(SP-03)

Structure and magnetic properties of $La_{1-x}Sr_xCoO_3$

K. K. Yu, J. Y. Kim, J. S. Park, Y. P. Lee, Y. S. Lee*, J. H. Kang**

q-Psiand Department of Physics, Hanyang University, Seoul, Korea,

*Division of information Communication and Computer Engineering, Hanbat National University, Daejeon, Korea,

**Process Development Team Memory Division, Samsung Electronics Co., Ltd. Yongin, Korea

Polycrystalline $La_{1-x}Sr_xCoO_3$ (x = 0.15, 0.25 and 0.30) samples were synthesized by standard solid-state reaction. The x-ray diffraction (XRD) measurements were performed at each step to monitor the progress of reaction. The ferromagnetic transition temperature (T_C) were obtained from the ac susceptibility measurement, and the temperature dependence of magnetization was measured by using a superconducting quantum interference device (SQUID) magnetometer. The neutron powder diffraction experiment were also carried out at the high-resolution neutron diffractometer ST2 of HANARO (Daejeon, Korea), covering an angular range of $5^\circ < 2\theta < 155^\circ$ with an incident neutron wavelength λ = 1.835 Å. The X-ray patterns after the sintering confirm that the samples are in single phase and have the expected lattice parameter (a = 5.45 Å and c = 13.18 Å for x = 0.25). From the temperature dependence of inverse magnetic susceptibility $1/\chi$, the Curie temperatures are found to be 147, 217 and 232 K for x =0.15, 0.25 and 0.3, respectively. As temperature decreases, evolution of the low-energy peaks is clearly observed in the neutron-diffraction partterns, which implies the existence of anti-ferromagnetic phase. By considering that the ferromagnetic transitions were clearly observed in the magnetic-susceptibility and the SQUID results for all the specimens, it is thought that the anti-ferromagnetic and the ferromagnetic states coexist at low temperatures.