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Molecule-induced Spin Rotation of Photoelectrons from FePc on Fe(110)[1] ANDREAS SANDIN, J.E. (JACK) ROWE, DANIEL DOUGHERTY, North Carolina State University, ELIO VESCOVO, National Synchrotron Light Source, Brookhaven National Labs — We have studied sub-monolayers to multi-layers of iron phthalocyanine (FePc) adsorbed on $\sim$ 10-20 monolayer epitaxial films on Fe(110) on W(110). We find that the spin-resolved photoemission changes rapidly as a function of coverage and the initial (majority spin axis along [110] rotates by $\sim$ 30 degrees for sub-monolayer coverage and then becomes unpolarized at $\sim$ 1 monolayer (ML). The coverage is determined by work function measurements which show that the initial work function of clean Fe(110) of 5.0 eV decreases monotonically to a value of $\sim$ 3.8 eV at a coverage that we assign as $\sim$ 1 monolayer of FePc. These values were determined from the measurements of the photoelectron spectrum using the low-energy vacuum-level cutoff of a biased sample. Our spin-resolved data for clean Fe(110) show highly spin-polarized photoelectrons from the Fermi energy to values about 3.5 eV below the Fermi energy for an applied B-field along [110] both for majority-spin and minority-spin electrons. The polarization is about 60% at -3.2 eV below E-Fermi. For 0.13 ML adsorbed FePc the spin polarization is somewhat reduced and is rotated from [110] towards [100] in the plane of the sample. We interpret this rotation as due to a strong coupling of the orbital moment of FePc with the conduction electrons of the Fe substrate.

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