

Abstract Submitted
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Detection of overtone vibrations in single molecules by the scanning tunneling microscope GREGORY CZAP, PETER WAGNER, ZHUMIN HAN, JIANG YAO, WILSON HO, UC Irvine — Inelastic electron tunneling spectroscopy (IETS) with the scanning tunneling microscope (STM) is a powerful tool for studying molecules on surfaces. Vibrational overtone excitations are thought to be extremely weak or not detectable by this technique, although recent theoretical work has challenged these assumptions. Here we show that overtone excitations of single molecules on a metal surface can be detected and explore the variation in the overtone signal among different adsorption geometries. These results extend the capabilities of STM-IETS to the detection of new vibrational transitions, with the potential to yield novel information about the degree of anharmonicity of single-molecule binding potentials.

Gregory Czap
UC Irvine

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