

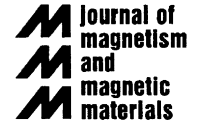


ELSEVIER

Available online at www.sciencedirect.com



Journal of Magnetism and Magnetic Materials 320 (2008) e575–e577



www.elsevier.com/locate/jmmm

Mössbauer study of antiferromagnetic CuFeO_2

Dong Hyeok Choi, In-Bo Shim, Chul Sung Kim*

Department of Physics, Kookmin University, Seoul 136-702, Republic of Korea

Available online 9 April 2008

Abstract

We have studied the magnetic spin structure of antiferromagnetic CuFeO_2 by X-ray diffraction (XRD) and Mössbauer spectroscopy. Its crystal structure determined by XRD analysis was a rhombohedral structure (space group R-3m) and lattice constants a_0 and c_0 were 3.0333 and 17.1595 Å, respectively. In spite of 4-Fe sublattices in a delafossite CuFeO_2 , its Mössbauer spectra were analyzed with 1-set (6-Lorentzian lines) below 10 K due to the collinear-commensurate spin structure, but the spectra were fitted with 4-sextet above 10 K due to the incommensurate spin structure. This phenomenon was attributed to the spin–lattice relaxation effect. Magnetic Néel temperature was also determined at 18 K, which corresponded to the high-spin Fe^{3+} valance state. On the other hand, $\text{CuFe}_{0.98}\text{Al}_{0.02}\text{O}_2$ powder with a noncollinear spin structure was fitted with 4-sextet at 4.2 K.

© 2008 Elsevier B.V. All rights reserved.

PACS: 75.30.Kz; 78.80.+y

Keywords: Delafossite CuFeO_2 ; Mössbauer spectroscopy
