

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
3 February 2005 (03.02.2005)

PCT

(10) International Publication Number  
**WO 2005/010948 A2**

(51) International Patent Classification<sup>7</sup>: **H01L**  
(21) International Application Number:  
PCT/US2004/023597  
(22) International Filing Date: 22 July 2004 (22.07.2004)  
(25) Filing Language: English  
(26) Publication Language: English  
(30) Priority Data:  
10/627,185 24 July 2003 (24.07.2003) US

(71) Applicant (for all designated States except US): **CHEM-TRACE PRECISION CLEANING, INC.** [US/US];  
44050 Fremont Boulevard, Fremont, CA 94538 (US).

(72) Inventors: **TAN, Samantha**; 4715 Finn Cove Court,  
Union City, CA 94587 (US). **CHEN, Ning**; 39651 Blacow  
Road, Fremont, CA 94538 (US).

(74) Agent: **HICKMAN, Paul, L.**; Perkins Coie LLP, 101 Jef-  
ferson Drive, Menlo Park, CA 94025 (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, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,  
MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,  
PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,  
TN, TR, TT, TZ, UA, UG, US, 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, IT, 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).

**Published:**

— without international search report and to be republished  
upon receipt of that report

For two-letter codes and other abbreviations, refer to the "Guid-  
ance Notes on Codes and Abbreviations" appearing at the begin-  
ning of each regular issue of the PCT Gazette.

(54) Title: CLEANING PROCESS AND APPARATUS FOR SILICATE MATERIALS

(57) Abstract: A method for treating a surface of a quartz substrate includes preparing a substrate to provide a working surface having an initial roughness; and then ultrasonically acid-etching the working surface to increase the roughness of the working surface by at least about 10%. In one embodiment, the initial surface roughness is greater than about 10 Ra, and in another embodiment the initial surface roughness is greater than about 200 Ra. In a still further embodiment, the initial surface area, if less than about 200 Ra, is increased to greater than about 200 Ra. In other embodiments of the present invention, the working surface roughness is increased by at least about 25% or at least about 50%. Simultaneous with the increase in surface area (as measured by the roughness), the surface defects are reduced to reduce particulate contamination from the substrate.



WO 2005/010948 A2