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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Mössbauer studies of $LiFe_{1/3}Mn_{1/3}Ni_{1/3}PO_4$ cathode material

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Li*M*PO_4 (*M*: transition metal) cathode materials of olivine structure have been studied to exhibit specific magnetic properties due to spin orbit at low temperature. We were synthesized Mn and Ni-doped $LiFePO_4$ sample with concentration of each 30 % molar ratio using a solid state reaction method. The sample have been characterized by means of Rietveld refinement of XRD patterns, VSM, and Mössbauer spectroscopy. The $LiFe_{1/3}Mn_{1/3}$ $Ni_{1/3}PO_4$ sample shows that the single phase having the orthorhombic (space group: *P*nma). The lattice parameters of sample were determined to be a_0 = 10.3293, b_0 =6.0060, and c_0 =4.6948 Å. Temperature-dependent magnetic susceptibility curve shows the antiferromagnetic (AFM) structure with the Néel temperature (T_N) of 40 K for $LiFe_{1/3}Mn_{1/3}$ $Ni_{1/3}PO_4$. The Mössbauer spectra of $LiFe_{1/3}Mn_{1/3}$ $Ni_{1/3}PO_4$ show a distorted lines broadening below T_N. The Mössbauer spectrum at 4.2 K were composed of eight lines with measured value of hyperfine field H_{hf}= 118.95 kOe, electric quadrupole splitting ΔE_Q= 2.79 mm/s, isomer shift δ= 1.21 mm/s, polar ϑ= 0°, azimuthal φ= 0°, and asymmetric parameter η= 0.8. Ratio of the magnetic dipole and electric quadrupole interaction was to be 3.4, the large value of *R* indicates that the quadrupole interaction is larger than the magnetic dipole interaction. Also, we observed that the value of hyperfine field rapidly decreased with increasing temperature near T_N. The quenched orbital angular moment due to strong crystalline field of the asymmetric MO_6 structure has weakened the spin-orbit coupling.

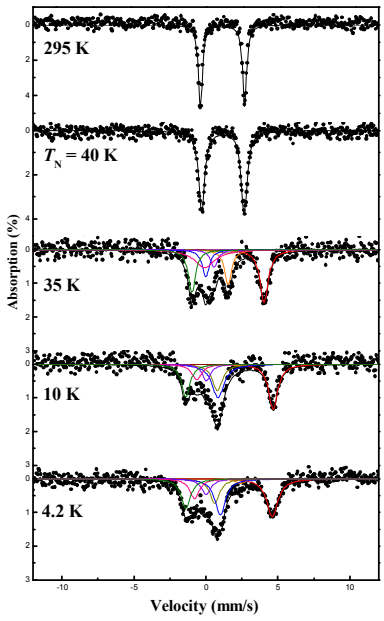

Fig. 1. Mössbauer spectra of $LiFe_{1/3}Mn_{1/3}$ $Ni_{1/3}PO_4$ at various temperatures.