



Optica Applicata 2007(Vol.37), No.1-2, pp. 117-122

## Influence of Eu dopant on optical properties of TiO<sub>2</sub> thin films fabricated by low pressure hot target reactive sputtering

Agnieszka BORKOWSKA, Jaroslaw DOMARADZKI, Danuta KACZMAREK

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### Keywords

titanium oxide, europium, thin film, magnetron sputtering, optical properties

### Abstract

This work presents the influence of europium dopant on optical properties of TiO<sub>2</sub>:Eu<sup>3+</sup> thin films fabricated by low pressure hot target reactive sputtering. Thin films were deposited from metallic Ti-Eu mosaic target on different substrates (*i.e.*, monocrystalline silicon and SiO<sub>2</sub>). Selected samples were additionally annealed for 4 hours in an air ambient at 200 °C after deposition. Thin films were examined by means of scanning electron microscopy with energy disperse spectrometer (SEM-EDS), X-ray diffraction (XRD), optical transmission method and photoluminescence (PL). From SEM-EDS measurements total Eu concentration in fabricated thin films was determined. XRD analysis revealed the existence of crystalline TiO<sub>2</sub> in the form of anatase and rutile in examined samples with smaller and larger amount of Eu dopant, respectively. Optical transmission method showed that doping with selected amount of Eu results in different shift of the fundamental absorption edge for prepared thin films. PL studies showed a red luminescence of TiO<sub>2</sub>:Eu<sup>3+</sup> thin films. The intensity of luminescence increased with the annealing temperature and decreased with larger amount of europium.



341.0 kB

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