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Magnetic properties and electron-transport properties in $\text{Fe}_{0.92}\text{Cr}_2\text{S}_4$

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Abstract

Sample of $\text{Fe}_{0.92}\text{Cr}_2\text{S}_4$ has been studied with Mössbauer spectroscopy, X-ray photoelectron spectroscopy (XPS), SQUID magnetometer, and magnetoresistance (MR). The crystal structure was cubic spinel with its lattice constant $a_0 = 9.9925(2)$ Å. The maximum MR ratio was observed at 183 K about 12% under 1.6 T. The Mössbauer spectra were recorded from 18 K to room temperature. Below the Curie temperature the asymmetric line broadening is observed and considered to be dynamic Jahn–Teller distortion. Isomer shift value of the sample at room temperature was 0.53 mm/s, which means that charge state of Fe ions is ferrous in character. The conduction mechanism in this sample is different from the double exchange mechanism in a point that there were no mixed iron charge valences. © 2001 Elsevier Science B.V. All rights reserved.

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