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Identifying Charge States of Molecules with Spin-flip Spectroscopy YING-SHUANG FU, XI CHEN, TONG ZHANG, SHUI-HUA JI, Tsinghua University, XUCUN MA, Institute of physics, Chinese academy of sciences, JIN-FENG JIA, QI-KUN XUE, Tsinghua University — The charge states of single magnetic CoPc chains on Pb(111) film were manipulated with a scanning tunneling microscope and identified by spin-flip inelastic tunneling spectroscopy. We show that the tunneling spectra of the charged and neutral states of the molecular chain exhibit different features associated with the spin-flip processes. Therefore we are able to identify the charge states by the spin-flip spectroscopy. This approach does not rely on the indirect information induced by the additional charges on molecules. The experiment demonstrates a general method for detecting the charge states at the nanometer scale in a more straightforward manner.

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