Long Range Modification of a Metal Surface Electronic Structure
by an Organic Semiconductor JINGYING WANG, DANIEL DOUGHERTY,
North Carolina State Univ — In an organic spintronic device the interaction between
electrode surface and organic semiconductor layer plays an important role in spin
injection at this interface. The antiferromagnetic material Cr(001) is known to
have a spin-polarized state near Fermi level that could potentially hybridize with
organic molecules. Here we report our STM/STS study of electronic structure at
interface between an organic semiconductor, PTCDA, and Cr(001) surface. The
study shows that the surface state at Fermi level of Cr(001) can be broadened
by PTCDA molecules deposited on the surface due to hybridization of PTCDA
molecular orbital and conduction sp band of Cr(001). This indirect modification is
not only localized at molecular adsorption sites, but also extends several nm to bare
surrounding Cr(001) surface and decays with distance away from PTCDA molecules.

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