

Abstract Submitted  
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**STM and optical investigations of molecules on graphene**<sup>1</sup> OZGUN SUZER, Center for Nanoscale Materials, Argonne National Laboratory, Argonne, IL 60439, USA, JOSEPH SMERDON, Surface Science Research Centre, University of Liverpool, Liverpool L69 3BX, UK, NATHAN GUISENGER, JEFFREY GUEST, Center for Nanoscale Materials, Argonne National Laboratory, Argonne, IL 60439, USA — We describe efforts to understand the structural, electronic and optical properties of an archetypal organic molecular building block for graphene-based nano-optical and photovoltaic devices, presenting UHV STM studies of pentacene (Pn) molecules deposited on graphene that was grown epitaxially on SiC(0001). Isolated electronic states are observed and associated molecular orbitals are resolved; also, a large HOMO-LUMO spacing indicates that we are probing a “transport gap” in the monolayer Pn. The electronic properties of this system indicate a decoupling of the molecules from the graphene and underlying substrate, similar to results obtained for the complementary molecular system, C60 on graphene [Cho, et.al. Nano Letters 12, 3018 (2012)], suggesting a path for developing molecular-scale electronic and optically active devices that are not dominated by substrate interactions. We will also discuss our efforts to correlate these studies with the optical properties of the systems using a UHV STM that incorporates confocal optical microscopy and spectroscopy at the tip-sample junction.

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