

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
15 May 2008 (15.05.2008)

PCT

(10) International Publication Number
WO 2008/058240 A3

(51) International Patent Classification:
B01J 23/847 (2006.01) **C01B 17/00** (2006.01)

(21) International Application Number:
PCT/US2007/084095

(22) International Filing Date:
8 November 2007 (08.11.2007)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
11/557,548 8 November 2006 (08.11.2006) US

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(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH,

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, JP, 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, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, 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, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))
- of inventorship (Rule 4.17(iv))

Published:

- with international search report

(88) Date of publication of the international search report:
14 August 2008



WO 2008/058240 A3

(54) Title: METAL-RICH SILICEOUS COMPOSITIONS AND METHODS OF PRODUCING SAME

(57) Abstract: A modified sol-gel method to create metal-rich siliceous material, such as colloidal silica or aluminosilicate particles is disclosed. Initially, the metal salt of choice is added to a silicic acid solution or a silicic acid solution containing aluminum salt. The aluminum is added to vary the metal-support interaction as it forms Al-O-Si linkages within the silica matrix. Besides aluminum, other metals can be added that form M-O-Si (M = Ti, B, etc.) linkages, which do not become reduced when treated with a reducing agent. Once the metal, silicic acid and/or aluminum salt is generated, it is subjected to colloidal growth by addition to a basic heel. Upon colloidal synthesis, the metal salt containing colloidal particle is left as is to maximize colloidal stability or is reduced with hydrazine to produce the zero valence metal-containing colloidal particle. Keeping a particle colloidal before use may be an effective method of forming a catalyst material as it can be easily spray-dried or mixed with other materials for extruded catalyst particles.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 07/84095

A. CLASSIFICATION OF SUBJECT MATTER IPC(8) - B01J 23/847; C01B 17/00 (2008.01) USPC - 502/247; 423/535 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) USPC: 502/247; 423/535 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) Electronic Databases Searched: USPTO WEST (PGPUB, EPAB, JPAB, USPT), Google patent, Google Scholar. Search Terms Used: colloidal, silicic, silica, metal-rich, siliceous, metal, colloidal, amine?, lithium or sodium or hydroxide, hydrazine, sodium or hydroxide or chloride or lithium or ammonium, amine, nanometers, palladium		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,015,453 A (Chapman) 14 May 1991 (14.05.1991) entire document especially abstract; example 1 and 8; col 4, ln 24-45; col 5, ln 19-25 and ln 36-40; col 4, ln 59-61; col 6, ln 48-61; col 5, ln 66 to col 6, ln 22	1-20
Y	US 3,575,888 A (Long et al.) 20 April 1971 (20.04.1971) entire document especially col 3, ln 13-19	1-20
Y	US 3,954,496 A (Batzar) 04 May 1976 (04.05.1976) entire document especially col 2, ln 65-67	2-3
Y	US 6,051,672 A (Burns et al.) 18 April 2000 (18.04.2000) especially example 4	6-7 and 15-20
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Date of the actual completion of the international search 26 February 2008 (26.02.2008)		Date of mailing of the international search report 23 APR 2008
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201		Authorized officer: Lee W. Young PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774