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Green-emitting nanoscaled borate phosphors $Sr_3RE_2(BO_3)_4:Tb^{3+}$

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Streszczenie

Three Tb^{3+} doped mixed strontium – rare earths borate phosphors of general formula $Sr_3RE_2(BO_3)_4:Tb^{3+}$ (RE = Y, La or Gd) of 25–40 nm particle size were obtained by the Pechini sol–gel method, using citric acid and ethylene glycol as gel-forming agents. The structures of prepared materials were confirmed and characterized using X-ray powder diffraction and transmission electron microscopy. Photoluminescence properties, such as emission and excitation spectra and luminescence lifetimes of the phosphors, were measured. Excitation of the phosphors using different wavelengths in the UV range is possible. Lifetimes measured for the phosphors ranged from 2.2 to 2.7 ms. All of the Tb^{3+}-doped phosphors show excellent luminescent properties, with a bright emission of green light under UV excitation. The color coordinates of emitted light on CIE1931 chromaticity diagram are close to those of National Television Standards Committee (NTSC) standard of green.

Słowa kluczowe

nanostructures, inorganic compounds, sol–gel growth, photoluminescence spectroscopy, luminescence

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