

Mixed-Island Formation and Electronic Structure of Metallo-Porphyrin Molecules on Au(111)

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Orderings and electronic structures of organic molecules on metal substrates have been studied due to possible applications in electronic devices. In molecular systems, delocalized pi-electrons play important roles in the adsorption behaviors and electronic structures. We studied the adsorption and electronic structures of Co-Porphyrin molecules on Au(111) using scanning tunneling microscopy (STM) and spectroscopy (STS) at low temperature. Molecules form closely packed two-dimensional islands on Au(111) surface with two different types, having different shape evolutions in our energy-dependent STM observations. The Kondo resonance state, occurred by spin exchange interaction between the Co center atom and conduction electrons in the metal substrate, was observed in one type, while it was absent in the other type in scanning tunneling spectroscopy measurements. Possible origins of two molecular shapes will be discussed.

Keywords: Scanning Tunneling Microscope, Molecule, Kondo Effect,