



On thermoluminescence of $\text{Lu}_2\text{O}_3\text{:Tb,Ta}$ ceramic storage phosphors.

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For the first time thermoluminescence of $\text{Lu}_2\text{O}_3\text{:Tb,Ta}$ ceramics sintered at 1700 °C in different atmospheres—air, forming gas and vacuum—were investigated. Exposure of the materials into the 254 nm radiation of a mercury lamp led to the Tb³⁺-green persistent luminescence of noticeable intensity. Thermoluminescence glowcurves revealed two strong thermoluminescence peaks located around 170 °C and 250 °C, with the former being by a factor of ~2–2.5 more intense compared to the latter. T_{max}-T_{stop} thermoluminescence experiments revealed that each of these bands is composed of numerous individual, strongly overlapping components of similar characteristics, known as continuous traps distribution. The highest thermoluminescence was observed from the material sintered in vacuum. Those sintered in air or forming gas showed the storage capabilities by about 15–25% lower, though shapes of their glow curves were very similar. A scheme of carriers trapping was proposed with the hole immobilized at Tb³⁺ site and the electron being trapped in the vicinity Ta(V) impurity due to its strong positive net charge in the Lu site.

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