Electronic structure studies of CoFeRO (R=Hf, La, Nb) thin films by X-ray absorption spectroscopy

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We report the electronic structure of CoFeO-R (R=Hf, La, Nb) thin films studied by x-ray absorption spectroscopy (XAS). These ferrites thin films were prepared by pulsed laser deposition method and characterized by XAS measurements at O K-, Co and Fe L-edges. The O K-edge spectra suggest that there is a strong hybridization between O 2p and 3d electrons of transition metal cations and Fe L₃,₂-edge spectra indicate that Fe-ions exist in Fe²⁺ with tetrahedral site of the spinel structure. Divalent Co ions is also distributed in tetrahedral site with rare earth ions goes to octahedral sites of spinel structure. X-ray magnetic circular dichroism (XMCD) is also used to explain the symmetry and magnetic nature dependence on rare-earth ions.