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K2 Y F5 crystal symmetry determined by using rare-earth ions as paramagnetic probes

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Abstract

The electron paramagnetic resonance angular dependences for Gd³⁺ and Ce³⁺ centers in K₂YF₅ crystals show that the Y³⁺ site has monoclinic Ch symmetry in these crystals. This site symmetry is compatible with the crystal structure having the P₂ space group. From the zero-field splitting parameters of the Gd³⁺ center, it is deduced that the symmetry of the Y³⁺ sites is close to trigonal around the b axis, distorted by the overall orthorhombic symmetry of the crystal structure. This information is required for the identification of radiation-induced centers in this material, which shows favorable properties for applications as thermoluminescent dosimeter. © 2007 The American Physical Society.

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