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Anisotropic exchange interactions in CuTe₂O₅

Eremina R., Gavrilova T., Krug Von Nidda N., Pimenov A., Deisenhofer J., Loidl A.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

Electron paramagnetic resonance (EPR) was used to study CuTe₂O₅ single crystals at frequencies of 9.4 and 160 GHz. Analytic expressions for the second and fourth moments of the EPR line are deduced with inclusion of the difference between the exchange couplings of the copper spin with its different neighbors. From comparing the calculated and measured EPR linewidths, the positions of copper ions with the strongest exchange interactions are identified. The parameters of the anisotropic exchange interaction between copper ions in a pair are found. The parameter of the exchange interaction between magnetically nonequivalent copper centers is determined from the frequency dependence of the EPR linewidth. The directions of the principal axes of the g tensors are established. The data obtained count in favor of a quasi-one-dimensional model of magnetism in CuTe₂O₅. © 2008 Pleiades Publishing, Ltd.

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