THERMOLUMINESCENCE STUDIES OF UNDOPED LiF CRYSTALS. 1. THE METHOD OF ANALYSIS OF COMPLICATED THERMOLUMINESCENCE PEAKS

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S u m m a r y

Undoped LiF crystals have been investigated by the methods of thermoluminescence (TL) in the temperature range of 80–200 K. A method of analysis of complicated TL peaks, which allows one to establish the cause of a peak broadening, i.e. to find whether the peak is an elementary one glowing in accordance with the second-order kinetics or a compound one formed by several closely situated elementary peaks, has been proposed. The method consists in studying the regularities of the peak maximum position and the peak half-width both considered as functions of the lightsum, which is modified in two manners, namely, by varying the excitation time and by heating the specimen excited at 80 K, to different intermediate temperatures, followed by its rapid cooling back to the initial excitation temperature and the registration of the residual TL peak. For a simple peak, both the ways must give identical results independently of the kinetics order. In the case of a compound peak, the corresponding dependences must be different. To illustrate the method, a broad TL peak at 141 K has been shown to be compound. Its low-temperature component is a superposition of two or more peaks, and the high-temperature one is an elementary peak that glows in accordance with a linear kinetics. The energies of thermal trap activation, which are responsible for the peak at 141 K, have been determined as well. The relevant traps can be characterized by three activation energy values: 0.48, 0.40 (the low-temperature components), and 0.32 eV (the high-temperature one).