

## Effects of cation distribution and oxidation state on the electrical and magnetic properties of $\text{Ni}_{1-x}\text{Cu}_x\text{FeMnO}_4$

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### Abstract

$\text{Ni}_{1-x}\text{Cu}_x\text{FeMnO}_4$  ( $x = 0-1$ ) ferromanganites are prepared by solid-state reactions, and their structural, electrical, and magnetic properties were investigated. The results demonstrate that all of the synthesized materials are partially inverted spinels with cubic unit cells and are magnetic semiconductors. The temperature and frequency dependences of their transport properties are characteristic of hopping conduction. Mössbauer data and the results of electrical and magnetic measurements are used to assess the cation distribution in the ferromanganites studied, which are shown to contain  $\text{Mn}^{2+}$  in the A site and a mixture of  $\text{Mn}^{3+}$  and  $\text{Mn}^{4+}$  in the B site.

<http://dx.doi.org/10.1023/B:INMA.0000008920.98386.7a>

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