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The electronic band alignment on nanoscopically patterned substrates.[1] STEPHEN BERKEBILE, GEORG KOLLER, MARTIN OEHZELT, JAN IVANCO, FALKO P. NETZER, MICHAEL G. RAMSEY, KF University, 8010 Graz, Austria — Understanding band alignment on the molecular scale is vital for the future of molecular electronics, but it is also important in today's devices as their contact interfaces can have defects on the nanoscale. The band alignment of the organic semiconductor sexiphenyl on a nanoscopically patterned substrate, was investigated with UV-photoemission and STM. We show that for increasing coverage on inhomogeneous surfaces shifts in electronic level alignment occur, which are due to the change from local to average band alignment. The Cu-(2x1)O stripe phase, used as a model substrate consists of alternating stripes of bare and oxygen passivated copper, with stripe widths comparable to the molecular length. In the first molecular layer the electronic bands are aligned to the local surface potential of the specific stripe, resulting in a superposition of two photoemission spectra offset by 1eV. Beyond two monolayers the valence band spectra clearly indicate a single electronic level alignment, which is determined by the average interface dipole.

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