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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
17 June 2010 (17.06.2010)

PCT

(10) International Publication Number
WO 2010/068753 A3

(51) International Patent Classification:
H05H 1/34 (2006.01) *H05H 1/42* (2006.01)

(21) International Application Number:
PCT/US2009/067495

(22) International Filing Date:
10 December 2009 (10.12.2009)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
61/121,353 10 December 2008 (10.12.2008) US

(71) Applicant *(for all designated States except US)*: **LAM RESEARCH CORPORATION** [US/US]; 4650 Cushing Parkway, Fremont, CA 94538-6401 (US).

(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: **ZHOU, Catherine** [US/US]; 4650 Cushing Parkway, Fremont, CA 94538-6401 (US). **OUTKA, Duane** [US/US]; 4650 Cushing Parkway, Fremont, CA 94538-6401 (US). **AVOYAN, Armen** [US/US]; 4650 Cushing Parkway, Fremont, CA 94538-6401 (US). **SHIH, Hong** [US/US]; 4650 Cushing Parkway, Fremont, CA 94538-6401 (US).

(74) Agents: **BEYER, James, E.** et al.; Dinsmore & Shohl LLP, One South Main Street, Fifth Third Center, Suite 1300, Dayton, OH 45402-2023 (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, 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, 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).

Declarations under Rule 4.17:

— *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*

— *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

Published:

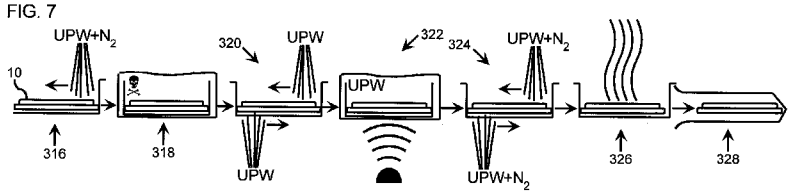
— *with international search report (Art. 21(3))*

— *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:
26 August 2010

(54) Title: IMMERSIVE OXIDATION AND ETCHING PROCESS FOR CLEANING SILICON ELECTRODES

FIG. 7



(57) Abstract: A process for cleaning a silicon electrode is provided where the silicon electrode is soaked in an agitated aqueous detergent solution and rinsed with water following removal from the aqueous detergent solution. The rinsed silicon electrode is then soaked in an agitated isopropyl alcohol (IPA) solution and rinsed. The silicon electrode is then subjected to an ultrasonic cleaning operation in water following removal from the IPA solution. Contaminants are then removed from the silicon electrode by soaking the silicon electrode in an agitated mixed acid solution comprising hydrofluoric acid, nitric acid, acetic acid, and water. The silicon electrode is subjected to an additional ultrasonic cleaning operation following removal from the mixed acid solution and is subsequently rinsed and dried. In other embodiments of the present disclosure, it is contemplated that the silicon electrode can be soaked in either the agitated aqueous detergent solution, the agitated isopropyl alcohol (IPA) solution, or both. Additional embodiments are contemplated, disclosed, and claimed.

WO 2010/068753 A3