

4th International Conference and Exhibition on **Materials Science & Engineering** September 14-16, 2015 Orlando, USA

The effect of preparation method on the properties of titanium dioxide nanoparticles used as a dielectric material

Davoud Dastan and **N B Chaure**
Savitribai Phule Pune University, India

The properties of materials strongly depend on the preparation technique. Titania nanoparticles (NP's) have been prepared using various surfactants such as Acetic Acid (AA), Oleic Acid (OA), Oley amine (OM), and a mixture of (OA+OM) by two different techniques, sol-gel and solvothermal methods. The solution was under vigorous stirring, and then the resultant suspension was transformed into a teflon-line autoclave and reacted at 180°C for 24 hours in solvothermal method to obtain the mono-dispersed titania NP's which was dried at room temperature. TiO₂ powder was collected after several times centrifugation with ethanol. Titania NP's were annealed at 550 and 950°C for 18 and 24 hours respectively. The structural, optical, and morphological features of TiO₂ NP's were evaluated by means of X-ray diffraction (XRD), Raman spectroscopy, ultraviolet visible (UV-vis.) Photoluminescence spectroscopy, Field Emission Scanning Electron Microscopy (FESEM), and Transmission Electron Microscopy (TEM). Titania NP's prepared using both methods showed anatase and rutile phases for samples annealed at 550 and 950°C whereas as prepared samples exhibited amorphous nature in case of sol-gel route and illustrated a pure anatase phase in case of solvothermal technique. The results of XRD were further confirmed by Raman spectroscopy, TEM, and FESEM. The crystallite size was almost 8-15 nm and 250-300 nm, for as prepared and annealed at 550 and 950°C samples grown by solvothermal and sol-gel routes respectively. UV-visible corroborates the energy band 3.26, 3.04 and 2.94 eV for as-prepared and sintered at 550 and 950°C TiO₂ NP's.

Biography

Davoud Dastan has completed his MSc degree from University of Pune with a first class grade and is currently a PhD student at Savitribai Phule Pune University. He has published more than 10 papers in reputed journals.

d.dastan61@yahoo.com

Notes: