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Mapping Molecular States of a Co-Porphyrin Molecule on Au(111) surface HOWON KIM, WON JUN JANG, JONG KEUN YOON, SE-JONG KAHNG, Korea University, WON-JOON SON, SEUNGWU HAN, Ewha Womans University — The biggest factor determining electronic transport property in molecular devices, is the character of molecular electronic states and their interaction with conducting electrodes. While there are tremendous efforts to manifest electronic devices with single molecules, the study of molecular orbitals and the molecule-metal interaction is comparatively small. In this talk, we will present our study of Co-porphyrin on Au(111) performed using low-temperature scanning tunneling microscope (STM). As the sample bias is changed, the STM images show strong spatial variations. With molecular orbital calculation and STM simulation, the bias-dependent images were well-reproduced. At +2V, the molecule shows four lobes, while at -2V, it exhibit two lobes. At intermediate biases, the molecule displays center-concentrated orbitals. Even though the molecules adsorb on Au(111) surface, the calculated orbitals from a free molecule are in good agreement with experimental data, implying marginal substrate effect.

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