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Characterization of Anatase and Rutile Phase of TiO₂ Nanostructures with Different Thermal Annealing

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Abstract

TiO₂ nanostructures were prepared by anodization of Ti foils. The TiO₂ nanostructure films were annealed at the temperature range of 500°C to 900°C for 2 h. The morphology, elemental composition, and crystallization of TiO₂ nanostructures were analyzed by field emission scanning electron microscopy (FE-SEM), X-ray diffraction (XRD), Raman spectra, and X-ray spectroscopy (XPS), respectively. XRD and Raman spectra results confirm the presence of the anatase phase for TiO₂ nanostructure films which were annealed at 500°C to 700°C. Furthermore, it found that anatase to rutile phase transition occurred at temperature above 700°C.

Keywords

Titanium dioxide; Nanotubes; Thermal annealing; Anodization