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Ferrocenes on Calcite: Single-electron tunneling detected at room temperature PHILIPP RAHE, Department of Physics and Astronomy, The University of Utah, RYAN STEELE, Department of Chemistry, The University of Utah, CLAYTON WILLIAMS, Department of Physics and Astronomy, The University of Utah — We present the assembly of a functionalized ferrocene derivative on a truly insulating support, namely the calcite $(10\bar{1}4)$ surface, and investigate the transfer of single electrons between the molecules and the conductive tip of an atomic force microscope in the absence of a macroscopic tunneling current. Molecules on insulating surfaces attract currently increasing attention [1], stimulated by promising applications in the fields of surface functionalization and, especially, in the context of molecular (opto-)electronics. For isolated atoms and single molecules adsorbed on thin insulating films, the manipulation and storage of single charges has been induced by a tunneling current [2,3]. Our approach, however, is based on single-electron tunneling force microscopy methods [4,5] combined with Kelvin-probe force microscopy. By using this combination of methods we present the measurement and control of the charge state of the ferrocene molecules by injecting and extracting charge on the order of single electrons.

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