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B01J 29/85 (2006.01) *B01J 37/00* (2006.01)

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(71) Applicant: **JOHNSON MATTHEY PUBLIC LIMITED COMPANY** [GB/GB]; 25 Farringdon Street, London EC4A 4AB (GB).

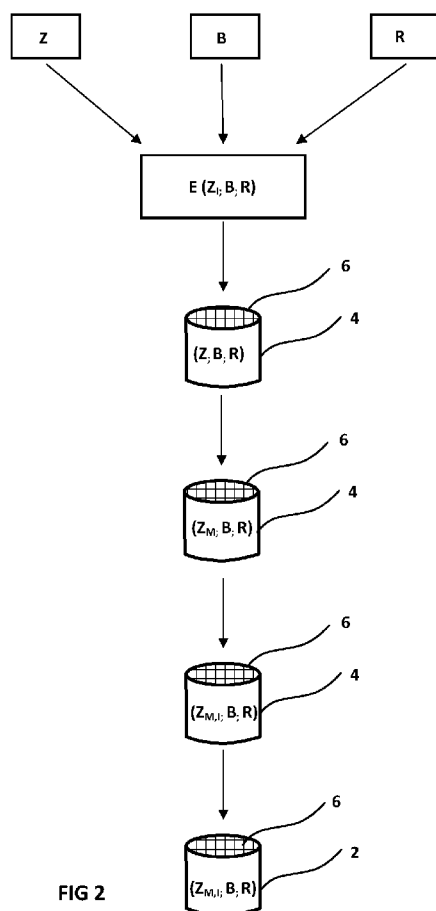
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[Continued on next page]

(54) Title: SCR METHOD FOR REDUCING OXIDES OF NITROGEN AND METHOD FOR PRODUCING A CATALYST FOR SUCH METHOD



(57) Abstract: A method of reducing nitrogen oxides in exhaust gas of an internal combustion engine by selective catalytic reduction (SCR) comprises contacting the exhaust gas also containing ammonia and oxygen with a catalytic converter comprising a catalyst (2) comprising at least one crystalline small-pore molecular sieve catalytically active component ($Z_{M,i}$) having a maximum ring opening of eight tetrahedral basic building blocks, which crystalline small-pore molecular sieve catalytically active component ($Z_{M,i}$) comprising mesopores.



HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

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LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

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19 November 2015

INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER INV. B01D53/94 B01J29/072 B01J29/56 B01J29/70 B01J29/83 B01J29/85 B01J35/04 B01J35/10 F01N3/20 B01J37/02 B01J37/30 B01J37/00														
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) B01D B01J F01N 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 <table border="1"> <thead> <tr> <th>Category*</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>Y</td> <td>US 2011/165051 A1 (BEUTEL TILMAN W [US] ET AL) 7 July 2011 (2011-07-07) paragraphs [0016], [0023] - [0027], [0036], [0089] - [0094], [0098], [0100], [0138] - [0140] claims 13,15,19,20 -----</td> <td>1-13</td> </tr> <tr> <td>Y</td> <td>US 2012/258852 A1 (MARTINEZ JAVIER GARCIA [ES] ET AL) 11 October 2012 (2012-10-11) paragraphs [0006] - [0008], [0023], [0026], [0027], [0030], [0048], [0049], [0055] - [0057], [0060] - [0065] claims 1, 15-19, 23,25 -----</td> <td>1-13</td> </tr> <tr> <td>A</td> <td>US 2007/244341 A1 (KREMER SEBASTIEN P B [BE] ET AL) 18 October 2007 (2007-10-18) paragraphs [0002], [0006] - [0008], [0014] - [0018] -----</td> <td>1-13</td> </tr> </tbody> </table>			Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	Y	US 2011/165051 A1 (BEUTEL TILMAN W [US] ET AL) 7 July 2011 (2011-07-07) paragraphs [0016], [0023] - [0027], [0036], [0089] - [0094], [0098], [0100], [0138] - [0140] claims 13,15,19,20 -----	1-13	Y	US 2012/258852 A1 (MARTINEZ JAVIER GARCIA [ES] ET AL) 11 October 2012 (2012-10-11) paragraphs [0006] - [0008], [0023], [0026], [0027], [0030], [0048], [0049], [0055] - [0057], [0060] - [0065] claims 1, 15-19, 23,25 -----	1-13	A	US 2007/244341 A1 (KREMER SEBASTIEN P B [BE] ET AL) 18 October 2007 (2007-10-18) paragraphs [0002], [0006] - [0008], [0014] - [0018] -----	1-13
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☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.														
* Special categories of cited documents : <table border="0"> <tr> <td> "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 "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 </td> <td> "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 </td> </tr> </table>			"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 "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										
"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 "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		Date of mailing of the international search report												
29 June 2015		22/09/2015												
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016		Authorized officer Hackenberg, Stefan												

INTERNATIONAL SEARCH REPORT

International application No.
PCT/GB2015/050947

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.:

1-13

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: 1-13

a method for reducing nitrogen oxides in exhaust gas by
selective catalytic reduction

2. claims: 14-17

a method for producing an extruded shaped body

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/GB2015/050947

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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