

Recent XAFS development and its application in Shanghai Synchrotron Radiation Facility

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Abstract: Zhangjiang Comprehensive National Science Center in Pudong, Shanghai consists of Shanghai Synchrotron Radiation Facility (SSRF), Shanghai Soft X-ray Free-Electron Laser User Facility (SXFEL-UF) and Shanghai High Repetition Rate XFEL and Extreme Light Facility (SHINE), forming advanced spectroscopic platforms^[1-3]. Abundant synchrotron radiation X-ray spectroscopy (SRXS) methods, including XAFS, X-ray emission spectroscopy (XES), energy-dispersive XAS (EDXAS) and operando/in situ measurement have been developed and applied, offering nonnegligible characterization assistance to researchers in the field of catalysis, material and chemistry. SRXS is a unique method to study the local atomic and electronic structure of materials. In recent years, with the complication of energy-related catalytic system, the establishment of the correlation between atomic structure and the catalytic properties has been more and more important. Catalytic systems such as CO₂ electrochemical reduction, syngas conversion, oxygen reduction and so on provide a promising reaction route for energy conversion, and SRXS technology is widely used in atomic structure characterization of the catalysts^[4-7]. Especially through in-situ SRXS measurement, the adsorption and dissociation of intermediates are finely resolved, the atomic and electronic structure changes during the reaction process are clarified, thus providing powerful evidence for the reaction mechanism.

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