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Modification of the electronic band structure of the topological insulator Bi_2Te_3 by the adsorption of the organic molecule Manganese Phthalocyanine ANDREW HEWITT, JONATHON BOLTERSDORF, PAUL MAGGARD, DANIEL DOUGHERTY, North Carolina State University — Topological insulators (TIs) have a spin-textured surface state protected by time-reversal symmetry within a bulk insulating gap. Typical approaches to breaking time-reversal symmetry have been to introduce dilute magnetic impurities into a solid-solution synthesis. Organic molecules offer another route for magnetic-doping of TIs. It has been shown that a coupling may exist, along with a new hybrid-interface state, between the magnetic molecule Manganese Phthalocyanine (MnPc) and the TI Bi_2Te_3. We report the modification of the electronic band structure by the adsorption of MnPc molecules as measured by ultraviolet photoelectron spectroscopy. We show a new state emerging below the Fermi level at less than a monolayer coverage of MnPc molecules. We also observe an n-doping effect as charge is transferred from the molecule to the TI substrate in agreement with recent work. We suggest that this interface system may have important implications for understanding the role of local time reversal symmetry breaking in TI's and in controlling spin injection into these novel materials.

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