



Cuprous and Cupric Oxide Nanoparticles as Antimicrobial Agent and for Dye Degradation

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ABSTRACT: A novel one-pot colloidal synthesis of stable, pure phase cuprous and cupric oxide nanoparticles is presented. NaOH concentration regulated the morphology of synthesized nanooxides - CuO nanoflakes, spherical CuO or spherical Cu₂O nanoparticles, by reduction of copper sulphate in presence of ascorbic acid and trisodium citrate at pH 12.5-13. Trisodium citrate leads to charge stabilization of nanoparticles resulting in stable sols. Effect of pH, oxygen scavenger concentration and capping agent was studied to minimize polydispersity and ensure stability of pure copper oxide nanoparticles. Finally, probable mechanism of synthesis was evaluated. The as-prepared copper oxide(s) nanoparticles were analyzed by ultraviolet-visible spectroscopy, transmission electron microscopy, X-ray powder diffraction, and Fourier transform infrared spectroscopy. The efficacy of nanoparticles over microbial flora (bacterial and fungal) was evaluated in comparison to the bulk metal chips. Further, these nanoparticles exhibited excellent activity towards degradation of dyes used in textile, paper, leather and printing industries. Degradation of dye by cuprous and cupric oxide nanoparticles was evident decoloration of the dye solution with time that was further confirmed by UV-vis spectroscopy. © 2016 iGlobal Research and Publishing Foundation. All rights reserved.

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