

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
9 December 2010 (09.12.2010)

(10) International Publication Number
WO 2010/141464 A3

(51) International Patent Classification:
H01L 21/304 (2006.01)

(21) International Application Number:
PCT/US2010/036895

(22) International Filing Date:
1 June 2010 (01.06.2010)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
61/183,284 2 June 2009 (02.06.2009) US
61/235,980 21 August 2009 (21.08.2009) US

(71) Applicants (for all designated States except US):
SAINT-GOBAIN ABRASIVES, INC. [US/US]; 1 New Bond Street, Box Number 15138, Worcester, MA 01615 (US). **SAINT-GOBAIN ABRASIFS** [FR/FR]; Rue de l'Ambassadeur, F-78700 Conflans Sainte Honorine (FR).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **WU, Jianhui** [CN/US]; 16 Arrowhead Circle, Ashland, MA 01721 (US). **HWANG, Taewook** [KR/US]; 37 Concord Road, Acton, MA 01720 (US). **VEDANTHAM, Ramanujam** [IN/US]; 15 Arrowsic Street, Worcester, MA 01606 (US). **DINH-NGOC, Charles** [FR/US]; 696 Central Street, Holliston, MA 01746 (US). **PUTHANANGADY, Thomas** [US/US]; 11 Boston Hill Circle, Shrewsbury, MA 01545 (US). **SCHULZ, Eric, M.** [US/US]; 76

Harley Drive, Worcester, MA 01606 (US). **RA-MANATH, Srinivasan** [US/US]; 28 Avery Road, Holden, MA 01520 (US).

(74) Agent: **TAYLOR, Anabela Cristina**; Houston Eliseeva LLP, 4 Militia Drive Suite 4, Lexington, MA 02421 (US).

(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.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, 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, 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))

[Continued on next page]

(54) Title: CORROSION-RESISTANT CMP CONDITIONING TOOLS AND METHODS FOR MAKING AND USING SAME

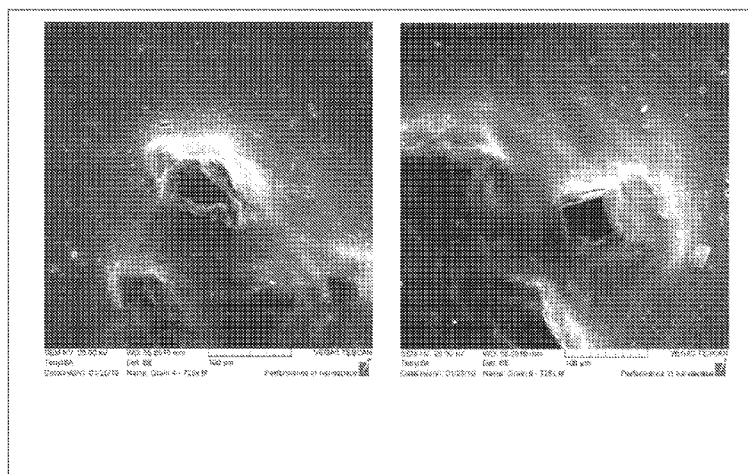


Fig. 4

(57) Abstract: An abrasive tool for conditioning CMP pads includes abrasive grains coupled to a substrate through a metal bond and a coating, e.g., a fluorine-doped nanocomposite coating. The abrasive grains can be arranged in a self-avoiding random distribution. In one implementation, an abrasive tool includes a coated plate and a coated abrasive article that has two abrading surfaces. Other implementations related to a process for producing an abrasive tool that includes a coating at one or more of its surfaces. Also described are methods for dressing a CMP pad.



WO 2010/141464 A3

— *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))*

(88) Date of publication of the international search report:
5 May 2011

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2010/036895**A. CLASSIFICATION OF SUBJECT MATTER****H01L 21/304(2006.01)i**

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)

H01L 21/304; H01L 29/94; B24B 1/00; B24B 21/18

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

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) & Keywords: CMP pad, coating, diamond, carbon, silicon, oxygen, hydrogen, fluorine

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2007-0066194 A1 (ROY F. WIELONSKI et al.) 22 March 2007 See abstract; paragraphs [0011]-[0016], [0024]-[0045]; figures 1-3.	1-9, 34-35, 37
A	US 6368198 B1 (SUNG; CHIEN-MIN et al.) 09 April 2002 See abstract; column 3, lines 34-48, column 5, lines 38-45, column 8, lines 52-58.	1-9, 34-35, 37
A	US 2005-0153634 A1 (ABANESHWAR PRASAD et al.) 14 July 2005 See paragraphs [0022]-[0027].	1-9, 34-35, 37
A	US 2008-0153398 A1 (SUNG CHIEN-MIN) 26 June 2008 See paragraphs [0038]-[0059].	1-9, 34-35, 37
A	US 2007-0235801 A1 (KANGGUO CHENG et al.) 11 October 2007 See paragraph [0030].	1-9, 34-35, 37

 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 application or patent 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 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

"&" document member of the same patent family

Date of the actual completion of the international search

10 MARCH 2011 (10.03.2011)

Date of mailing of the international search report

14 MARCH 2011 (14.03.2011)

Name and mailing address of the ISA/KR

Korean Intellectual Property Office
Government Complex-Daejeon, 139 Seonsa-ro, Seo-
gu, Daejeon 302-701, Republic of Korea

Facsimile No. 82-42-472-7140

Authorized officer

Lee, Byul Sup

Telephone No. 82-42-481-8497



INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2010/036895

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

- I. Claims 1-9, 34-35, 37 of an abrasive tool or method are directed to materials for coating.
- II. Claims 10-22, 32-33, 36 of an abrasive tool or method are directed to abrasive grains.
- III. Claims 23-28, 31 of an abrasive tool or method are directed to a removable coupling mechanism.
- IV. Claim 29 of an abrasive tool is directed to a first and second abrasive layers with coating.
- V. Claims 30, 38 of an abrasive tool or method are directed to a substrate surface having two different abrasive textures.

1. As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:
1-9,34-35,37

Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2010/036895

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2007-0066194 A1	22.03.2007	US 7300338 B2	27.11.2007
US 6368198 B1	09.04.2002	AU 2003-288917 A1	19.04.2004
		AU 2003-288917 A8	19.04.2004
		CN 100351063 C	28.11.2007
		CN 100351063 C0	28.11.2007
		CN 101068654 A	07.11.2007
		CN 101068654 A0	07.11.2007
		CN 101068654 B	08.09.2010
		CN 101292062 A	22.10.2008
		CN 101292062 A0	22.10.2008
		CN 101391402 A	25.03.2009
		CN 101391402 A	25.03.2009
		CN 1120766 C	10.09.2003
		CN 1252021 A0	03.05.2000
		CN 1261301 A	26.07.2000
		CN 1261301 C0	26.07.2000
		CN 1694788 A0	09.11.2005
		EP 1015180 A1	05.07.2000
		EP 1015182 A2	05.07.2000
		EP 1015182 B1	25.01.2006
		EP 1151825 A2	07.11.2001
		EP 1151825 A3	31.03.2004
		EP 1151825 B1	28.06.2006
		EP 1554098 A2	20.07.2005
		EP 1645365 A1	12.04.2006
		EP 1751391 A2	14.02.2007
		JP 03801215 B2	26.07.2006
		JP 2000-512219 A	19.09.2000
		JP 2000-512220 A	19.09.2000
		JP 2006-501073 A	12.01.2006
		JP 2007-531681 A	08.11.2007
		JP 2008-515238 A	08.05.2008
		KR 10-0366465 B1	31.12.2002
		KR 10-0366466 B1	31.12.2002
		KR 10-2005-0046802 A	18.05.2005
		KR 10-2006-0132973 A	22.12.2006
		KR 10-2007-0063569 A	19.06.2007
		TW 200916262 A	16.04.2009
		TW 394723 A	21.06.2000
		TW 394723 B	21.06.2000
		TW 414748 A	11.12.2000
		TW 414748 B	11.12.2000
		US 06039641 A	21.03.2000
		US 06159286 A	12.12.2000
		US 2002-0077054 A1	20.06.2002
		US 2002-0173234 A1	21.11.2002
		US 2003-0084894 A1	08.05.2003
		US 2004-0112359 A1	17.06.2004

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2010/036895

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		US 2004-0194689 A1	07.10.2004
		US 2005-0082067 A1	21.04.2005
		US 2005-0095959 A1	05.05.2005
		US 2005-0136667 A1	23.06.2005
		US 2006-0016127 A1	26.01.2006
		US 2007-0051354 A1	08.03.2007
		US 2007-0051355 A1	08.03.2007
		US 2007-0157917 A1	12.07.2007
		US 2007-0254566 A1	01.11.2007
		US 2007-0295267 A1	27.12.2007
		US 2008-0047484 A1	28.02.2008
		US 2008-0136730 A1	12.06.2008
		US 2008-0248305 A1	09.10.2008
		US 6193770 B1	27.02.2001
		US 6286498 B1	11.09.2001
		US 6679243 B2	20.01.2004
		US 6884155 B2	26.04.2005
		US 7090014 B2	15.08.2006
		US 7124753 B2	24.10.2006
		US 7201645 B2	10.04.2007
		US 7323049 B2	29.01.2008
		US 7368013 B2	06.05.2008
		US 7404857 B2	29.07.2008
		US 7585366 B2	08.09.2009
		WO 2004-028746 A2	08.04.2004
		WO 2004-028746 A3	08.04.2004
		WO 2005-084334 A2	15.09.2005
		WO 2005-084334 A3	15.09.2005
		WO 2006-039457 A1	13.04.2006
		WO 98-45091 A2	15.10.1998
		WO 98-45092 A1	15.10.1998
US 2005-0153634 A1	14.07.2005	None	
US 2008-0153398 A1	26.06.2008	None	
US 2007-0235801 A1	11.10.2007	EP 2008300 A2	31.12.2008
		US 2007-235801 A1	11.10.2007
		US 2008-0169494 A1	17.07.2008
		US 7439135 B2	21.10.2008
		WO 2007-115002 A2	11.10.2007
		WO 2007-115002 A3	06.11.2008
		WO 2007-115002 A3	11.10.2007