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Upconversion/Downconversion luminescence and preparation of NIR-to-UV-excited Gd₂O₂S:Er phosphor

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Abstract

Efficient conversion of ultraviolet (UV) and near-infrared (NIR) radiations to visible emissions were carried out through Gd₂O₂S:Er phosphor synthesized by solid-state reaction method in vacuum. The spectra study of Gd₂O₂S:Er phosphor was performed as a function of firing temperature under the excitation wavelengths of 379 and 980 nm, respectively. The emission bands in visible light region corresponding to the transitions between ²H_{9/2} → ⁴I_{15/2} (412 nm), ⁴F_{7/2} → ⁴I_{15/2} (488 nm), ²H_{11/2} → ⁴I_{15/2} (531 nm), ⁴S_{3/2} → ⁴I_{15/2} (554 nm) and ⁴F_{9/2} → ⁴I_{15/2} (670 nm) were demonstrated. Color emission can be tuned from red to green due to Er³⁺ ions doping by varying the firing

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