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Graphene Template for Epitaxial Growth of Pentacene and C₆₀ Thin Film KWANPYO KIM, Ulsan National Institute of Science and Technology, Korea, ELTON J.G. SANTOS, Department of Chemical Engineering, Stanford University, TAE HOON LEE, YOSHIO NISHI, Department of Electrical Engineering, Stanford University, ZHENAN BAO, Department of Chemical Engineering, Stanford University — The study and reliable control of molecular packing structures at the graphene-molecule interface are of great importance for various applications. We utilize suspended graphene as an assembly template to investigate thin-film epitaxial growth of various organic molecules. Thin-film packing structures of pentacene and C₆₀ on graphene are investigated using transmission electron microscopy. For pentacene thin-film, we observe an unusual polymorph growth on graphene, which shows significant strain along the c-axis of pentacene crystals. Moreover, the strained film exhibits a specific molecular orientation and a strong azimuthal correlation with underlying graphene lattice. For C₆₀ crystals, we observe large grain sizes and somewhat strong azimuthal correlation with respect to underlying graphene lattice direction. Utilizing *ab initio* electronic structure calculations with van der Waals interactions, we understand the observed molecular growth behavior mainly with graphene-molecule interaction.

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