

Grazing Incidence X-ray Absorption Spectroscopy in Beijing Synchrotron Radiation Facility and Its Application in the Structure Characteristics of Thin Films

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Grazing-incidence X-ray absorption spectroscopy (GIXAS) combines Grazing-incidence X-ray optics technique and X-ray absorption spectroscopy method. It provides a novel approach to the local structure and electronic structure about the buried interface which is difficult to get with general surface detection method, and the dilution and disorder system which is hard to study with grazing incidence diffraction. GIXAS has been applied in various functional thin films, surface, solid - solid and solid - liquid interface. However, how to get high quality GIXAS experimental data is still a challenging task, especially for the thin films on substrates. Here, we present the experimental apparatus and setup to perform the GIXAS experiments at Beijing Synchrotron Radiation Facility. An easy and quick automatic sample alignment procedure is detail described. By optimizing the geometry of sample and detector, as well as filter, the scattering and/or fluorescence from the matrix has to be strongly attenuated. These experimental systems are evaluated with a few examples. The interesting fluorescence signal from the surface layer is enhanced without a corresponding increase in the elastic scattering and/or diffraction contribution from the matrix. Further Depth-dependent local structures in the examples are unraveled by GIXAS systems.