

Low Temperature Physics 2015 vol.41 N1

Crystal field simulation and NMR study of ^{19}F in a EuF_3 Van Vleck paramagnet

Savinkov A., Dooglav A., Malkin B., Tagirov M., Korableva S.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© 2015 AIP Publishing LLC. The temperature dependence of the nuclear spin-lattice relaxation rate of ^{19}F nuclei is measured for a powder sample of a EuF_3 Van Vleck paramagnet, in a broad temperature range (55-300K). The increase in the nuclear relaxation rate observed at $T < 100\text{K}$ is caused by fluctuations in the magnetic fields, induced at the fluorine nuclei by the magnetic moments of the europium ions, the lifetime of which is determined by a two-phonon relaxation process with input from the first excited state of the electron shell of Eu^{3+} ions ($\Delta_1 \approx 370\text{K}$). The set of crystal field parameters allowing for a satisfactory description of the electron energy spectrum of the Eu^{3+} ions in the EuF_3 crystal, is calculated within the framework of the semi-phenomenological exchange charge model.

<http://dx.doi.org/10.1063/1.4906337>
