

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
20 February 2003 (20.02.2003)

PCT

(10) International Publication Number
WO 03/013722 A1

(51) International Patent Classification⁷: **B01J 27/14**,
27/186, 27/187, 27/199, 27/188, 27/19, 27/185, 27/02,
27/047, 27/051, 27/049, 27/045, 23/00

(21) International Application Number: PCT/US02/25048

(22) International Filing Date: 7 August 2002 (07.08.2002)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/310,712 7 August 2001 (07.08.2001) US

(71) Applicant: **MASSACHUSETTS INSTITUTE OF TECHNOLOGY** [US/US]; 77 Massachusetts Avenue, Cambridge, MA 02139 (US).

(72) Inventors: **YING, Jackie, Y.**; 9 Fairlane Terrace, Winchester, MA 01890 (US). **XU, Jinsuo**; ABB Lummus, Technical Development Center, 1515 Broad Street, Blomfield, New Jersey 07003 (US).

(74) Agent: **GORDON, Dana, M.**; Patent Group, Foley, Hoag LLP, 155 Seaport Boulevard, Boston, MA 02210-2698 (US).

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: NON-ZEOLITIC NANOCOMPOSITE MATERIALS FOR SOLID ACID CATALYSIS

(57) Abstract: One aspect of the present invention relates to a catalytic compound of anion-modified metal oxides doped with metal ions. Another aspect of the present invention relates to a method of isomerizing an alkane or alkyl moiety.



WO 03/013722 A1