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Superhyperfine structure of the EPR spectra of Nd³⁺ and U³⁺ ions in LiRF₄ (R = Y, Lu, Tm) double fluorides

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Abstract

The superhyperfine structure of the EPR spectra of impurity Nd³⁺ and U³⁺ ions in LiYF₄, LiLuF₄, and LiTmF₄ double-fluoride single crystals has been observed and discussed. In LiYF₄: Nd ($g_{\parallel} = 1.987$, $g_{\perp} = 2.554$) and LiTmF₄: Nd, the superhyperfine structure is observed at the orientation of the external magnetic field B in parallel to the c axis of the crystals and consists of nine components with a splitting of ~ 15.4 MHz. In LiYF₄: U ($g_{\parallel} = 1.149$, $g_{\perp} = 2.508$) and LiLuF₄: U, the superhyperfine structure is observed at both $B \parallel c$ and $B \perp c$ and consists of nine and eleven components, respectively, with a splitting of ~ 21.5 MHz. It should be noted that the resolution of the superhyperfine structure of the EPR spectrum of LiLuF₄: U³⁺ becomes significantly higher with a deviation from the orientation $B \perp c$. © 2011 Pleiades Publishing, Ltd.

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