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Highly Ordered Organic Molecular Thin Films on Silicon Studied by STM and LEED[1] SEAN WAGNER, PENGPENG ZHANG, Department of Physics and Astronomy, Michigan State University — Achieving growth of long-range ordered organic molecular thin films on inorganic substrates continues to be a significant challenge for organic electronics applications. Here, we report the growth of highly ordered zinc phthalocyanine (ZnPc) thin films both in-plane and out-of-plane on the deactivated Si(111) surface by scanning tunneling microscopy (STM) and low energy electron diffraction (LEED). By adjusting the substrate temperature during deposition, the anisotropic step-flow growth mode can be accessed causing a reduction in the substrate symmetry which allows for the long-range in-plane ordering as well as the decrease of grain boundary density [1] [2]. Additionally, the ZnPc molecules are able to maintain a highly ordered configuration in multi-layers despite a gradual decrease in the molecule-substrate interaction, which is attributed to the strong interlayer π-π interaction [2].

[1] S. R. Wagner, R. R. Lunt, and P. P. Zhang, *Phys. Rev. Lett.* **110**, 086107 (2013).
[2] S. R. Wagner and P. P. Zhang, (Submitted).

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