

Spectroscopic properties of persistent luminescence phosphors: $\text{Lu}_2\text{O}_3:\text{Tb}^{3+}$, M^{2+} ($\text{M} = \text{Ca}, \text{Sr}, \text{Ba}$).

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A new family of persistent luminescence phosphors, $\text{Lu}_2\text{O}_3:\text{Tb}^{3+},\text{M}^{2+}$ ($\text{M} = \text{Ca}, \text{Sr}, \text{Ba}$), was found and the materials' most important spectroscopic properties related to the persistent luminescence phenomenon were reported and discussed. The persistent luminescence seen by the naked eye in the dark lasted for at least 10 h. The green persistent luminescence is exclusively due to emission from the Tb^{3+} ion. The thermoluminescence glow curves change with the codopant. For Ca^{2+} codoping, the main TL band is located around 100 °C. When Sr^{2+} is added, a similar TL band is accompanied with another structure around 240 °C, and for Ba^{2+} codoped material, the latter band becomes the most prominent feature in the TL glow curve. Analysis of the various findings leads to the conclusion that the persistent luminescence is governed by a temperature-assisted tunneling mechanism and the point defects get spatially linked during the materials processing into $[\text{Tb}_{\text{Lu}}^{\times}-\text{V}_{\text{O}}^{\bullet\bullet}-2\text{M}_{\text{Lu}}^{\text{I}}]$ cluster entities.

Słowa kluczowe

Ceramics, Luminescence, Defects, Materials, Ions

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