ICAMD 2009
The 6th International Conference on Advanced Materials and Devices
December 9 ~ 11, 2009
Ramada Plaza Jeju Hotel, Jeju, Korea

Program and Abstracts

Organized by
Applied Physics Division, The Korean Physical Society
Quantum Metamaterials Research Center
Asia Pacific Center for Theoretical Physics
Center for Nanotubes and Nanostructured Composites
Quantum Photonic Science Research Center
National Core Research Center for Extreme Light Applications
Center for Subwavelength Optics
Center for THz-Bio Application Systems
Center for Cross-coupled Complex Materials Research
WCU-QPD, School of Physics, KonKuk University
New and Renewable Energy Research Center, Ewha Womans University
Center for Subwavelength Nanowire Photonic Devices

In cooperation with
The Japan Society of Applied Physics
The Physical Society of Republic of China

Sponsored by
Korean Ministry of Education, Science and Technology
National Research Foundation of Korea
BK21 Department of Physics, Ewha Womans University
Jeju Convention & Visitors Bureau

The Korean Physical Society
Crystallographic and Magnetic Properties of LiCoPO$_4$

Chan Hyuk Rhee, Sam Jin Kim, and Chul Sung Kim
Department of Physics, Kookmin University, Seoul 136-702, Korea

The LiCoPO$_4$ has been studied for magnetoelectric effect material [1] and cathode material for lithium battery. Recently, various magnetic phenomena were observed in LiCoPO$_4$ at low temperature [2, 3]. Polycrystalline LiCoPO$_4$ powder was synthesized by a solid-state reaction method. The temperature dependence of crystal structure was analyzed using by HRPD (high resolution powder neutron diffraction) at various temperatures, as shown in Fig. 1. The octahedron with cobalt and six oxygen ions was distorted to one axis direction at low temperature. Lattice constants $a_0$, $b_0$, and $c_0$ were determined to be 10.172 Å, 5.900 Å, and 4.683 Å at 4 K, respectively. The temperature dependence of magnetization was measured using by SQUID (superconducting quantum interference device) magnetometer at temperatures ranging from 5 to 300K. Although LiCoPO$_4$ shows antiferromagnetic behavior, rapid increasing of magnetization was observed below 9 K and large coercivity observed at 5 K, which was determined to be 335 Oe. Néel temperature ($T_N$) of LiCoPO$_4$ was determined to be 23 K.


Fig. 1. Neutron diffraction patterns for LiCoPO$_4$ from 4 to 297K.