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1108

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : H01L 21/285	A1	(11) International Publication Number: WO 99/10921 (43) International Publication Date: 4 March 1999 (04.03.99)
(21) International Application Number: PCT/US98/17503 (22) International Filing Date: 24 August 1998 (24.08.98) (30) Priority Data: 08/924,487 23 August 1997 (23.08.97) US (71) Applicant: APPLIED MATERIALS, INC. [US/US]; 3050 Bowers Avenue, Santa Clara, CA 95054-3299 (US). (72) Inventors: NGAN, Kenny, King-tai; 43793 Cameron Hills Drive, Fremont, CA 94539 (US). HOGAN, Barry; 400 Riverside Court #302, Santa Clara, CA 95054 (US). RA-MASWAMI, Seshadri; 1503 Jarvis Court, San Jose, CA 95118 (US). (74) Agent: CHURCH, Shirley, L.; Suite #14, 520 Weddell Drive, P.O. Box 61929, Sunnyvale, CA 94088 (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. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>
(54) Title: METHOD OF FORMING A BARRIER LAYER IN A CONTACT STRUCTURE		
(57) Abstract The aluminum <111> crystal orientation content of an aluminum interconnect layer or the copper <111> crystal orientation content of a copper interconnect can be maintained at a consistently high value during the processing of an entire series of semiconductor substrates in a given process chamber. To provide the stable and consistent aluminum <111> content, or the stable and consistent copper <111> content, it is necessary that the barrier layer structure underlying the aluminum or the copper have a consistent crystal orientation throughout the processing of the entire series of substrates, as well. We have determined that to ensure the consistent crystal orientation content of the barrier layer structure, it is necessary to form the first layer of the barrier layer structure to have a minimal thickness of at least about 150 Å, to compensate for irregularities in the crystal orientation which may be present during the initial deposition of this layer. As an alternative to increasing the thickness of the first layer of the barrier layer structure, this first layer can be deposited at a low process chamber pressure, so that harmful irregularities in the crystal orientation are eliminated.		