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Local environment of Gd³⁺ in MgF₂

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Abstract

The electron paramagnetic resonance (EPR) of Gd³⁺ in MgF₂ reveals that Gd³⁺ has two different environments in the lattice. One of them has D_{2h} symmetry, the EPR spectrum is characterized by a large zero field splitting [$B_2^0 = 968 \cdot 10^{-4} \text{ cm}^{-1}$; $B_2^2 = 357 \cdot 10^{-4} \text{ cm}^{-1}$] and the fourth order term of the spin Hamiltonian is axial; it is assumed that one Gd³⁺ substitutes two Mg²⁺. The other Gd³⁺ center has only monoclinic symmetry. From the analysis of the fourth order term of the spin Hamiltonian of the corresponding spectrum it is seen that one Gd³⁺ substitutes one Mg²⁺ and that this substitution produces a large local distortion of the lattice. © 1990 Springer-Verlag.

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