



- (51) **International Patent Classification:**
H01L 21/306 (2006.01) *H01L 21/302* (2006.01)
- (21) **International Application Number:**
PCT/US2010/020093
- (22) **International Filing Date:**
5 January 2010 (05.01.2010)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
12/356,170 20 January 2009 (20.01.2009) US
- (71) **Applicant (for all designated States except US):** LAM RESEARCH [US/US]; 4650 Cushing Parkway, Fremont, CA 94538 (US).
- (72) **Inventors; and**
- (75) **Inventors/Applicants (for US only):** WAGNER, Mark, I. [US/US]; 3931 Far West Blvd., Austin, TX 78731 (US). DEYOUNG, James, P. [US/US]; 6314 Llano Ave., Dallas, TX 75214 (US).
- (74) **Agent:** LETTANG, Mollie, E.; Daffer McDaniel, LLP, P.O. Box 684908, Austin, TX 78768-4908 (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, 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).

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))

(54) **Title:** METHODS FOR PREVENTING PRECIPITATION OF ETCH BYPRODUCTS DURING AN ETCH PROCESS AND/OR A SUBSEQUENT RINSE PROCESS

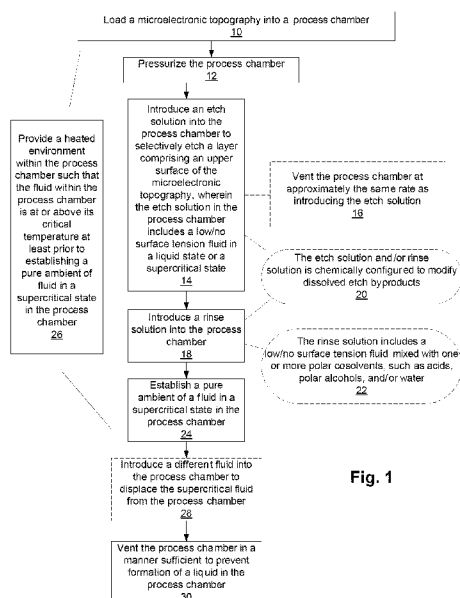


Fig. 1

(57) **Abstract:** Methods for processing a microelectronic topography include selectively etching a layer of the topography using an etch solution which includes a fluid in a supercritical or liquid state. In some embodiments, the etch process may include introducing a fresh composition of the etch solution into a process chamber while simultaneously venting the chamber to inhibit the precipitation of etch byproducts. A rinse solution including the fluid in a supercritical or liquid state may be introduced into the chamber subsequent to the etch process. In some cases, the rinse solution may include one or more polar cosolvents, such as acids, polar alcohols, and/or water mixed with the fluid to help inhibit etch byproduct precipitation. In addition or alternatively, at least one of the etch solution and rinse solution may include a chemistry which is configured to modify dissolved etch byproducts within an ambient of the topography to inhibit etch byproduct precipitation.