

# A Brief Study on Optical and Photocatalytic Property of Core-shell TiO<sub>2</sub>-MgO Nanocomposites

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**Abstract**—Semiconductor nanoparticles have found a prominent place in varied areas of research because of their novel optical and electrical properties [1]. Among them, core shell nanostructures have grabbed immense attention which are yielded by coating a given ensemble of nanoparticles by another material [2]. Among the semiconductors, TiO<sub>2</sub> has already established its versatility in photocatalysis. But since TiO<sub>2</sub> shows very little absorbance in visible region, its band gap may be tuned by coating it with a shell layer. Such compounds exhibit improved absorbance in visible regime than the core TiO<sub>2</sub>. Again, photocatalysis requires ambient charge separation of electron and holes. This is favored by formation of core-shell nanostructures as charge separation occurs at the interface due to difference in band alignment of the two materials [2]. Here we report on a two step synthesis method of core-shell TiO<sub>2</sub>-MgO nanocomposites via a cost effective and simple sol-gel method. It was followed by studying their optical properties through characterization tools such as UV and PL spectra. A study on photocatalytic activity of the prepared core-shell nanocomposites for degradation of methylene blue dye (MB) under visible light is also performed which shows that the core-shell nanostructure displays much better photocatalytic activity than the core TiO<sub>2</sub> nanostructures.

**Keywords:** Nanocomposites, Photocatalytic

**References:**

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