



Preparation, X-ray analysis and spectroscopic investigation of nanostructured $\text{Lu}_2\text{O}_3:\text{Tb}$.

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Streszczenie

Formation of Lu_2O_3 through combustion of $\text{Lu}(\text{NO}_3)_3$ and $\text{CO}(\text{NH}_2)_2$ (urea) at various temperatures was investigated. From XRD patterns analysis, the optimal reaction temperature was found to be $\sim 600\text{--}700^\circ\text{C}$. For that range products with crystallites of $\sim 7\text{--}13$ nm were obtained, as found from TEM pictures. With the same technique Tb-doped Lu_2O_3 was successfully fabricated and its basic spectroscopic properties were characterized. Emission of the phosphors was found to be typical for Tb^{3+} , with main components at 490 and 550 nm, resulting from radiative relaxation of $^5\text{D}_4$ level. Undoped material produced broad-band luminescence peaking in blue. Raw Tb-doped samples were brownish, which was attributed to incorporation of some of the activator as Tb^{4+} . Such assignment was derived from reflection, excitation and EPR spectra. The colour could be completely removed through post-fabrication vacuum heat-treatment at 1100°C .

Słowa kluczowe

Lutetium oxide, Tb luminescence, Tb^{3+} , Tb^{4+} , Combustion synthesis

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