

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

Wen-Chen Zheng<sup>a,b,c</sup>, Shao-Yi Wu<sup>a,b,c</sup>, and Hui-Ning Dong<sup>a</sup>

<sup>a</sup> Department of Material Science, Sichuan University, Chengdu 610064, P. R. China

<sup>b</sup> International Centre for Materials Physics, Chinese Academy of Sciences, Shenyang 110016, P. R. China

<sup>c</sup> Key Laboratory for Radiation Physics and Technology of the Ministry of Education, P. R. China (in Sichuan University)

Reprint requests to W.-C. Z; E-mail: zhengwenchen@netease.com

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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  $\text{Ni}^{2+}$  ions in both  $\text{Mg}^{2+}$  sites of  $\text{La}_2\text{Mg}_3(\text{NO}_3)_{12} \cdot 24 \text{H}_2\text{O}$  crystal. It is found that the local trigonal distortion angles  $\beta_i$  of the two  $\text{Ni}^{2+}$  centers are only slightly different from the corresponding host ones, but the local angular compressibilities under pressure and stress for both  $\text{Ni}^{2+}$  centers are quite different not only from the corresponding host ones, but also from each other.

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