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(21) International Application Number: PCT/US95/13243 (22) International Filing Date: 10 October 1995 (10.10.95) (30) Priority Data: 322,020 / 11 October 1994 (11.10.94) / US (71) Applicants: GELEST, INC. [US/US]; 612 William Leigh Drive, Tullytown, PA 19007-6308 (US). THE RESEARCH FOUNDATION OF STATE UNIVERSITY OF NEW YORK [US/US]; State University Plaza, Albany, NY 12246 (US). (72) Inventors: ARKLES, Barry, C.; 428 Bluebird Lane, Dresher, PA 19025 (US). KALOYEROS, Alain, E.; 39 Ridgely Drive, Voorheesville, NY 12186 (US). (74) Agents: PARKER, David, W. et al.; Panitch Schwarze Jacobs & Nadel, P.C., 36th floor, 1601 Market Street, Philadelphia, PA 19103 (US).		(81) Designated States: AL, AM, AT, AU, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TT, UA, UG, UZ, VN, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG), ARIPO patent (KE, MW, SD, SZ, UG). Published <i>Without international search report and to be republished upon receipt of that report.</i> RMTP copy
(54) Title: CONFORMAL TITANIUM-BASED FILMS AND METHOD FOR THEIR PREPARATION (57) Abstract Titanium and titanium nitride layers can be produced by chemical vapor deposition (CVD) processes conducted at temperatures below 475 °C. The layers may serve as diffusion and adhesion barriers for ultra-large scale integration (ULSI) microelectronic applications. The processes use a titanium halide precursor, such as titanium tetraiodide, and hydrogen or hydrogen in combination with nitrogen, argon, or ammonia to either produce pure titanium metal films, titanium films which alloy with the underlying silicon, or titanium nitride films. The deposition of titanium metal from titanium halide and hydrogen or the deposition of titanium nitride from titanium halide with nitrogen and hydrogen is achieved with the assistance of a low energy plasma. The process allows smooth and reversible transition between deposition of films of either titanium metal or titanium nitride by introduction or elimination of nitrogen or ammonia.		