

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Charge Trapping in Organic Thin-Film Transistors CLAIRE MCLELLAN, JACK OWEN, Wake Forest University, MARSHA GRIMMINGER, JOHN ANTHONY, University of Kentucky, OANA JURCHESCU¹ — Charge trapping in the bulk of the organic semiconductors and at interface with the gate dielectric and/or contacts is one of the determining factors governing charge transport in organic thin-film transistors (OTFTs). We explore the current-voltage characteristics in different charge density regimes and extract the field-effect mobility. The dependence of mobility on gate/drain voltage give us valuable insight into the mechanism of charge transport and the relevance of trapping states. We perform measurements on devices fabricated using different methods, such as spin-coating, drop-casting or spray-coating, on a silicon gate electrode, silicon dioxide gate dielectric, and gold source and drain contacts. We demonstrate that the performance of OTFTs is strongly dependent on processing details. We show that even when using the same processing method, we are able to systematically tune the charge trapping states by chemically modifying the contact and dielectric surfaces with self-assembly monolayers.

¹Wake Forest University

Claire McLellan
Wake Forest University

Date submitted: 23 Dec 2010

Electronic form version 1.4