

Abstract Submitted  
for the MAR06 Meeting of  
The American Physical Society

**Direct measurements of contact resistances in asymmetric pentacene thin-film transistors with polyaniline and gold electrodes** KWANG SEOK LEE, TIMOTHY SMITH, JOUNG EUN YOO, KEITH STEVENSON, YUEH-LIN (LYNN) LOO, Department of Chemical Engineering, Department of Chemistry and Biochemistry, University of Texas at Austin — We have fabricated asymmetric pentacene thin-film transistors with one gold electrode and one polyaniline (PANI) electrode connected to the same pentacene channel. Surface potential measurements reveal large potential drops at the gold/pentacene contact, but not at the PANI/pentacene contact during operation. We observe, however, some potential drop along the PANI electrode outside the scan window due to the bulk resistance of PANI. To minimize the potential drop across the PANI electrode, we have fabricated asymmetric devices with one exposed gold electrode, and one PANI-coated gold electrode. The surface potential profiles of these asymmetric devices with the PANI-coated gold electrode as the source electrode and the exposed gold electrode as the drain electrode, and vice versa, reveal no additional potential drop across the PANI-coated gold electrode. Quantification of the contact resistance indicates that the PANI/pentacene contact is significantly less resistive than the gold/pentacene contact whether the PANI-coated gold electrode is used as the source, or the drain electrode. Additionally, charge injection from the exposed gold electrode and the PANI-coated electrode appears to be more difficult than charge extraction from these electrodes.

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Date submitted: 29 Nov 2005

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