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In-Situ Measurements of Organic Electronic Devices Fabricated via Transfer Printing on Flexible Substrates ANDREW TUNNELL, DANIEL R. HINES, VINCE W. BALLAROTTO, MIHAELA BREBAN, ELLEN D. WILLIAMS, Laboratory for Physical Sciences and Department of Physics, University of Maryland, College Park, MD. — Transfer printing was used to fabricate high quality organic thin-film transistors (TFT) on flexible substrates. The model system of a pentacene (Pn) TFT with 600 nm thick poly(methyl methacrylate) dielectric layer and gold electrodes on a polyethylene terephthalate substrate has shown a mobility (adjusted for contact resistance) of 0.237 cm^2/Vs, on/off ratio of 10^5 and threshold voltage of -7 V. To optimize the transfer printing parameters of the Pn semiconductor layer, mobility and contact resistance were studied as a function of printing temperature and pressure. The best TFT devices resulted from printing at 120 ^oC and 600 psi. A detailed study of the effect of transfer printing on the device properties was performed via in-situ measurements of drain current (ID) as a function of both drain (VD) and gate (VG) voltages. Details of the in-situ measurements while transfer printing the Pn layer will be presented and discussed.
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