

Basic study of lithium strontium borates as thermal neutron scintillators

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A special group of luminescence materials are scintillators for thermal neutron detection. Due to different mechanisms of neutron interaction with matter (contrary to e.g. electrons or gamma photons), a different approach has to be utilized – the high content of atoms with the sufficient absorption cross-section toward neutrons and lower material density are needed. This contribution pursues a basic study of LiSrBO_3 and $\text{LiSr}_4(\text{BO}_3)_3$ doped with cerium or europium – materials promising as thermal neutron scintillators. These borates exhibit promising properties such as the high content of lithium and boron, suitable density, and proper environment for luminescent ions. Radioluminescence of these ceramic borates doped with cerium and europium was examined and promising samples were further characterized by photoluminescence spectroscopy and radioluminescence and photoluminescence kinetics measurement. The most promising material – $\text{LiSr}_4(\text{BO}_3)_3:\text{Ce}$ was further characterized in a form of translucent ceramics prepared by a SPS sintering.

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