

Effect of Reaction Time and Precursor Concentration in the Structural Properties of TiO₂ Nanoparticles Synthesized by Low Temperature Sol-Gel Method

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Abstract : Titanium dioxide (TiO₂) nanoparticles were synthesized by sol-gel method at low temperature using different precursor concentrations and reaction times. The synthesized samples were calcined at 400°C. The phase formation of titanium dioxide was identified from powder X-ray diffraction study. Lattice strain was found using Williamson-Hall (W-H) analysis. SEM images revealed the spherical shape of the TiO₂ nanoparticles. The presence of functional groups in TiO₂ nanoparticles were identified using FTIR analysis. UV-vis diffuse reflectance spectral study was used to determine bandgap of the samples. The luminescent property of the synthesized material was found to have its emission wavelength in the UV-region assessed by photoluminescence study.

Keywords : Sol-Gel method, TiO₂, SEM, W-H analysis.

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