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(21) International Application Number: PCT/US99/19019 (22) International Filing Date: 20 August 1999 (20.08.99) (30) Priority Data: 09/140,614 26 August 1998 (26.08.98) US (71) Applicants: MATTSON TECHNOLOGY, INC. [US/US]; 3550 West Warren Avenue, Fremont, CA 94538 (US). SANDIA CORPORATION [US/US]; 7011 East Avenue, Livermore, CA 94550 (US). (72) Inventors: GRIFFITHS, Stewart, K.; 122 Alice Court, Danville, CA 94526-2449 (US). NILSON, Robert, H.; 2239 Ruddy Duck Court, Cardiss, CA 92007 (US). MATTSON, Brad, S.; 19251 Black Road, Los Gatos, CA 95030 (US). SAVAS, Stephen, B.; Apartment G, 1357 Pearl Street, Alameda, CA 94501 (US). (74) Agent: MURPHY, Michael, J.; Wilson Sonsini Goodrich & Rosati, 650 Page Mill Road, Palo Alto, CA 94304-1050 (US).		(81) Designated States: JP, KR, SG, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published <i>With international search report.</i> <i>Before the expiration of the time limit for amending the</i> <i>claims and to be republished in the event of the receipt of</i> <i>amendments.</i>
(54) Title: METHOD AND APPARATUS FOR THERMAL PROCESSING OF SEMICONDUCTOR SUBSTRATES (57) Abstract An apparatus and method for thermal processing of semiconductor wafers (135). Individual wafers (135) are rapidly inserted into and withdrawn from a furnace cavity (120) held at a nearly constant and isothermal temperature. The speeds of insertion and withdrawal are sufficiently large to limit thermal stresses and thereby reduce or prevent plastic deformation of the wafer as it enters and leaves the furnace (110). By processing the semiconductor wafer (135) in a substantially isothermal cavity (120), the wafer temperature and spatial uniformity of the wafer temperature can be ensured by measuring and controlling only temperatures of the cavity walls (121, 122, 123). Further, peak power requirements are very small compared to lamp-heated rapid thermal processor because the cavity temperature is not cycled and the thermal mass of the cavity (120) is relatively large.		