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## Luminescence of Tl<sup>+</sup> ions in a KZnF<sub>3</sub> crystal

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### Abstract

The luminescence spectra of a KZnF<sub>3</sub>: Tl<sup>+</sup> crystal are investigated in the energy range from 4.75 to 5.9 eV at temperatures of 10-300 K upon excitation into the A absorption band (5.7-6.3 eV). At T = 300 K, the luminescence spectra exhibit an intense band with a maximum at 5.45 eV, which is attributed to single Tl<sup>+</sup> ions substituted for K<sup>+</sup> ions. The 5.723-eV intense narrow band observed at T < 20 K is assigned to the 3Γ<sub>1u</sub>-1Γ<sub>1g</sub> zero-phonon transition, which is weakly allowed by the hyperfine interaction. The luminescence decay is studied as a function of temperature. The main characteristics of the luminescence spectra are adequately described in terms of the semiclassical theory based on the Franck-Condon principle and the Jahn-Teller effect for an excited sp configuration of the Tl<sup>+</sup> ion with the use of the parameters obtained earlier from analyzing the absorption spectra of the system under investigation. © 2002 MAIK "Nauka/Interperiodica".

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