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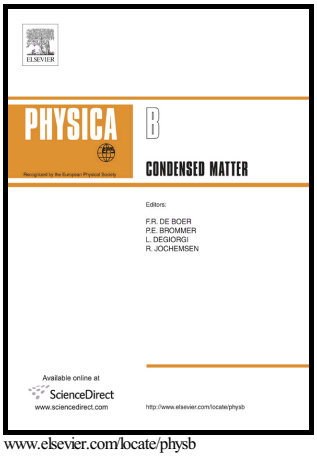

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XANES studies of titanium dioxide nanoparticles synthesized by using *Peltophorum pterocarpum* plant extract

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Abstract

The preparation and characterization of a Titanium dioxide (TiO_2) by a simple, cost effective, facile and eco-friendly green synthesis method using *Peltophorum pterocarpum* plant extract is presented. The green synthesized nanoparticles were characterized using X-ray diffraction (XRD), Raman spectroscopy, High-resolution transmission electron microscopy (HR-TEM) and X-ray absorption near edge spectroscopy (XANES). XRD results show that the prepared TiO_2 NPs were significantly crystalline with various percentages of anatase and rutile phases. The nanoparticles were found to have different diameters ranging from 20 to 80 nm. No evidence of any intermediate or different TiO_2 phases were found in XANES measurements performed at the Ti K- and L-edge. It is shown that the TiO_2 NPs with high uniformity, high surface area and minimum aggregation can be prepared with relative ease and the desired anatase:rutile phase ratio can be obtained by controlling the experimental conditions.

Keywords: Nanostructures; Semiconductors; TEM; powder diffraction; phase transitions; XANES.

1. Introduction