

Theoretical Studies of the EPR g Factors and Optical Spectra for Tetragonal Ce^{3+} Centers in CaF_2 and SrF_2 Crystals

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By using the irreducible tensor operator technique, the complete energy matrix including the admixture between $J = 7/2$ and $J = 5/2$ manifolds and the covalency reduction effect for $4f$ ion in tetragonal symmetry is established. Based on this, the electron paramagnetic resonance (EPR) g factors for the tetragonal Ce^{3+} centers in CaF_2 and SrF_2 crystals are reasonably explained and some levels of the $J = 5/2$ manifold for these centres are estimated. The results are discussed.

Key words: Crystal- and Ligand-field Theory; Electron Paramagnetic Resonance (EPR); Optical Spectra; Ce^{3+} ; CaF_2 ; SrF_2 .