

Radioluminescence as a Function of Temperature and Low Temperature Thermoluminescence of BaY₂F₈:Ce and BaY₂F₈:Nd Crystals

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The crystals of BaY₂F₈:Ce and BaY₂F₈:Nd were already examined for their scintillating properties with research dating in the 20th century [1,2]. The interconfigurational *d-f* emissions of Ce³⁺ and Nd³⁺ ions had been supposed to produce fast and efficient scintillation, strengthening the potential of the BaY₂F₈ host already displaying the extremely fast still not efficient core-to-valence luminescence. Such expectations were not met, as the scintillation yield of BaY₂F₈:Ce and BaY₂F₈:Nd turned out to be very low. This result was related to the tenuous host-to-ion energy transfer, probably limited to the radiative mode from self-trapped excitons (STE), as well as to the STE emission quenching increasing with temperature [3]. Regardless of their rather weak scintillation properties, BaY₂F₈:Ce and BaY₂F₈:Nd provide very interesting subject for studies of energy transfer processes. In this work, we present the results of our research on radioluminescence as a function of temperature and low temperature thermoluminescence of the above mentioned crystals. Comparison to the data available in relevant literature will also be made in order to build a complete picture of the energy transfer from the Ce³⁺ and Nd³⁺ ions to the BaY₂F₈ host.

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[2] R. Visser, P. Dorenbos, C.W.E. van Eijk, A. Meijerink, H.W. den Hartog, *Journal of Physics: Condensed Matter* **5** (1993), 8437-8460

[3] A. Vedda, M. Martini, D. Di Martino, E. Sani, A. Toncelli, M. Tonelli, *Radiation Effects & Defects in Solids* **157** (2002), 973-976

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