

Covalent Embedding of Ni²⁺/Fe³⁺ Cyanometallate Structures in Silica by Sol–Gel Processing

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Abstract

Compound [Ni(AEAPTS)₂]₃[Fe(CN)₆]₂ (AEAPTS=N-(2-aminoethyl)-3-aminopropyltrimethoxysilane), in which Ni²⁺ and Fe³⁺ ions are ferromagnetically coupled through cyano bridges, was prepared. Sol–gel processing of the AEAPTS derivative resulted in incorporation of the cyanometallate in silica. The obtained material is magnetically ordered below 22 K with an effective magnetic moment μ_{eff} of 4.46 μ_{B} at room temperature, a maximum of 8.60 μ_{B} at approximately 15 K and a narrow hysteresis at 2 K, with a saturation remanence of about 300 emu mol⁻¹ and a coercitivity of 0.03 T.