Abstract Submitted
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Direct-Write Molecular Layer Epitaxy by Thermal Dip-Pen Nanolithography M. YANG, P. E. SHEEHAN, Naval Research Laboratory, Washington, DC 20375, W. P. KING, Georgia Institute of Technology, Atlanta, GA 30080, L. J. WHITMAN, Naval Research Laboratory, Washington, DC 20375 — Achieving nanometer-scale control of structure in organic thin films is crucial to understand charge transport and thereby develop reliable devices such as organic FETs and LEDs. Although a variety of methods can be used to reliably deposit thin polymer films, fabrication of polymer nanostructures remains a significant challenge. We have developed a new technique, thermal dip-pen nanolithography (tDPN),[1] that can be used to directly write such nanostructures. In tDPN a custom AFM cantilever with an integral tip heater is pre-coated with a solid "ink," which can then be precisely deposited onto a substrate by heating the tip above the inks melting temperature. Using this technique, poly(3-dodecylthiophene) nanostructures have been deposited on silicon oxide surfaces with layer-by-layer thickness control. By adjusting the tip heating power and the writing speed, we can vary the polymer thickness from a single monolayer (about 2.8 nm) to tens of monolayers with lateral dimensions < 200 nm.

[1]P. A. Sheehan, *et al.*, Appl. Phys. Lett. **85**, 1589 (2004).

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