

Traps formation and characterization in long-term energy storing $\text{Lu}_2\text{O}_3\text{:Pr,Hf}$ luminescent ceramics.

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Sintered ceramics of $\text{Lu}_2\text{O}_3\text{:Pr,Hf}$ storage phosphor were prepared and their spectroscopic properties were evaluated. It was shown that during irradiation with X-rays as well as with short UV radiation, the material was able to accumulate energy, which could thereafter be recovered by thermal stimulation in the range of approximately 20–450 °C. The glow curve consisted of three bands peaking around 130, 250, and 340 °C, and each of them contained two overlapping components related to traps, with activation energies in the range of 0.8–2.1 eV. Frequency factors of the traps exceeded the Debye frequency by 3–4 orders of magnitude indicating a complex mechanism of the process. The thermoluminescence was found to follow the first-order kinetics mechanism. A 30% fading was recorded after nine months. The stored energy could also be totally recovered with optical stimulation around 400 nm. Both dopants, Hf(IV) and Pr^{3+} , were found to be active in permanent energy trapping, forming electron (Hf) and hole (Pr) traps.

Adres publiczny

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<https://www.acs.org/content/acs/en.html>