

RIXS Study : Electronic structure of Cu-Au Alloy

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Abstract

Cu-Au bimetallic catalysts in CO₂ reduction reaction (CO₂RR) attracts a lot of attentions due to high catalytic performance, tunable electronic structure, and variable product selectivity. Importantly, the catalytic activity is controlled by the binding strength of intermediate product, *CO and *COOH, derived the hybridization between the molecular orbit of absorbate and the d-band of metal. However, the d-band of Cu-Au alloy is hybridized from Cu and Au to lack a total understanding. Fortunately, the resonance inelastic X-ray scattering (RIXS) spectroscopy provides an elemental valance band information to resolve the electronic structure. In this study, we measure Cu-Au alloy (Cu, Cu₃Au, and, CuAu₃) by X-ray absorption and RIXS spectroscopy to understand the unoccupied and occupied d-band structure.

Keywords – CO₂ reduction reaction, Cu-Au Alloy, bimetallic catalyst, d-band