



Optica Applicata 2007(Vol.37), No.4, pp. 433-438

Optical emission from Eu, Tb, Nd luminescence centers in TiO₂ prepared by magnetron sputtering

Danuta Kaczmarek, Jaroslaw Domaradzki, Agnieszka Borkowska, Artur Podhorodecki, Jan Misiewicz, Karolina Sieradzka

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Keywords

luminescence, rare earth elements, TiO₂, magnetron sputtering

Abstract

This work presents the results of optical emission from Eu³⁺, Tb³⁺ and Nd³⁺ luminescence centers in TiO₂ thin films. Thin films were prepared by magnetron sputtering from metallic Ti-Eu, Ti-Tb, Ti-Nd targets, respectively. Optical properties were examined by means of photoluminescence and optical transmission measurements. The total content of dopants was analyzed using an energy disperse spectrometer. It has been shown that doping of TiO₂ thin films using selected lanthanides results in the visible (Eu, Tb) and near-infrared (Nd) light emission, upon ultraviolet radiation. Additionally, transparency range and optical band gap of prepared thin films were determined, in comparison to pure TiO₂.



526.9 kB

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