

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
29 December 2005 (29.12.2005)

PCT

(10) International Publication Number
WO 2005/123336 A3

- (51) International Patent Classification:
B24B 37/04 (2006.01) *B24D 13/14* (2006.01)
- (21) International Application Number:
PCT/US2005/020400
- (22) International Filing Date: 9 June 2005 (09.06.2005)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
10/865,027 10 June 2004 (10.06.2004) US
- (71) Applicant: **CABOT MICROELECTRONICS CORPORATION** [US/US]; 870 North Commons Drive, Aurora, Illinois 60504 (US).
- (72) Inventors: **WYLIE, Ian**; c/o Legal Department, Cabot Microelectronics Corporation, 870 North Commons Drive, Aurora, IL 60504 (US). **ANJUR, Sriram**; c/o Legal Department, Cabot Microelectronics Corporation, 870 North Commons Drive, Aurora, IL 60504 (US).
- (74) Agents: **WESEMAN, Steven** et al.; Legal Department, Cabot Microelectronics Corporation, 870 North Commons Drive, Aurora, Illinois 60504 (US).
- (81) Designated States (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,

CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, 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, MC, 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).

Declarations under Rule 4.17:

- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for all designations*
- *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii)) for all designations*

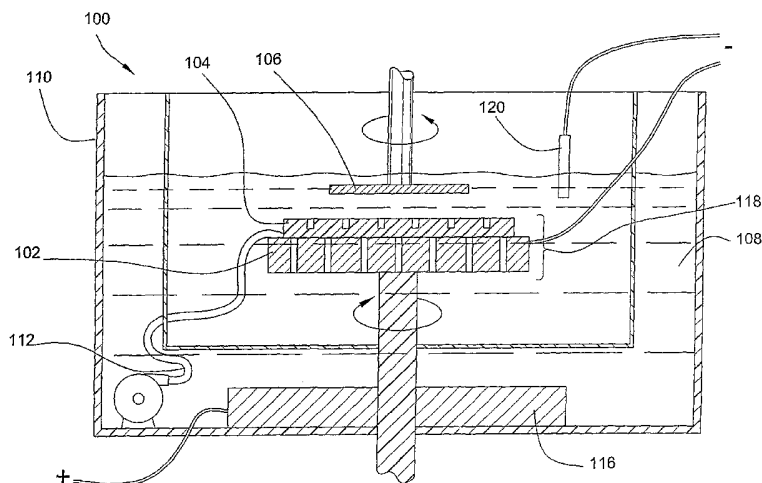
Published:

- *with international search report*

(88) Date of publication of the international search report:
2 March 2006

[Continued on next page]

(54) Title: ELECTROCHEMICAL-MECHANICAL POLISHING SYSTEM



(57) Abstract: Provided is a polishing apparatus (100) and polishing pad (104), intended for polishing a substrate, and designed for improved flow and distribution of a polishing composition to the area of interaction between the pad and substrate. In one aspect, a polishing pad is provided having first and second pluralities of unidirectional pores (146, 148) configured to communicate polishing composition between the top and bottom surfaces of the pad. A cyclic flow of composition is established to continuously renew composition to the area of interaction between the pad and the substrate. In another aspect, a polishing apparatus is provided having a polishing composition transfer region between a polishing pad and a platen. Pores disposed through the pad communicate composition from the transfer region to the top surface. To facilitate directing the composition into the pores, the apparatus includes a plurality of protrusions protruding into the transfer region that are aligned with the pores.

WO 2005/123336 A3



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.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US2005/020400

<p>A. CLASSIFICATION OF SUBJECT MATTER B24B37/04 B24D13/14</p> <p>According to International Patent Classification (IPC) or to both national classification and IPC</p>											
<p>B. FIELDS SEARCHED</p> <p>Minimum documentation searched (classification system followed by classification symbols) B24B B24D</p> <p>Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched</p> <p>Electronic data base consulted during the international search (name of data base and, where practical, search terms used) EPO-Internal, WPI Data</p>											
<p>C. DOCUMENTS CONSIDERED TO BE RELEVANT</p> <table border="1"> <thead> <tr> <th>Category °</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>WO 00/12264 A (ADVANCED MICRO DEVICES, INC) 9 March 2000 (2000-03-09) page 9, lines 4-13; figure 19 -----</td> <td>1,41</td> </tr> <tr> <td>A</td> <td>US 5 725 420 A (TORII ET AL) 10 March 1998 (1998-03-10) abstract; figures -----</td> <td>1,41</td> </tr> </tbody> </table>			Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	A	WO 00/12264 A (ADVANCED MICRO DEVICES, INC) 9 March 2000 (2000-03-09) page 9, lines 4-13; figure 19 -----	1,41	A	US 5 725 420 A (TORII ET AL) 10 March 1998 (1998-03-10) abstract; figures -----	1,41
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.									
A	WO 00/12264 A (ADVANCED MICRO DEVICES, INC) 9 March 2000 (2000-03-09) page 9, lines 4-13; figure 19 -----	1,41									
A	US 5 725 420 A (TORII ET AL) 10 March 1998 (1998-03-10) abstract; figures -----	1,41									
<p><input type="checkbox"/> Further documents are listed in the continuation of box C. <input checked="" type="checkbox"/> Patent family members are listed in annex.</p>											
<p>° Special categories of cited documents :</p> <table border="0"> <tr> <td style="vertical-align: top;"> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"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)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </td> <td style="vertical-align: top;"> <p>"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</p> <p>"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</p> <p>"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.</p> <p>"&" document member of the same patent family</p> </td> </tr> </table>			<p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"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)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"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</p> <p>"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</p> <p>"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.</p> <p>"&" document member of the same patent family</p>							
<p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"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)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"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</p> <p>"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</p> <p>"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.</p> <p>"&" document member of the same patent family</p>										
<p>Date of the actual completion of the international search 26 August 2005</p>		<p>Date of mailing of the international search report 13. 12. 2005</p>									
<p>Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016</p>		<p>Authorized officer Garella, M</p>									

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2005/020400

Box 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 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:

see additional sheet

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.:

1-20, 41-45

Remark on Protest

- The additional search fees were accompanied by the applicant's protest.
- No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-20,41-45

Polishing pad with unidirectional pores and method for using the same.

2. claims: 21-39

Polishing apparatus with platen assembly.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US2005/020400

Patent document cited in search report		Publication date		Patent family member(s)		Publication date
WO 0012264	A	09-03-2000	US	6331137 B1		18-12-2001

US 5725420	A	10-03-1998	CN	1151342 A		11-06-1997
			JP	3042593 B2		15-05-2000
			JP	9117855 A		06-05-1997
			KR	229058 B1		01-11-1999
