

Electron Paramagnetic Resonance and DTA Investigation of Cr^{3+} in Tris(guanidinium) Hexafluoroaluminate Single Crystals

T. Lakshmi Kasturi and V. G. Krishnan

Physics Department, Osmania University, Hyderabad 500 007, India

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Electron Paramagnetic Resonance (EPR) studies of Cr^{3+} in single crystals of tris(guanidinium) hexafluoroaluminate, $[\text{C}(\text{NH}_2)_3]_3\text{AlF}_6$, have been carried out in the X-band region. A temperature dependent study of the zero-field splitting parameter D in the range 77–398 K shows the presence of a phase transition, which is supported by Differential Thermal Analysis. In addition, ^{19}F superhyperfine structure has been observed in the 9.3% naturally abundant ^{53}Cr isotope hyperfine structure. D shows a large decrease with increasing temperature. The phase transition brings about a chemical inequivalence in the two chemically equivalent but magnetically inequivalent room temperature $(\text{CrF}_6)^{3-}$ species. Comparison is made with the alums $\text{AlCl}_3 \cdot 6\text{H}_2\text{O}$, as well as other guanidinium aluminum salts.

Reprint requests to Dr. V. G. Krishnan. E-mail: sathyan@hd1.vsnl.net.in