

Abstract Submitted
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Thin Bismuth Film as a Template for Growth of Highly Ordered Pentacene: STM and LEEM study JERZY T. SADOWSKI, TADA AKI NAGAO, YASUNORI FUJIKAWA, SHIN YAGINUMA, ABDULLAH AL-MAHBOOB, TOSHIO SAKURAI, IMR, Tohoku University, 980-8577 Sendai, Japan, GAYLE E. THAYER, RUUD M. TROMP, IBM TJ Watson Research Center, Yorktown Heights, NY 10598, USA — Considering that the atomic bonding in bulk Bi can be described as intermediate between covalent and metallic, one may expect a unique growth mechanism for thin Bi films, different from that observed in the case of metals or semiconductors. In this talk, the results of the scanning tunneling microscope (STM) and low-energy electron microscope (LEEM) investigations will be used to show that thin Bi film undergoes an unique and unexpected structural transformation of the quasi-cubic, 012 oriented film into a hexagonal Bi(001) film [1]. Subsequently, the possibility of using annealed, well ordered Bi(001)/Si(111) films as the templates for the growth of organic thin films with excellent crystallinity will be demonstrated on the example of pentacene — one of the most promising organic semiconductors. Pn nucleates on Bi(001) into highly ordered, crystalline layer, with pentacene molecules standing up on the Bi surface, with (001) plane on the growth front. Pn layer is aligned with the Bi(001) surface, having point-on-line commensurate relation with the substrate. Moreover, a bulk-like structure is observed in Pn/Bi(001) film, directly from the first Pn layer. [1] T. Nagao et al., Phys. Rev. Lett. 93 (2004) 105501

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