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The growth mechanism of Pentacene-C₆₀ heteroepitaxial films A. AL-MAHBOOB, J.T. SADOWSKI, Y. FUJIKAWA, T. SAKURAI, Institute for Materials Research, Tohoku University — Pentacene (Pn) and fullerene (C₆₀) are of great interest among organic semiconductors as they show highest field-effect hole and electron mobilities respectively. The absorption peak in Pn crystal is located close to maximum of solar visible spectra, making a bipolar Pn-C₆₀ diode promising for solar cell application. In order to improve its efficiency to satisfy the requirement for practical application, an in-depth understanding of Pn-C₆₀ interface formation is necessary for further optimization. We shall discuss the growth mechanism of Pn-C₆₀ heteroepitaxial films on Bi(0001)/Si(111) substrate studied by real time low-energy electron microscopy and complementary scanning tunneling microscopy. A competitive growth between a thin-film phase of Pn having standing-up orientation and a phase with laying-down orientation has been observed. The growth of laying-down phase is suppressed gradually with increasing film thickness. The nucleation of this phase is also suppressed with increasing temperature and the standing up phase without co-presence of laying down phase is achievable at $\sim 75^\circ\text{C}$.

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