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Surface

Treatment

for Improved Mobility in Poly(3-hexylthiophene) Thin-Film Transistors¹ ADRIAN SOUTHARD, MICHAEL FUHRER, Department of Physics and Center for Superconductivity Research, University of Maryland — Thin films of poly(3-hexylthiophene), an organic semiconductor, were spin-coated from chloroform onto a self-assembled monolayer of octyltrichlorosilane (2 nm thick) and yielded an order of magnitude higher field-effect mobility than similar films deposited directly onto the SiO₂/Si substrate. Mobility was measured using the polymer as the conducting channel of a field-effect transistor with Au top contacts as the source and drain electrodes and the doped silicon as a gate. The higher mobility is presumed to be due to the increased order of the semiconducting layer. Evidence for this ordering and the effect of other self-assembled monolayers will be discussed along with the effect of various contact geometries. This work was supported by the Laboratory for Physical Sciences.

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