07/08/03
200 30520 81

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

(19) World Intellectual Property Organization
International Bureau

162162

(43) International Publication Date
22 August 2002 (22.08.2002)

PCT

(10) International Publication Number
WO 02/065529 A3

(51) International Patent Classification[7]: H01L 21/306, 21/321, 21/3105, 21/461, 21/768

(21) International Application Number: PCT/US02/03453

(22) International Filing Date: 8 February 2002 (08.02.2002)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
09/783,069 13 February 2001 (13.02.2001) US

(71) Applicant: EKC TECHNOLOGY, INC. [US/US]; 2520 Barrington Court, Hayward, CA 94545-1163 (US).

(72) Inventors: SMALL, Robert, J.; 11418 Rampart Drive, Dublin, CA 94568 (US). SHANG, Xiaowei; 1129 Robin Way, Sunnyvale, CA 94087 (US).

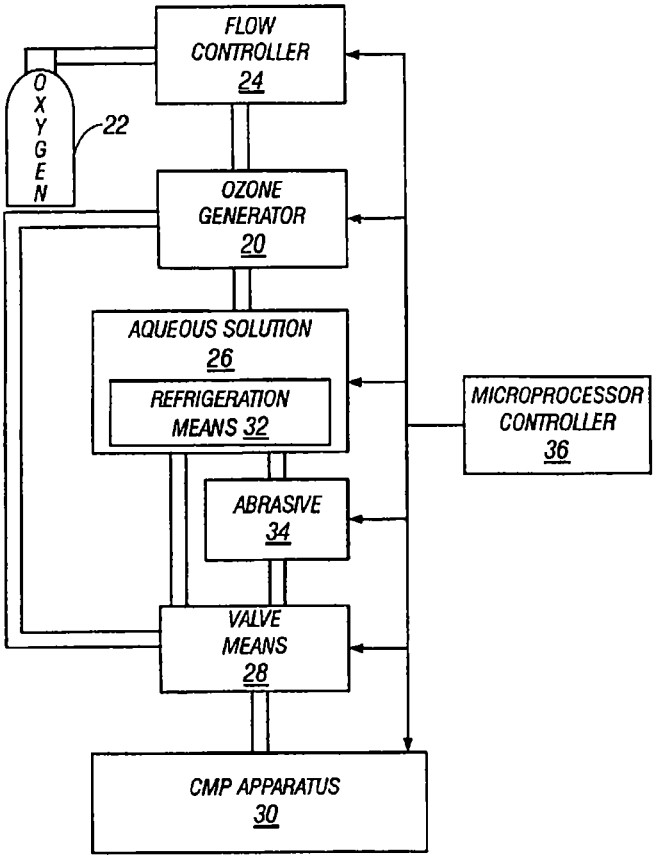
(74) Agent: DE RUNTZ, K., Alison; Skjerven Morrill LLP, Three Embarcadero Center, 28th Floor, San Francisco, CA 94111 (US).

(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZM, ZW.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent

[Continued on next page]

(54) Title: CHEMICAL-MECHANICAL PLANARIZATION USING OZONE



(57) Abstract: The present invention relates to the use of ozone (O3) as a reagent in chemical mechanical planarization either in aqueous solution or as a gas directly impinging on the surface to be planarized. An aqueous solution containing ozone may optionally contain abrasive particles and/or additional CMP reagents co-dissolved with the ozone including carbonate and bicarbonate anions, and organic acids such as formic, oxalic, acetic and glycol. Abrasives that may be added include alumina, silica, spinel, ceria, and zirconia. Typical concentrations of ozone in aqueous solution are in the range from approximately 1 part-per-million up to saturation. Ammonium salts, particularly ammonium carbonate, facilitate planarization in cooperation with the ozone-containing aqueous solution. Low k dielectric materials, organic as well as inorganic, and difficult to oxidize metals can be planarized with ozone reagents pursuant to the present invention.

WO 02/065529 A3

ACTION

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

(88) Date of publication of the international search report:
10 October 2002

Published:
— *with international search report*
— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

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.