

A new photoluminescent feature in $\text{LuPO}_4\text{:Eu}$ thermoluminescent sintered materials.

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Streszczenie

Nanocrystalline powders of $\text{LuPO}_4\text{:Eu}$ were prepared at 230 °C by a hydrothermal method. Their post-treatment at 900, 1200 and 1350 °C induced a moderate grain growth from ~20–50 nm up to 80–300 nm. These powders were sintered at 1700 °C and such $\text{LuPO}_4\text{:Eu}$ materials, despite the regular Eu^{3+} emission, produced a broad-band luminescence peaking at around 425 nm at room temperature. The sintered $\text{LuPO}_4\text{:Eu}$ materials also generated an intense thermoluminescence with the maximum around 200 °C. The photoluminescence characteristics of the broad luminescence was performed in the 20–550 K range of temperature. While the intensity of this emission did not change within 20–550 K its decay time dropped from ~823 μs (20 K) to ~7 μs only (550 K) with the most potent decrease between 150 and 300 K. At the same time the emission peak position moved from ~438 nm (20 K) to ~412 nm (550 K). These data were explained as a result of a two-level emitting center with the higher state being thermally populated at the expense of the lower level.

Adres publiczny

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Strona internetowa wydawcy

<https://www.rsc.org/>