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Scanning Tunneling Microscopy investigation of multilayer diF-TES-ADT on Au(111) SHAWN HUSTON, Appalachian State University, JIUYANG WANG, North Carolina State University, MARSHA LOTH, JOHN ANTHONY, University of Kentucky, BRAD CONRAD, Appalachian State University, DANIEL DOUGHERTY, North Carolina State University — Organic thin film transistors (OTFT) partially composed of solution processed 2,8-difluoro-5,11-bis(triethylsilylethynyl)-anthradithiophene (diF-TES-ADT) have shown high performance with hole mobilities up to 1 $cm^2/(V\ s)$. Pretreatment of the gold electrodes results in growth of large diF-TES-ADT crystals extending well out into the channel of the OTFT. Without electrode pretreatment, the crystal sizes are small and possess a non-preferred molecular orientation. We have chosen to investigate the reasons for the reduced crystal size of these films on untreated gold electrodes by studying a model system generated by vapor deposition of multilayers of diF-TES-ADT on Au(111). The initial wetting layer forms a highly ordered film such that the anthradithiophene backbone is oriented parallel to the substrate and the unit cell is 1.49 nm x 1.25 nm with an included angle of 56.8°. The second layer is poorly ordered with only weak evidence of crystallinity in small regions. Growth beyond the second layer appears essentially bulk-like and crystalline with domain sizes that are potentially limited by the disordered bilayer growth.

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