Abstract Submitted
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Organic and Carbon-based Thin-film Transistors on Flexible Substrates.[1] DANIEL R. HINES, A. E. SOUTHARD, J.H. CHEN, M.S. FUHRER, E.D. WILLIAMS, Dept. of Physics, University of Maryland, College Park, MD — Fabrication of organic & carbon-based thin-film transistors (TFT) was achieved on plastic substrates using transfer printing. Each device component (Au electrodes, polymer dielectric layer and semiconductor layer) was printed using only pressure and temperature, eliminating all chemical processing on the device substrate. Pentacene (Pn), poly(3-hexylthiophene) (P3HT), carbon nanotube mats (CNTM) and graphene TFTs were all fabricated on polyethylene terephthalate (PET) substrates, yielding mobilities of 0.237 cm^2/Vs for Pn and 0.04 cm^2/Vs for P3HT. Bottom-gate CNTM TFTs are p-type, with mobilities of 13.7 cm^2/Vs, on/off ratio of 10^3 and minimal hysteresis. Top-gate graphene TFTs have mobilities of 1.0x10^4 cm^2/Vs for holes and 4x10^3 cm^2/Vs for electrons. P3HT TFTs showed little variation in mobility, but strong variation in threshold voltage for different dielectric layers. These TFTs printed onto plastic substrates with a variety of polymer dielectric layers will be presented and discussed..

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