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Scanning Tunneling Spectroscopy measurements of the Electronic Structure of C60 films on the Cu(100) surface[1] D.R. DAUGHTON, J.A. GUPTA, The Ohio State University, Department of Physics — Successful implementation of organometallic electronic and photoelectronic device architectures requires understanding and engineering of molecule-electrode interfaces. Here we investigate the electronic structure of a monolayer film of C60 on a Cu(100) surface with low temperature (5 K) scanning tunneling microscopy (STM) and spectroscopy. C60 adopts four unique orientations on the Cu(100) surface, and shifts in the molecular orbital resonances for the four geometries indicate different degrees of electronic molecule-surface hybridization. At higher bias, Stark-shifted image state resonances are shown to spatially vary across the molecular film. Modulation of the image state energies are attributed to shifts in the interfacial dipole that derive from the interplay of interfacial charge transfer, surface reconstruction, and orientational ordering of the molecular film. These observations suggest the need for nanoscale interface characterization for optimizing the performance of molecular electronic devices.

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