Hard X-ray Photoelectron Spectroscopy of CrO_2

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CrO_2 is a half-metallic ferromagnetic material. Until now, various experiments have been performed. Since the surface of CrO_2 is easily covered by Cr_2O_3 because of the chemical instability of CrO_2, it has been difficult to observe the bulk electronic states of pure CrO_2 by means of photoelectron spectroscopy. In order to suppress the influence of the surface, we performed the hard x-ray photoelectron spectroscopy (HAXPES) on CrO_2 thin film at SPring-8 BL19LXU. The CrO_2 thin film was transferred into the sample-airlock system through N_2 gas. HAXPES was measured in ultrahigh vacuum without any surface processing. In the previous report [1], the so-called “well-screened” peak was clearly observed on the low binding energy side of the transition metal 2p core HAXPES spectrum in metallic phases. Such a peak is confirmed to be a bulk-specific component. In the present experiment, the “well-screened” peak is very clearly observed in the Cr 2p HAXPES spectrum. Other core HAXPES spectra are also discussed.

Reference:

[1] K. Horiba *et al*., Phys. Rev. Lett. **93**, 236401 (2004)