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Properties study of TiO₂ nanoparticle immobilized in a porous silicon template

We report on the fabrication and characterization of TiO₂ nanoparticles immobilized in porous silicon (p-Si) structures; p-si was obtained by chemical anodization using crystalline silicon (c-Si) substrates with varying resistivity. This study used two types of TiO₂ nanoparticle nanoparticles to compare their properties: one synthesized by hydrothermal process and the other commercial. Structural characterization was conducted using X-ray diffraction (XRD), and the results were corroborated by Raman spectroscopy. Morphological characterization was performed using scanning electron microscopy (SEM) to determine the porous distribution as well as the shape and size of the TiO₂ nanoparticles. The optical properties of the porous silicon were analyzed using luminescence techniques. Time-resolved photoluminescence (TRPL) was employed to determine the average lifetime of the carriers involved in the recombination processes.

Keywords

Nanoparticles, Titanium dioxide, nanostructure, porous silicon

Reference

Tank, C. M., Sakhare, Y. S., Kanhe, N. S., Nawale, A. B., Das, A. K., (2011). Electric field enhanced photocatalytic properties of TiO₂ nanoparticles
Gupta, T., Cho, J., (2021). Hydrothermal synthesis of TiO₂ nanorods: formation chemistry, growth mechanism, and tailoring

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