

Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Electrical and structural characterization of high performance airbrushed organic thin film transistors CALVIN CHAN, LEE RICHTER, CHERNO JAYE, BRAD CONRAD, HYUN WOOK RO, DAVID GERMACK, DANIEL FISCHER, DEAN DELONGCHAMP, DAVID GUNDLACH, National Institute of Standards and Technology, SEMICONDUCTOR ELECTRONICS DIVISION TEAM, SURFACE AND MICROANALYSIS SCIENCE DIVISION TEAM, CERAMICS DIVISION TEAM, POLYMERS DIVISION TEAM — High performance airbrushed organic thin film transistors were demonstrated and characterized using electrical and structural methods. For example, high molecular weight poly-3-hexylthiophene (P3HT) transistors exhibited an average saturation regime mobility $>0.02 \text{ cm}^2\text{V}^{-1}\text{s}^{-1}$, which is comparable to the best mobilities observed for transistors of this material prepared using other methods. Complex droplet and film formation dynamics were inferred, and the resulting film structure was observed using optical microscopy, atomic force microscopy, near-edge x-ray absorption fine structure spectroscopy, and grazing incidence x-ray diffraction.

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Date submitted: 24 Nov 2009

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