Investigations of the EPR g Factors for Er^{3+} in $CaMoO_4$

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The electron paramagnetic resonance (EPR) g factors $g_\parallel$ and $g_\perp$ for Er^{3+} in $CaMoO_4$ are theoretically investigated by using the perturbation formulas of the g factors for a $4f^{11}$ ion in tetragonal symmetry. In these formulas, the contributions to the g factors arising from the second-order perturbation terms and the admixture of various states are considered. The crystal-field parameters for the tetragonally distorted tetrahedra are determined by using the superposition model and the structural data of the impurity Er^{3+} on the host Ca^{2+} site in $CaMoO_4$. The calculated g factors agree with the observed values. The validity of the results is discussed.