

User Meeting 2020

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Soft x-ray studies of molecular nanoarchitectures

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One of the goals of nanoscience is achieving precise control over the structure and function of nanoscale architectures at surfaces. Bottom-up approaches using molecular building blocks present a flexible and intuitive approach to this challenge. Combining the Lego-like modularity of molecules with the epitaxial and reactive influences of surfaces creates a range of opportunities to build exciting new nanoarchitectures.

Our recent work has focused on studying the reactions of halogenated and carboxylated molecules at metal surfaces, where we investigate their adsorption, self-assembly, coupling reactions and the subsequent formation of oligomeric and polymeric structures. Understanding the on-surface behavior of the molecules is possible using a combination of scanning tunneling microscopy, photoelectron spectroscopy and near-edge x-ray absorption fine structure. We are particularly interested in looking at how the structure of these molecular systems affects their electronic properties, and I will discuss our progress in measuring both the filled and unfilled electronic states of these materials.

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