

Synthesis Antimicrobial and Photocatalytic applications of TiO₂@CuO nanoparticles

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Titanium dioxide (TiO₂) nanoparticles are pivotal in sustainable nanocomposite research, particularly in UV-driven photocatalysis due to their significant surface area, stability, and cost-effective synthesis. [1] Incorporating noble metal nanoparticles can heighten TiO₂ photocatalytic ability by improving electron-hole separation and extending absorption into the visible spectrum. [2]

In this study, spherical TiO₂ nanoparticles were synthesized through a revised sol-gel process, with high yield and monodispersity. Hybrid Cu@TiO₂ Nps were fabricated by embedding Cu Nps on the surface of TiO₂ Nps in the presence of hydrazine. The nanocomposites were characterized structurally by FT-IR and XRD, while their morphology was determined by SEM, TEM and colloidal stability was assessed through DLS. The photocatalytic activity was systemically evaluated through UV-Vis spectroscopy by studying the photodegradation of methyl orange (MO), after visible light irradiation.

References:

- [1] H. M. Sung-Suh, Y. C. Bae, et al. J. Photochem. Photobiol., A 163, (2004)
- [2] M.A. Habib, M.T. Shahadat, N.M. Bahadur, et al. Int Nano Lett 3, 5 (2013).