

THERMOLUMINESCENT PROPERTIES OF MANGANESE-DOPED YAP CERAMICS

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The manganese-doped yttrium aluminum perovskite (YAP) single crystals are perspective material for thermoluminescent (TL) dosimetry of ionizing radiation [1]. In spite of the high effective atomic number ($Z_{\text{eff}}=31.4$), this material is a good candidate for middle- and high-dose dosimetry of ionizing radiation, especially when tissue equivalence is not needed.

From the technological point of view, polycrystalline and ceramic materials offer significant advantage over the single crystals due to the ease and the cost of fabrication.

The present work reports synthesis of ceramic and polycrystalline YAP:Mn samples by the solid-state reaction and the arc melting methods as well as results of characterization of the obtained materials by means of X-ray powder diffraction, photo- and thermoluminescence measurements. The thermoluminescent properties of the obtained materials are compared with ones of single crystalline YAP:Mn grown by the Czochralski method [1, 2]. Impact of the technological conditions such as temperature and sintering atmosphere on the TL properties of studied materials are analyzed.

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References

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