



(51) International Patent Classification:

B01D 53/94 (2006.01) *B01J 37/02* (2006.01)
B01J 23/00 (2006.01) *F01N 3/08* (2006.01)
B01J 23/58 (2006.01)

(21) International Application Number:

PCT/IB2013/000293

(22) International Filing Date:

26 February 2013 (26.02.2013)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

2012-047177 2 March 2012 (02.03.2012) JP

(71) Applicant (for all designated States except US):

TOYOTA JIDOSHA KABUSHIKI KAISHA [JP/JP]; 1,
 Toyota-cho, Toyota-shi, Aichi-ken, 471-8571 (JP).

(72) Inventors; and

(71) Applicants (for US only): TAKAGI, Nobuyuki [JP/JP];
 c/o TOYOTA JIDOSHA KABUSHIKI KAISHA, of 1,
 Toyota-cho, Toyota-shi, Aichi-ken, 471-8571 (JP).
 SATAKE, Yasushi [JP/JP]; c/o TOYOTA JIDOSHA KA-

BUSHIKI KAISHA, of 1, Toyota-cho, Toyota-shi, Aichi-ken, 471-8571 (JP). TANAKA, Toshiyuki [JP/JP]; c/o KABUSHIKI KAISHA TOYOTA CHUO KENKYUSHO, of 41-1, Yokomichi, Nagakute-shi, Aichi-ken, 480-1192 (JP). YOKOTA, Koji [JP/JP]; c/o KABUSHIKI KAISHA TOYOTA CHUO KENKYUSHO, of 41-1, Yokomichi, Nagakute-shi, Aichi-ken, 480-1192 (JP).

(81) Designated States (unless otherwise indicated, for every

kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, 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, 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.

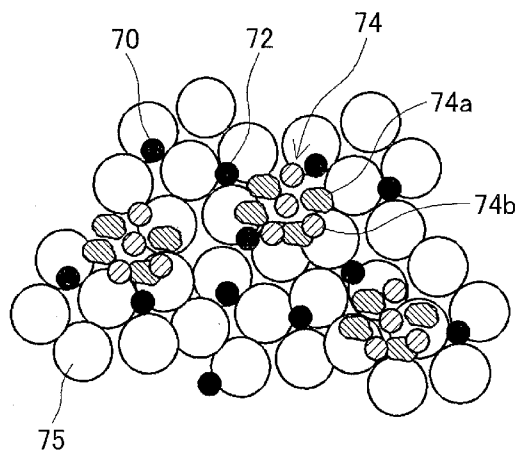
(84) Designated States (unless otherwise indicated, for every

kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK,

[Continued on next page]

(54) Title: EXHAUST GAS CONTROL APPARATUS, EXHAUST GAS CONTROL METHOD AND EXHAUST GAS PURIFICATION CATALYST

FIG. 9



(57) Abstract: An exhaust gas control apparatus includes an exhaust gas purification catalyst and a controller. The controller is configured to alternately change a concentration of hydrocarbon flowing in the exhaust gas purification catalyst between a high concentration region where the concentration of hydrocarbon is relatively high and a low concentration region where the concentration of hydrocarbon is relatively low in a predetermined period. The exhaust gas purification catalyst includes a support (75), metal catalysts (70, 72) supported on the support (75), and a NOx storage material (74) supported by the support (75) and having NOx storage capacity. The NOx storage material (74) contains a barium-titanium composite oxide where barium (74a) and titanium (74b) are dissolved to form a solid solution.



EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, 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, ML, MR, NE, SN, TD, TG).

(88) Date of publication of the international search report:
27 December 2013

(15) Information about Correction:

Previous Correction:
see Notice of 7 November 2013

Published:

— *with international search report (Art. 21(3))*

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2013/000293

A. CLASSIFICATION OF SUBJECT MATTER

INV. B01D53/94 B01J23/00 B01J23/58 B01J37/02 F01N3/08
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)

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)

EP0-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	JP 2005 060147 A (TOYOTA CENTRAL RES & DEV) 10 March 2005 (2005-03-10) paragraphs [0002], [0008], [0015] - [0018], [0021], [0022], [0025], [0030], [0031], [0034], [0051] examples 2-4 claims 2,3,7	1-15
X	JP 2003 071298 A (TOYOTA CENTRAL RES & DEV) 11 March 2003 (2003-03-11) paragraphs [0011] - [0018], [0021], [0022], [0025], [0030], [0033], [0034], [0037] example 1 claims 2,3,7	1-15



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

"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

28 August 2013

Date of mailing of the international search report

04/09/2013

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/IB2013/000293

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 2008 012501 A (TOYOTA MOTOR CORP; TOYOTA CENTRAL RES & DEV; CATALER CORP) 24 January 2008 (2008-01-24) paragraph [30.33.56] example 1 claim 1	1-15
X	----- JP 2008 178811 A (TOYOTA CENTRAL RES & DEV) 7 August 2008 (2008-08-07) paragraphs [0044], [0074], [0076] example 5 -----	1-15

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2013/000293

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP 2005060147 A	10-03-2005	JP 4599817 B2 JP 2005060147 A	15-12-2010 10-03-2005
JP 2003071298 A	11-03-2003	JP 4715064 B2 JP 2003071298 A	06-07-2011 11-03-2003
JP 2008012501 A	24-01-2008	JP 4786442 B2 JP 2008012501 A	05-10-2011 24-01-2008
JP 2008178811 A	07-08-2008	JP 4811666 B2 JP 2008178811 A	09-11-2011 07-08-2008