Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Thin film morphology of organic electronic materials S. D. HUDSON, R. J. KLINE, D. M. DELONGCHAMP, O. D. JURCHESCU, D. J. GUNDLACH, L. J. RICHTER, NIST, Gaithersburg, MD 20899 — The crystal orientation and morphology of a polythiophene (pBTTT) and an anthradithiophene (diF-TEADT, a pentacene analog) in thin films have been explored by TEM, SEM, AFM, GISAXD, NEXAFS, polarized FTIR and ellipsometry. The orientation has a striking influence on the performance of thin film transistors. We show that solution casting and annealing conditions have a significant effect on the morphology of pBTTT. Correlations between film surface step morphology and crystal orientation are determined. Interfacial interactions with the substrate (gold, silica, or fluorinated sam) govern the crystal orientation and crystal aggregate morphology of diF-TESADT. Depending on this orientation, the carrier mobility spans from approximately 0.001 cm^2/Vs to 0.4 cm^2/Vs. Epitaxial relationships within crystal aggregates are observed.

Steven Hudson
NIST, Gaithersburg, MD 20899

Date submitted: 21 Nov 2008 Electronic form version 1.4