Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Effects of polar analytes on the transport properties of organic semiconductor field-effect chemical sensors DAVIANNE DUARTE, Univeristy of Texas at Austin, BRIAN COBB, ANANTH DODABALAPUR, University of Texas at Austin — Chemical recognition or sensing in organic thin film transistors (TFTs) can be achieved by direct analyte interaction or the inclusion of specific receptor molecules added to the semiconducting surface. Overall, sensing is dependent on the interactions occurring between the molecule and the OTFT active region, which includes the semiconductor and semiconductor-insulator interface. The magnitude of the interaction will depend on the molecules polarizability and the partition function of the analyte vapor. We employ a range of analytes (cyclohexane, ethanol, and styrene) with different solvations parameters (polarizability/dipolarity levels) to gain more clarity on their effects of the charge transport properties in OTFTs. Receptors are used to understand in more detail the physical and chemical interactions, which contribute to the sensor response. The receptors themselves have diverse polarizability/dipolarity parameters, which produce varying sensing behaviors dependent on the solvation parameters of the analytes.

Davianne Duarte
Univeristy of Texas at Austin

Date submitted: 27 Nov 2010 Electronic form version 1.4