

White persistent luminescence of $\text{La}_2\text{Hf}_2\text{O}_7:\text{Ti},\text{Pr}$

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Streszczenie

White-light persistent luminescence is of practical interest but is not easy to generate, especially over a longer time. In this paper we present the possibility to generate a white-light persistent emission over a few hours by the doubly-doped $\text{La}_2\text{Hf}_2\text{O}_7:\text{Ti},\text{Pr}$ phosphor. Its relevant thermoluminescent properties are presented together with adequate photoluminescence characteristics. The singly-activated versions (with Ti or Pr) of the $\text{La}_2\text{Hf}_2\text{O}_7$ host were also fabricated and characterized for comparison and better understanding the properties of $\text{La}_2\text{Hf}_2\text{O}_7:\text{Ti},\text{Pr}$.

Thermoluminescence of all those phosphors showed strong activator-concentration dependence. When the activator contents exceeded 0.1mol% the thermoluminescence intensity lessened quickly and the persistent luminescence intensity and duration got reduced adequately. In $\text{La}_2\text{Hf}_2\text{O}_7:0.1\%\text{Ti},0.1\%\text{Pr}$ both activators contributed to strong thermoluminescence peaking at around 115 °C and resulting from traps showing some distribution of depths. After charging, these traps served as reservoir of energy for white persistent luminescence generated by both Ti and Pr activators and lasting a few hours.

Słowa kluczowe

White persistent luminescence, Thermoluminescence, Lanthanum hafnate, Ti-luminescence, Pr-luminescence

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