Theoretical Studies on the Gyromagnetic Factors for Nd^{3+} in Scheelites-Type ABO_4 Compounds

Shao-Yi Wu[a,b] and Hui-Ning Dong[b,c]

[a] Department of Applied Physics, University of Electronic Science and Technology of China, Chengdu 610054, P. R. China
[b] International Centre for Materials Physics, Chinese Academy of Sciences, Shenyang 110016, P. R. China
[c] College of Electronic Engineering, Chongqing University of Posts and Telecommunications, Chongqing 400065, P. R. China

Reprint requests to S.-Y. W.; E-mail: shaoyi_wu@163.com.

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The gyromagnetic factors for Nd^{3+} in scheelite-type ABO_4 compounds (A = Cd, Ca, Pb, Ba; B = Mo, W) are theoretically studied by the perturbation formulas of the anisotropic g factors $g_{\|}$ and $g_{\perp}$ for a $4f^3$ ion in tetragonal symmetry. In these formulas, the contributions to the g factors due to the second-order perturbation terms and the admixtures of various energy levels are taken into account. The relevant crystal-field parameters are determined by the superposition model and the local geometrical relationship of the A^{2+} sites occupied by the impurity Nd^{3+}. The obtained g factors agree reasonably with the observed values. The discrepancies between theory and experiment are discussed.

Key words: EPR; Crystal-fields and Spin Hamiltonian; Nd^{3+}; Scheelite-type ABO_4 Compounds (A= Cd, Ca, Pb, Ba; B=Mo, W).