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PROCEEDINGS PAPER

Optical properties of TiO₂ thin film grown on quartz substrate by sol-gel method

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Paper Abstract

TiO₂ film was deposited on quartz substrate by sol-gel method. X-ray diffraction analysis and Raman scattering measurement indicate that the TiO₂ film is the pure rutile phase structure. From photoluminescence spectra, it is found that the TiO₂ film shows a near-infrared luminescence band centered at about 832 nm, and two visible luminescence bands centered at about 426 nm and 524 nm, respectively. The refractive index *n*, extinct coefficient *k*, optical band gap EOBG and thickness *d* of TiO₂ film were extracted by fitting transmission spectra with the **Adachi's** dielectric function model and a three-phase layered model. It is found that *n* value increases and then decreases with increasing wavelength, while *k* decreases continuously. The thickness of TiO₂ film is about 297 nm. EOBG value is about 3.72eV and larger than that attained by Tauc's law, which is about 3.28eV.

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