

Order-disordered structure and magnetic properties of $\text{Li}_{0.5}\text{Fe}_{2.5-x}\text{Rh}_x\text{O}_4$

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$\text{Li}_{0.5}\text{Fe}_{2.5-x}\text{Rh}_x\text{O}_4$ ($x=0.25-1.50$) has been studied by Mössbauer spectroscopy, superconducting quantum interference device magnetometry, and x-ray diffraction. The crystals are found to be a cubic spinel structure and have been classified into two different sets by crystallographic symmetry, the space group $Fd\bar{3}m$ for $x=0.25-1.25$ and the space group $F\bar{4}3m$ for $x=1.50$, respectively. The migration of Li ion has been confirmed by x-ray patterns and the results of Mössbauer analysis. The saturated magnetic moment measured at 4.2 K and Mössbauer spectra taken at various temperatures with 6.0 T applied field show that the spin structure of $\text{Li}_{0.5}\text{Fe}_{2.5-x}\text{Rh}_x\text{O}_4$ has the collinear Néel model. © 2005 American Institute of Physics. [DOI: 10.1063/1.1849553]