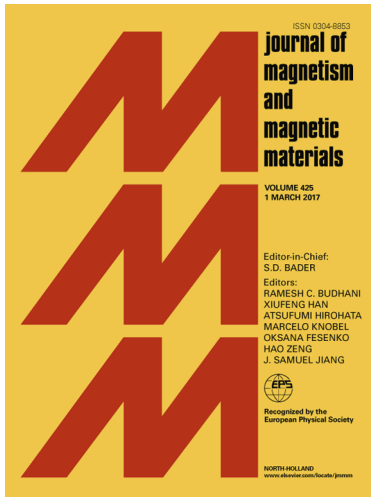

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Crystal growth, magnetic property and phase transition of the zigzag-chain antiferromagnet $FeNbO_4$

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Abstract

We report crystal growth, magnetic properties and electron spin resonance (ESR) study of the one dimensional zigzag-chain compound $FeNbO_4$. The single crystals were grown by the flux method using $Na_2WO_4{\cdot}12H_2O$ and $Na_2W_2O_7$ as the flux. Magnetic susceptibility and specific heat data show an antiferromagnetic ordering below 44 K. High-field magnetization data reveal a spin-flop transition at 12 T when magnetic field is applied along the magnetic easy axis. Multi-frequency ESR study on the single crystals reveal three resonance modes which can be understood by the molecule-field theory. Using a simple model with easy-axis type anisotropy, we estimate that the anisotropy field H_A and the exchange field H_E are 2.67 T and 27 T, respectively. The zero-frequency resonance field at 11 T corresponds to the spin-flop transition, demonstrating a close correlation between the high-field magnetization and the ESR spectra.

Keywords: crystal growth, magnetic phase transition, ESR spectra.

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