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Substitution effect of Ir oxide with K_2NiF_4 type structure SHINGO YASUDA, KENJI KAWASHIMA, Aoyama Gakuin Univ, MASAAKI YOSHIKAWA, IMRA Material Co. Ltd., JUN AKIMITSU, Aoyama Gakuin Univ
— The ground state of Sr_2IrO_4 with the K_2NiF_4 –type structure is the Mott insulator generated by the competition between the strong spin-orbit coupling (SOC, $\sim$0.5eV) and weak Coulomb interaction (U, $\sim$0.5eV). The crystal structure of Sr_2IrO_4 consists of stacked two dimensional (2D) IrO_2 layers with canted antiferromagnetic order (T_N = 250K) and SrO layer, similar to the high-T_c cuprate La_2CuO_4. We have investigated the substitution effect for Sr_2IrO_4 to confirm the influence of band filling control of Mott insulating state. We synthesized the hole doping sample of $Sr_{2-x}K_xIrO_4$ and electron doping sample of $Sr_{2-x}La_xIrO_4$. From the magnetic susceptibility data, the absolute magnetic moment of $Sr_{2-x}La_xIrO_4$ decreases with increasing La concentration x (However, T_N value is almost constant, being independent of x). The electrical resistivity data of $Sr_{2-x}M_xIrO_4$ (M = K, La) systematically decreases with increasing x. These facts indicate that we succeeded in effective carrier doping to IrO_2 layer and suggest that the ground state is gradually changed toward to metallic state.

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