(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization International Bureau



(10) International Publication Number WO 2008/041132 A3

(43) International Publication Date 10 April 2008 (10.04.2008)

- (51) International Patent Classification: C01B 17/027 (2006.01) C01B 17/033 (2006.01) **B01J 13/12** (2006.01)
- (21) International Application Number:

PCT/IB2007/004161

(22) International Filing Date:

10 August 2007 (10.08.2007)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

60/836,849

10 August 2006 (10.08.2006)

US

- (72) Inventor; and
- (71) Applicant: ABRY, Raymond G.F. [CA/CA]; 133 Douglasview Rise S.E., Calgary, Alberta T2Z 2P5 (CA).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): BEASLEY, Todd [CA/CA]; 327 Discovery Place S.W., Calgary, Alberta T3H 4N7 (CA). JOHNSON, Richard Lyle [CA/CA]; Box 175, Vegreville, Alberta T9C 1R2 (CA). KUZUB, Richard Eugene [CA/CA]; 45 Glengarry Crescent, Sherwood Par, Alberta T8A 3A1 (CA). TAK, Jin Kwon [KR/ CA]; 2891 23rd Street, Edmonton, Alberta T6T 0A2 (CA).
- (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).

Published:

- with international search report (Art. 21(3))
- (88) Date of publication of the international search report: 3 March 2011



INTERNATIONAL SEARCH REPORT

International application No. PCT/IB2007/004161

A. CLASSIFICATION OF SUBJECT MATTER

IPC: C01B 17/033 (2006.01), B01J 13/12 (2006.01), C01B 17/027 (2006.01)

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) C01B 17/033, B01J 13/12, C01B 17/027 (all 2006.01)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic database(s) consulted during the international search (name of database(s) and, where practicable, search terms used)
Delphion, Google Scholar, Internet (Google), Canadian Patent Database (sulfur, sulpher, micro*, ammonia, carbon dioxide, particles, solvent)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Α	US 4 824 656 (RICE ET AL.) 25 April 1989 (25-04-1989) Whole Document (cited in application)	1-17
A	US 2006/0043002 A1 (PETRINEC ET AL.) 2 March 2006 (02-03-2006) Whole Document (cited in application)	1-17

{	Further documents are listed in the continuation of Box C.	[X] See patent family annex.		
* "A"	Special categories of cited documents: document defining the general state of the art which is not considered	"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		
"E"	to be of particular relevance earlier application or patent but published on or after the international filing date	"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		
"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)	"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		
"O"	document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family		
"P"	document published prior to the international filing date but later than the priority date claimed	document inclined of the same patent raining		
Date of the actual completion of the international search		Date of mailing of the international search report		
17 April 2008 (17-04-2008)		20 May 2008 (20-05-2008)		
	and mailing address of the ISA/CA lian Intellectual Property Office	Authorized officer		
Place du Portage I, C114 - 1st Floor, Box PCT 50 Victoria Street Gatineau, Quebec K1A 0C9		Stewart Parsons 819- 997-4378		
Facsi	mile No.: 001-819-953-2476			

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No. PCT/IB2007/004161

			······································	L
Patent Document Cited in Search Report	Publication Date	Patent Family Member(s)	Publication Date	
US 4824656A	25-04-1989	None		
US 2006043002A1	02-03-2006	CA 2578937A1 WO 2006026417A2 WO 2006026417A3	09-03-2006 09-03-2006 12-10-2006	
	•			
·				
		·		