

# Emerging Trends in Materials Science and Nanotechnology

April 26-27, 2018  
Rome, Italy

R K Duchaniya et al., Nano Res Appl, Volume:4  
DOI: 10.21767/2471-9838-C1-008

## SYNTHESIS AND CHARACTERIZATION OF TiO<sub>2</sub> NANOPARTICLES BY SOL-GEL METHOD

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**T**itanium dioxide nanoparticles are used for variant applications which can be well chosen by size, thermal and electrical properties. The TiO<sub>2</sub> nanoparticles are not new for photo catalytic activity, in degrading organic contaminants and germs, making of cosmetic products and paper industries. Titanium dioxide nanoparticles are prepared by different techniques in which sol gel is most used. The sol-gel synthesis method of nano TiO<sub>2</sub> can be through different molar ratio of TTIP: ethanol: distilled water. Characterization of TiO<sub>2</sub> nanoparticles are done by x-ray diffraction analysis, UV-Vis spectroscopy, FTIR and FESEM (with EDS). The average crystalline size of TiO<sub>2</sub> nanoparticle is obtained value of 4.5 nm by XRD. Surface morphological studies have been concluded from SEM images. FT-IR peaks of Ti-O bond were observed around 630-770 cm<sup>-1</sup> for both samples. Electronic energy band gap of TiO<sub>2</sub> nanoparticles was observed 3.149 eV and 3.293 eV in respect to one and the other sample. A mixture of both brookite and the small amount of anatase form of TiO<sub>2</sub> nanoparticle has been found in the couple of samples nano TiO<sub>2</sub>.

### Recent Publications

1. Suchita Chaudhary, R K Tak and R K Duchaniya (2017) Corrosion inhibition of mild steel in 0.5N H<sub>2</sub>SO<sub>4</sub> solution by *Tribulus terrestris* (Fruit) extract. *Journal of Surface Science and Technology* 33(1-2):63.
2. Kamlesh Verma, Ravi Agarwal, R K Duchaniya and Ramvir Singh (2016) Measurement and prediction of thermal conductivity of nanofluid containing TiO<sub>2</sub> nanoparticles. *Journal of Nanoscience and Nanotechnology* DOI:10.1166/jnn.2016.12584.

3. Komal Yadav and Vibha Uttam (2016) Study of corrosion behavior of Ni-P-TiO<sub>2</sub> nanocomposite coating on mild steel deposited by electroless deposition process. *Journal of Materials Science and Surface Engineering* 4:410-414.
4. Vibha Uttam, Parul Yadav and R K Duchaniya (2016) Characterization Study of Ni-P-TiO<sub>2</sub> nanocomposite coating on mild steel by electroless plating method. *Journal of materials science and surface engineering* 4:432-435.
5. Ravi Agarwal, Kamlesh Verma, Narendra Kumar Agarwal, Rajendra Kumar Duchaniya and Ramvir Singh (2016) Synthesis, characterization, thermal conductivity and sensitivity of CuO nanofluid. *Applied Thermal Engineering* 102:1024-1036.

### Biography

R K Duchaniya has his expertise in Nanomaterials, Engineering Materials, Corrosion and Surface Coatings. He has published 32 papers in national and international journals and conferences. He has expertise in the field of nano composite which can be used for solar cell. His work in the field of Electroless Plating Method is considerable for improving surface and corrosion resistance properties of materials by developing nano-composite coating on materials. He has developed a different field related to melt coolability of materials which can be used in nuclear reactor. He built collaboration of MNIT Jaipur with different institutes and research organizations.

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