

RIXS of Metalloenzymes

Stephen P. Cramer

Applied Science, University of California, Davis, CA 95616

Metal-containing enzymes play important roles in hundreds of biochemical processes, including environmentally critical reactions such as nitrogen fixation, hydrogen evolution, and methane oxidation. Characterizing the electronic structure of the active site metal(s) is often a key part of understanding the catalytic mechanism of these enzymes. With sufficient improvements in sensitivity and resolution, high-resolution resonant inelastic x-ray scattering (RIXS) at transition metal K-edges could provide missing information about the oxidation state, spin state, and electron distribution at Mo, Ni, and Fe centers in nitrogenase, hydrogenase, and methane monooxygenase. This talk will present preliminary results on Ni model compounds and discuss the challenges facing biochemical applications of RIXS.