

Superposition Model for the Zero-field Splitting b_2^0 of Gd^{3+} Ions in $\alpha\text{-LiIO}_3$ and LiNbO_3 Crystals

Wen-Chen Zheng^{a,b} and Shao-Yi Wu^{a,b}

Department of Material Science, Sichuan University, Chengdu 610064, P. R. China
International Centre for Materials Physics, Chinese Academy of Sciences, Shenyang 110016,
P. R. China

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

Z. Naturforsch. **57a**, 749–752 (2002); received February 6, 2002

The zero-field splitting of Gd^{3+} ions in $\alpha\text{-LiIO}_3$ and LiNbO_3 crystals are studied by the superposition model. The zero-field splittings b_2^0 for the trigonal Gd^{3+} centers in both crystals are reasonably explained and the defect structures of these Gd^{3+} centers are obtained. These defect structures are consistent with the expectation based on the electrostatic interaction models and agree qualitatively with the corresponding results obtained for similar trivalent paramagnetic (rare-earth and transition-metal) ions in $\alpha\text{-LiIO}_3$ and LiNbO_3 crystals.

Keywords: Electron Paramagnetic Resonance (EPR); Defect Structure; Superposition Model; Gd^{3+} ; $\alpha\text{-LiIO}_3$; LiNbO_3 .