

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
2 September 2010 (02.09.2010)

(10) International Publication Number
WO 2010/099208 A3

(51) International Patent Classification:
B01D 53/04 (2006.01) *B01J 20/22* (2006.01)
B01J 20/20 (2006.01) *B01J 20/28* (2006.01)

(74) Agent: **NONI, Lisa, M.**; Corning Incorporated, Intellectual Property Department, SP-TI-3-1, Corning, New York 14831 (US).

(21) International Application Number:
PCT/US2010/025244

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, 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, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(22) International Filing Date:
24 February 2010 (24.02.2010)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
12/393,239 26 February 2009 (26.02.2009) US

(71) Applicant (for all designated States except US): **CORNING INCORPORATED** [US/US]; 1 Riverfront Plaza, Corning, New York 14831 (US).

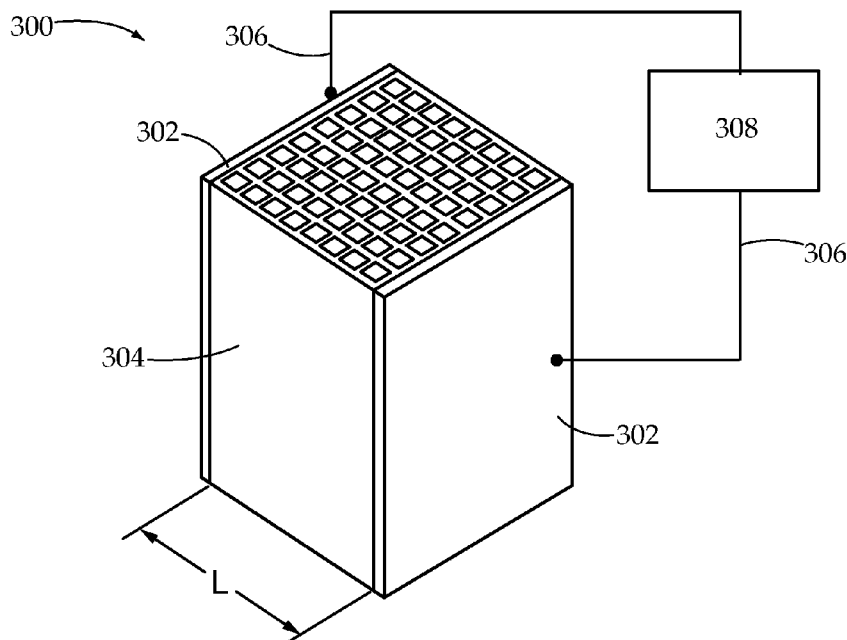
(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, SM,

(72) Inventors; and

(75) Inventors/Applicants (for US only): **GADKAREE, Kishor, P.** [US/US]; 15 Orchard Drive, Big Flats, New York 14814 (US). **SHI, Youchun** [US/US]; 26 Barrington Road, Horseheads, New York 14845 (US).

[Continued on next page]

(54) Title: SORBENT STRUCTURE APPLICABLE FOR CARBON DIOXIDE CAPTURE



(57) Abstract: A sorbent structure comprising a continuous activated carbon body in the form of a flow-through substrate; and an additive provided on the flow-through substrate, wherein the additive is capable of enhancing the sorption of CO₂ on the sorbent structure. Methods of making the sorbent structure, its use for CO₂ capture, and methods for regenerating the structure for further use.

FIG. 3

WO 2010/099208 A3



TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

Published:

— *with international search report (Art. 21(3))*

(88) Date of publication of the international search report:

21 October 2010

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2010/025244

A. CLASSIFICATION OF SUBJECT MATTER
 INV. B01D53/04 B01J20/20 B01J20/22 B01J20/28
 ADD.

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)
 B01D B01J

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 practical, search terms used)
 EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	EP 0 696 473 A1 (CORNING INC [US]) 14 February 1996 (1996-02-14) examples 1-3, 5-10	1, 2, 5, 9, 12-16 6-8, 10, 11
X	EP 1 371 607 A2 (CORNING INC [US]) 17 December 2003 (2003-12-17) examples 2, 4	1-4, 9, 12, 13
	----- -/--	

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *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)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *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
- *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
- *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.
- *G* document member of the same patent family

Date of the actual completion of the international search 24 August 2010	Date of mailing of the international search report 02/09/2010
--	---

Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040. Fax: (+31-70) 340-3016	Authorized officer Klemps, Christian
--	--

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2010/025244

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	GRANDE ET AL: "Electric Swing Adsorption for CO ₂ removal from flue gases" INTERNATIONAL JOURNAL OF GREENHOUSE GAS CONTROL, vol. 2, no. 2, 12 March 2008 (2008-03-12), pages 194-202, XP022525044 DOI: 10.1016/S1750-5836(07)00116-8 * abstract Section "2. Experimental"; page 195, left-hand column - right-hand column Section "4.1 Adsorption and desorption CO ₂ breakthrough curves"; page 198, left-hand column - page 199, left-hand column; figure 4; table 2 -----	17-24
Y	WO 02/059039 A1 (HONEYWELL INT INC [US]) 1 August 2002 (2002-08-01) examples 27, 28 example 29 example 31 -----	6-8,10, 17-24
Y	EP 0 684 071 A2 (CORNING INC [US]) 29 November 1995 (1995-11-29) examples 1, 3 -----	11
Y	US 4 810 266 A (ZINNEN HERMANN A [US] ET AL) 7 March 1989 (1989-03-07) * abstract column 14, line 1 - column 15, line 11; table 5 column 16, line 38 - line 40; example 7 -----	6-8,10, 17,19
A		1-5,14, 18,20,23

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2010/025244

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0696473	A1	14-02-1996	AT 308381 T 15-11-2005
			AU 688530 B2 12-03-1998
			AU 2835195 A 22-02-1996
			BR 9503615 A 16-04-1996
			DE 69534559 D1 08-12-2005
			DE 69534559 T2 27-07-2006
			JP 3818682 B2 06-09-2006
			JP 8224485 A 03-09-1996
			RU 2170140 C2 10-07-2001
			TW 429164 B 11-04-2001
			US 5488023 A 30-01-1996
EP 1371607	A2	17-12-2003	NONE
WO 02059039	A1	01-08-2002	EP 1355851 A1 29-10-2003
			JP 2004529747 T 30-09-2004
EP 0684071	A2	29-11-1995	AT 200230 T 15-04-2001
			AU 689870 B2 09-04-1998
			AU 2006495 A 07-12-1995
			BR 9502546 A 02-01-1996
			CA 2147112 A1 27-11-1995
			CZ 9501330 A3 14-02-1996
			DE 69520522 D1 10-05-2001
			DE 69520522 T2 12-07-2001
			JP 8052318 A 27-02-1996
			PL 308712 A1 27-11-1995
			US 6097011 A 01-08-2000
			ZA 9504273 A 24-01-1996
US 4810266	A	07-03-1989	EP 0401285 A1 12-12-1990
			JP 3502774 T 27-06-1991
			WO 8907979 A1 08-09-1989