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Chemically Sensitive Imaging of MgP with STM ARTHUR YU, SHAOWEI LI, GREG CZAP, WILSON HO, Univ of California - Irvine — Since its invention, the STM has been limited by its lack of sensitivity to chemical structures in molecules. Recent advances in scanning probe microscopy techniques, such as non-contact AFM and scanning tunneling hydrogen microscopy have enabled imaging of the internal structure and bonding of aromatic molecules such as pentacene and PTCDA. Here, we present a novel method of using the STM to image magnesium porphyrin molecules adsorbed on Au(110) with chemical sensitivity. In our previous study, we have shown that hydrogen molecules weakly adsorb on Au(110), exhibiting both vibrational and rotational IETS spectra. Exploiting the sensitivity of the vibrational and rotational mode energies to the local chemical environment, we perform dI/dV and d^2I/dV^2 imaging at different bias voltages, highlighting the various parts of the MgP molecule. In particular, we are able to image the positions of the nitrogen atoms in MgP. d^2I/dV^2 spectral mapping reveals that the origin of the chemical sensitivity comes from an energy shift of the rotational peak as the tip is scanned across the molecule, indicating a changing potential landscape for the H_2. Similar d^2I/dV^2 imaging with a CO terminated tip reveals no chemical sensitivity to nitrogen.

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