

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
29 August 2002 (29.08.2002)

PCT

(10) International Publication Number
WO 02/066371 A3

(51) International Patent Classification⁷: **C01B 3/40**, B01J 27/22, 23/00, 23/40, 23/46, 35/10, 35/04, 37/02

(21) International Application Number: PCT/US02/04479

(22) International Filing Date: 15 February 2002 (15.02.2002)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
09/788,293 16 February 2001 (16.02.2001) US
10/076,881 13 February 2002 (13.02.2002) US

(71) Applicant: **BATTELLE MEMORIAL INSTITUTE**
[US/US]; Pacific Northwest Laboratories, Intellectual Property Services, P.O. Box 999, Richland, WA 99352 (US).

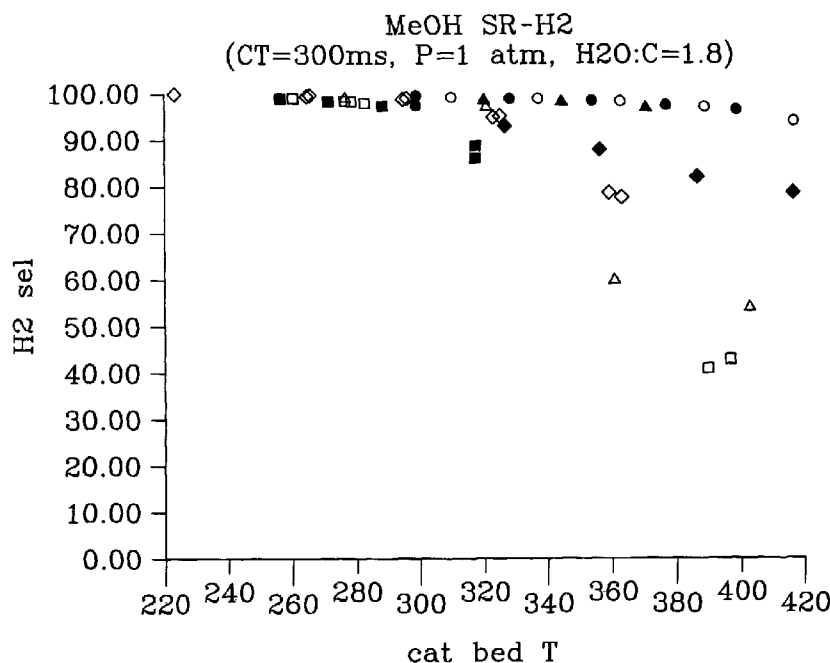
(72) Inventors: **WANG, Yong**; 2884 Troon Court, Richland, WA 99352 (US). **TONKOVICH, Anna, Lee, Y.**; 11875 Rausch Road, Marysville, OH 43040 (US). **VANDERWIEL, David, P.**; 1860 Ashland Avenue, Columbus, OH 43212 (US).

(74) Agent: **MAY, Stephen, R.**; Battelle Memorial Institute, Pacific Northwest Division, Intellectual Property Services, P.O. Box 999, MSIN: K1-53, Richland, WA 99352 (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, VN, YU, ZA, ZM, ZW.

[Continued on next page]

(54) Title: A CATALYST AND METHOD OF STEAM REFORMING



(57) Abstract: The present invention provides a method of steam reforming a hydrocarbon over a catalyst at short residence times or short contact times. The present invention also provides spinel-containing catalysts. Surprisingly superior results and properties obtained in methods and catalysts of the present invention are also described.

◆ commercial catalyst	△ 3%Ru/ZrO ₂ -CeO
● Ru/Al ₂ O ₃	■ 5%Pd-5%Ru/ZrO ₂ -CeO
○ 3%Ru/Al ₂ O ₃ -0.6%K	□ 5%Pd-5%Ru/ZrO ₂ -CeO
▲ 3%Ru/Al ₂ O ₃ -CeO	◇ 8%Pd-1.5%Ru/ZrO ₂ -CeO



(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, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (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:

6 March 2003

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.

Published:

— *with international search report*