

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
21 February 2008 (21.02.2008)

PCT

(10) International Publication Number  
**WO 2008/020811 A1**

(51) International Patent Classification:

|                             |                             |
|-----------------------------|-----------------------------|
| <b>B01J 19/00</b> (2006.01) | <b>B01J 19/28</b> (2006.01) |
| <b>B01J 19/20</b> (2006.01) | <b>B01J 19/06</b> (2006.01) |
| <b>B01J 19/32</b> (2006.01) | <b>B01J 19/24</b> (2006.01) |
| <b>B01J 19/26</b> (2006.01) | <b>B01J 19/02</b> (2006.01) |
| <b>B01J 19/18</b> (2006.01) | <b>B01J 19/22</b> (2006.01) |
| <b>B01J 19/30</b> (2006.01) | <b>B01J 19/16</b> (2006.01) |
| <b>B01J 19/14</b> (2006.01) |                             |

(21) International Application Number:

PCT/SG2007/000245

(22) International Filing Date: 10 August 2007 (10.08.2007)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

11/504,966 16 August 2006 (16.08.2006) US

(71) Applicant (for all designated States except US):  
**AGENCY FOR SCIENCE, TECHNOLOGY AND RESEARCH** [SG/SG]; 20 Biopolis Way, #07-01 Centros, Singapore 138668 (SG).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **YING, Jackie Y** [US/SG]; 31 Toh Avenue, Singapore 508056 (SG). **LEE, Su Seong** [KR/SG]; Blk 50, Bukit Batok Street 31, #17-03,

The Madeira, Singapore 659442 (SG). **LIM, Jaehong** [KR/SG]; 1 Fort Road, One Fort, #15-03, Singapore 439069 (SG). **SITI, Nurhanna Binte Riduan** [SG/SG]; Blk 566, Choa Chu Kang Street 52, #04-142, Singapore 680566 (SG).

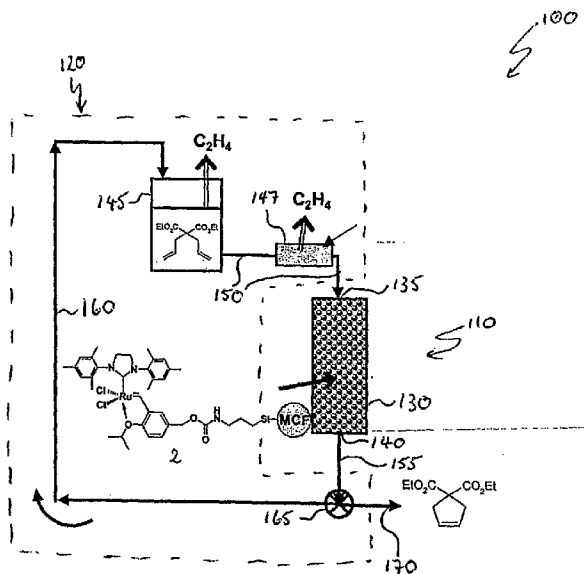
(74) Agent: **ELLA CHEONG SPRUSON & FERGUSON (SINGAPORE) PTE LTD**; P.O. Box 1531, Robinson Road Post Office, Singapore 903031 (SG).

(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,

[Continued on next page]

(54) Title: RECIRCULATING REACTOR



(57) Abstract: The invention provides a recirculating reactor for converting a substrate to a product. The reactor comprises a reaction chamber and a recirculation system, said recirculation system comprising a separator. The reaction chamber contains a catalyst, and comprises a chamber body, a chamber inlet and a chamber outlet. The recirculation system is adapted for recirculating liquid from the chamber outlet to the chamber inlet, and the separator is used for separating a by-product from the liquid.



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).

**Published:**

— *with international search report*