Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Substrate Dependence on the Allotropic Transformation and the Morphology of Ultrathin Bi Films on Si(111)[1] S. YAGINUMA, T. NAGAO, K. NAGAOKA, NIMS, Tsukuba, Japan, M. MAEKAWA, Kanazawa Univ., J.T. SADOWSKI, IMR. Tohoku Univ., M. SAITO, Kanazawa Univ., Y. FUJIKAWA, T. SAKURAI, IMR. Tohoku Univ., T. KAKAYAMA, NIMS. Tsukuba, Japan — Bismuth film grows via an intriguing thickness-driven allotropic transformation from a {012}-oriented phase to a bulk-like (001) phase. We compare the growth of Bi films on the Si(111)-7x7 surface with that on the Si(111)-$\beta - \sqrt{3}$x$\sqrt{3}$-Bi surface by use of electron diffraction and scanning tunneling microscopy. Small amount of Bi(001) nanocrystals can nucleate on the 7x7 substrate from the very beginning of the growth ~ 1 monolayer (ML). They stabilize with 3 bilayer height in a perfect commensurate manner on the 7x7 substrate because of lattice contraction as predicted from our *ab initio* calculations, and thus lead to the growth of the highly-crystalline (001) films. On the $\beta - \sqrt{3}$x$\sqrt{3}$-Bi surface, on the contrary, the (001) nuclei is not observed in the initial stage of the growth and the Bi{012} films survive, and thus the nucleation of the (001) phase is inhibited up to ~ 15 ML.

[1]This work has been supported by ICORP JST and Grants-in-Aid from JSPS

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Date submitted: 10 Jan 2006 Electronic form version 1.4