## PB08

### Soft X-ray Absorption Spectroscopy via Reflectivity

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The x-ray absorption spectroscopy (XAS) is a powerful tool which can probeelectronic structure of valence states. However, its conventional measurements such as total electron yields or fluorescence yields often restrict sample conditions due to surface sensitivity and charging effects in an insulator or self-absorption effects, respectively. As an alternative, we found to extract XAS spectra from soft x-ray reflectivity measurements for transition metal compounds. We performed the soft x-ray reflectivity measurements on reference transition metal oxides, CoO and NiO, at Co and Ni L2,3-edges, respectively, and successfully extracted the XAS spectrum using Kramers-Kronig relation from the reflectivity data.Considering that the reflectivity is a photon-in and photon-out experiment, this result suggests an alternative to obtain XAS spectra for systems, in which the conventional XAS measurements are not applicable.

## PB09

### Magnetic Properties of Iron Doped $TiO_2$ by Proton Irradiation

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Recent research indicate ferromagnetism in graphite by proton irradiation[1-2]. Also, as the roles of oxygen vacancies or defects have been embossed in oxide diluted magnetic semiconductor, the appearance of new consideration which can account for the ferromagnetism has been required and suggested [3] We have investigated the magnetic properties of $^{57}$Fe-doped $TiO_2$ compounds induced by proton irradiationat various time. The x-ray diffraction patterns for all samples showed an anatase single phase and the crystal structure was determined to be a tetragonal structure with a space group $I4_1/amd$. Magnetic moments enhanced by increasing proton irradiation time. Mössbauer spectra of proton irradiated $Ti_{0.99}{}^{57}Fe_{0.01}O_2$ samples were taken at 295 K. The spectra consist of the wing (sextet) and the central (doublet), suggesting that the magnetically ordered (MO) phase and the paramagnetic (PM) phase, respectively. Increasing proton irradiation time, part of the $Fe^{3+}$ ions were converted to $Fe^{2+}$ ions by compensation charge. It could be, therefore, evidenced that the enhancement of magnetic moment after proton irradiationis contributed to the moment by the spin-orbit coupling of Fe2+ ions.

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