

## **NMR, high frequency EPR and magnetization studies of YF<sub>3</sub>:Tm<sup>3+</sup> and TmF<sub>3</sub>**

Savinkov A., Shakurov G., Korableva S., Dooglav A., Tagirov M., Suzuki H., Matsumoto K., Abe S.  
*Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia*

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### **Abstract**

Magnetic properties of single crystal and powder samples of thulium fluoride, TmF<sub>3</sub> (orthorhombic Pnma space group), and single crystals of YF<sub>3</sub> doped with the Tm<sup>3+</sup> ions are studied by NMR, high-frequency EPR and dc-magnetometry. It is shown that TmF<sub>3</sub> is a Van Vleck paramagnet. Zero field splitting between two lowest ground state energy levels (ground <sup>3</sup>H<sub>6</sub> multiplet) of Tm<sup>3+</sup> ion in TmF<sub>3</sub> crystal lattice is found to be ~6.5 cm<sup>-1</sup>. The <sup>19</sup>F nuclear spin-lattice relaxation in TmF<sub>3</sub> at liquid helium temperatures is driven by the fluctuating magnetic fields created by Tm<sup>3+</sup> ions occupying the lowest excited singlet.

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