

## Spectroscopic studies of nanopowder and nanoceramics $\text{La}_2\text{Hf}_2\text{O}_7\text{:Pr}$ scintillator.

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### Streszczenie

Sintered nanoceramics of Pr-doped lanthanum hafnate,  $\text{La}_2\text{Hf}_2\text{O}_7\text{:Pr}$ , were prepared by means of a high-pressure sintering technique using nanopowders made by Pechini method. Structure, morphology, and spectroscopic properties of the ceramics compared to the starting powder are presented and discussed. Emission and excitation spectra recorded at room temperature as well as at 7 K using synchrotron radiation are presented together with results of luminescence kinetics measurements. In ceramics, at 7 K, the  $\text{Pr}^{3+}$  luminescence from  $3\text{P}_0$  (blue-green, green, and red region) and  $1\text{D}_2$  (red) levels is accompanied by a broad-band emission located in the 380–530 nm range of wavelengths, whereas powders gives only the  $\text{Pr}^{3+}$ -related luminescence. Depending on the excitation wavelength, the broad-band emission maximum moves between 430 and 470 nm indicating superposition of at least two components. In sintered nanoceramics, the lifetimes of  $\text{Pr}^{3+}$  emissions from  $3\text{P}_0$  and  $1\text{D}_2$  levels were by 10%–20% shorter compared to the powder. The existence of different luminescence centers was proved by the selective emission decays examination. The fast  $5\text{d} \rightarrow 4\text{f}$  luminescence of  $\text{Pr}^{3+}$  was not observed from either of the two types of  $\text{La}_2\text{Hf}_2\text{O}_7\text{:Pr}$  materials.

### Adres publiczny

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### Strona internetowa wydawcy

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