Studies of Zero-field Splitting and its Pressure and Stress Dependence for Ni$^{2+}$ in La$_2$Mg$_3$(NO$_3$)$_{12}$·24H$_2$O Crystal

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By using the high-order perturbation formulas, the $g$ factors $g_\parallel$ and $g_\perp$, the zero-field splittings $D$ and the pressure and uniaxial stress dependences of zero-field splitting are studied for Ni$^{2+}$ ions in both Mg$^{2+}$ sites of La$_2$Mg$_3$(NO$_3$)$_{12}$·24H$_2$O crystal. It is found that the local trigonal distortion angles $\beta_i$ of the two Ni$^{2+}$ centers are only slightly different from the corresponding host ones, but the local angular compressibilities under pressure and stress for both Ni$^{2+}$ centers are quite different not only from the corresponding host ones, but also from each other.

Key words: La$_2$Mg$_3$(NO$_3$)$_{12}$·24H$_2$O; Ni$^{2+}$; EPR; Local Distortion; Local Compressibility; Crystal Field Theory.