-01), pages 63-69, XP000691413 ISSN: 0268-2575 experimental, table 1	1-10
X	US 2006/069274 A1 (DIAS DE MORAES E SILVA REYNALD [BR] ET AL) 30 March 2006 (2006-03-30) paragraph [0013] - paragraph [0015]	11-18
X	EP 1 884 559 A1 (VITO [BE]) 6 February 2008 (2008-02-06) paragraph [0018] - paragraph [0020]; examples	11-18
A	YU L ET AL: "Inhibition of gas-phase oxidation of ethylene in the oxidative conversion of methane and ethane over CaO, La2O3/CaO and SrO-La2O3/CaO catalysts" APPLIED CATALYSIS A: GENERAL, ELSEVIER SCIENCE, AMSTERDAM, NL, vol. 175, no. 1-2, 14 December 1998 (1998-12-14), pages 173-179, XP004271574 ISSN: 0926-860X the whole document	1-10
A	EP 1 707 534 A1 (MITSUI MINING & SMELTING CO [JP]) 4 October 2006 (2006-10-04) the whole document	1-18

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2009/063363

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.:

1-18

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

a heterogeneous catalyst, comprising a calcium compound and a lanthanum compound; and a process for producing biofuel with said catalyst

2. claims: 19-33

A process for preparing a catalyst

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2009/063363

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 2006069274	A1	30-03-2006	NONE	
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