Abstract Submitted
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Electrical characterization of field effect transistors made from C-nanotubes covered with poly(3-hexylthiophene)[1] LUIS POMALES, NICHOLAS PINTO, UNiversity of Puerto Rico - Humacao, MITCHELL LERNER, ALAN JOHNSON JR., University of Pennsylvania — Organic transistors were fabricated using a thin film of regio-regular poly(3-hexylthiophene-2,5-diyl) spun from a 0.5 wt% solution in $CHCl_3$ on doped Si/SiO_2 substrates with and without CNT's. The performance of devices with percolating networks of CVD grown single-wall carbon nanotubes (SWNT's) between the source (S) and drain (D) electrodes and without SWNT's are compared. Nanotubes are used as a way to shorten the effective mean distance between the S/D terminals while retaining the wide spacing macroscopic shadow mask technique for S/D fabrication. We found that devices made with SWNT's do not exhibit S/D current saturation but have a charge mobility of $1.2\text{x}10^{-2}$ cm^2/V-s and an on/off ratio of 9, while the device without SWNT's show clear saturation with a charge mobility of $8.6\text{x}10^{-4}$ cm^2/V-s and an on/off ratio of 870. The devices made with nanotubes possess a larger off state current although they show a $\sim$14X increase in the mobility which can thus be increased without using sophisticated lift-off techniques to shorten the S/D distance.

[1]NSF

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