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Soft X-ray absorption Spectroscopic Investigation on Electronic Evolutions in $SrFe_{1-x}Mo_xO_{3\pm\delta}$ ($0 \leq x \leq 1$) 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 Sr_2FeMoO_6, which an alternative mixture of $SrFeO_3$ and $SrMoO_3$, is a half-metallic ferrimagnet with a high critical temperature $T_C \sim 400$K, although a certain amount of anti-site disorder diminishes the half-metallicity in a real system. $SrFeO_3$ and $SrMoO_3$, which have the ionic states of Fe^{4+} and 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 Fe^{3+} ($3d^5_\uparrow$) and Mo^{5+} ($4d^1_\downarrow$) , and then the Fe $3d$-Mo$4d$ hybridization makes a down spin band at the Fermi level. Hence the real ground state becomes a state with Fe^{2+}-Fe^{3+} and Mo^{5+}-Mo^{6+} mixed valences. It means that the valences of Fe and Mo can vary by two, i.e. from Fe^{4+} to Fe^{2+} and from Mo^{4+} to Mo^{6+} in $SrFe_{1-x}Mo_xO_{3\pm\delta}$ ($0 \leq x \leq 1$), respectively. Here we presents the structural, electrical, and magnetic phase diagram and electronic evolutions in $SrFe_{1-x}Mo_xO_{3\pm\delta}$ ($0 \leq x \leq 1$).

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