

Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

PES and MCD Study of Giant Magnetoresistive Spinel Compounds: $\text{Fe}_{1-x}\text{Cu}_x\text{Cr}_2\text{S}_4$ ($0 \leq x \leq 0.5$) S.W. HAN, J.-S. KANG¹, S.C. WI, S.S. LEE, G. KIM, The Catholic University of Korea, Puchon, KOREA, S.J. KIM, C.S. KIM, Kookmin University, Seoul, KOREA, J.-Y. KIM, B.-G. PARK, J.-H. PARK, H.J. SONG, H.J. SHIN, PAL, POSTECH, Pohang, KOREA, K.H. KIM, RINS, Gyeongsang National University, Jinju, KOREA, J.I. JEONG, RIST, Pohang, KOREA — Very large negative magnetoresistance (MR) and the metal-insulator (M-I) transition have been observed in $\text{Fe}_{1-x}\text{Cu}_x\text{Cr}_2\text{S}_4$ ($x=0, 0.5$) spinel compounds. The valence states of transition-metal (T) ions in $\text{Fe}_{1-x}\text{Cu}_x\text{Cr}_2\text{S}_4$ (FCCS) have been controversial. In this study, we have investigated the electronic structures and the local magnetic moments of FCCS ($x=0.1, 0.2, 0.3, 0.5$) polycrystalline samples by employing photoemission spectroscopy (PES), soft x-ray absorption spectroscopy (XAS), and magnetic circular dichroism (MCD). From the measured T 2p XAS spectra (T=Fe, Cr, Cu), the valence states of Fe, Cr, and Cu ions in FCCS have been determined. Then in the valence-band PES spectra, the Cr 3d and Fe 3d spectral distributions have been separated from other valence-electron emissions. In the Cr 2p, Fe 2p, and Cu 2p MCD measurements, the polarities and individual magnetic moments of the Cr, Fe, and Cu ions have been determined. Based on these experiments, we will discuss on the valence states, the electronic structures, and the magnetic moments of FCCS ($x=0.1, 0.2, 0.3, 0.5$).

¹CSCMR, Seoul National University, Seoul, KOREA

S.W. Han
CSCMR, Seoul National University, Seoul, KOREA

Date submitted: 29 Nov 2004

Electronic form version 1.4