PROGRAM BOOK

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G5-1540 First-principles Study of Electric Field Induced Giant Perpendicular Anisotropic Energy of Two-dimensional VS_2 Monolayer

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G5-1641 Comparison and Validation of Anisotropic Magnetization Models for Grain-oriented Silicon Steel

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G5-1649 Magnetism and Magnetocrystalline Anisotropy of C-substituted τ-MnAl

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G5-1722 Magnetic Anisotropy of Highly $Nd_{3-x}Bi_xFe_{5-y}Ga_yO_{12}$ Studied by FMR Measurements

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G5-1744 Magnetic and Dielectric Properties of $LiFePO_4$ by Mössbauer Spectroscopy

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G5-1757 Mössbauer Studies of $LiFe_{1/3}Mn_{1/3}Ni_{1/3}PO_4$ Cathode Material

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G5-1775 Effect of Decomposition Process on Crystallization of Garnet Films Fabricated by Metal Organic Decomposition Method

Yuya Hironaka, Hina Saito, Yoshito Ashizawa, Katsuji Nakagawa
Nihon University, Japan

G5-1840 First Principles Calculation on Magnetism and Magnetocrystalline Anisotropy of FeNi

Mun Bong Hong, Jin Sik Park, Sonny Rhim, Soon Cheol Hong
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G5-1989 Electronic Structures of Quasi Two-dimensional Cubic $CsSnBr_3$ Perovskite Nanoplatelets

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Magnetic and dielectric properties of $LiFePO_4$ by Mössbauer spectroscopy

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$LiFePO_4$ sample was prepared using the ball mill method. A mixture of Li_2CO_3, $FeC_2O_4{\cdot}2H_2O$, and $NH_4H_2PO_4$ was ground. The mixture was first calcined at 300 °C for 4 h under Ar atmosphere and was pressed into a pellet. Theses mixtures were sintered at 700 °C for 10 h under Ar atmosphere. The sample was measured by X-ray diffraction (XRD) and the $LiFePO_4$ sample confirmed that the structure of sample was orthorhombic with space group of *P*nma. From the Rietveld refinement method, the crystal unit cell parameters for $LiFePO_4$ are a_0 = 10.324, b_0 = 6.004, c_0 = 4.690 Å, and V = 290.781 Å^3. Zero field-cooled (ZFC) and field-cooled (FC) curves of $LiFePO_4$ was measured by using a vibrating sample magnetometer (VSM) within the temperatures ranging from 4.2 to 295 K at 1000 Oe. The Néel temperature (T_N) and the spin-reorientation temperature (T_S) were found to be T_N = 51.5 K, T_S= 25 K. We have investigated the magnetic hyperfine interaction by using Mössbauer spectrometer at various temperatures ranging from 4.2 to 295 K. At temperature below T_N, Mössbauer spectra of sample were analyzed asymmetric 8-absorption lines because of the magnetic dipole and electric quadruple interaction. At 4.2 K, the magnetic hyperfine field (H_{hf}), the electric quadruple splitting (ΔE_Q), and isomer shift (δ) for $LiFePO_4$ are found to be H_{hf} = 124.96 kOe, ΔE_Q =2.74 mm/s, δ =1.23 mm/s, polar angle ϑ = 0˚, azimuthal angle φ = 0˚, and asymmetric parameter η= 0.8, while at 295 K, ΔE_Q = 2.95 mm/s and δ = 1.10 mm/s, respectively. The Fe ions state of sample at all temperatures are ferrous (Fe^{2+}) ions. Also, $LiFePO_4$ sample was confirmed the permeability and permittivity by network analyzer (NA, Agilent E5071C).

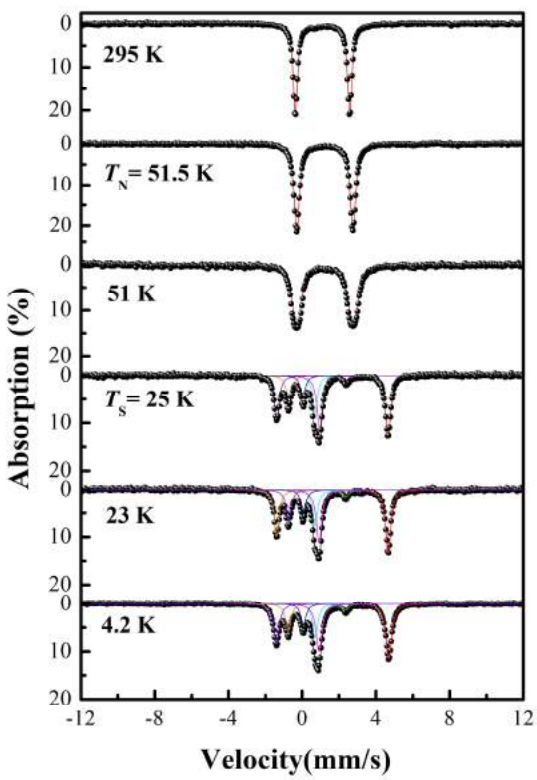

Fig. 1. Mössbauer spectra of the $LiFePO_4$ at various temperatures.