

Abstract Submitted  
for the MAR06 Meeting of  
The American Physical Society

**Soft X-ray absorption Spectroscopic Investigation on Electronic Evolutions in  $\text{SrFe}_{1-x}\text{Mo}_x\text{O}_{3\pm\delta}$  ( $0 \leq x \leq 1$ )** B.-K. PARK, POSTECH, J.-H. PARK, POSTECH/PLS, J.-Y. KIM, PLS, H.-J. LEE, J.H. SONG, Y.H. JEONG, POSTECH, H.-J. LIN, C.T. CHEN, NSRRC — A double perovskite  $\text{Sr}_2\text{FeMoO}_6$ , which an alternative mixture of  $\text{SrFeO}_3$  and  $\text{SrMoO}_3$ , is a half-metallic ferrimagnet with a high critical temperature  $T_C \sim 400\text{K}$ , although a certain amount of anti-site disorder diminishes the half-metallicity in a real system.  $\text{SrFeO}_3$  and  $\text{SrMoO}_3$ , which have the ionic states of  $\text{Fe}^{4+}$  and  $\text{Mo}^{4+}$ , are known to be an antiferromagnetic insulator and a non- magnetic metal, respectively. However, as they forms the double perovskite, the ionic states primarily form  $\text{Fe}^{3+}$  ( $3d_{\uparrow}^5$ ) and  $\text{Mo}^{5+}$  ( $4d_{\downarrow}^1$ ), and then the Fe 3d-Mo4d hybridization makes a down spin band at the Fermi level. Hence the real ground state becomes a state with  $\text{Fe}^{2+}$ - $\text{Fe}^{3+}$  and  $\text{Mo}^{5+}$ - $\text{Mo}^{6+}$  mixed valences. It means that the valences of Fe and Mo can vary by two, i.e. from  $\text{Fe}^{4+}$  to  $\text{Fe}^{2+}$  and from  $\text{Mo}^{4+}$  to  $\text{Mo}^{6+}$  in  $\text{SrFe}_{1-x}\text{Mo}_x\text{O}_{3\pm\delta}$  ( $0 \leq x \leq 1$ ), respectively. Here we presents the structural, electrical, and magnetic phase diagram and electronic evolutions in  $\text{SrFe}_{1-x}\text{Mo}_x\text{O}_{3\pm\delta}$  ( $0 \leq x \leq 1$ ).

Jae-Hoon Park  
POSTECH/PLS

Date submitted: 28 Nov 2005

Electronic form version 1.4