Abstract Submitted
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Electronic functionalization of organic semiconductors with self-assembled monolayers VITALY PODZOROV, Rutgers University — Self-assembled monolayers (SAM) are widely used in a variety of emerging applications for surface modification of metals and oxides. Here, we demonstrate a new type of molecular self-assembly: the growth of organosilane SAMs at the surface of organic semiconductors. Remarkably, SAM growth results in a pronounced increase of surface conductivity of organic materials, which can be very large for SAMs with a strong electron withdrawing ability. For example, the conductivity induced by perfluorinated alkyl silanes in organic molecular crystals approaches 10ˆ-5 S per square, two orders of magnitude greater than the maximum conductivity typically achieved in organic field-effect transistors (OFETs). The observed large electronic effect opens new opportunities for nanoscale surface functionalization of organic semiconductors with molecular self-assembly. In particular, SAM-induced conductivity exhibits sensitivity to different molecular species present in the environment, which makes this system very attractive for chemical sensing applications [1]. [1]. M. F. Calhoun, J. Sanchez, D. Olaya, M. E. Gershenson and V. Podzorov, "Electronic functionalization of the surface of organic semiconductors with self-assembled monolayers", Nature Materials, Nov. 18, (2007).

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