

Preparation and Characterization of Ag/CuO Hierarchical Nanostructures

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Abstract. A facile and cost-effective hydrothermal method aided by hydrogen peroxide was utilized to prepare silver/cupric oxide (Ag/CuO) nanocomposites. X-ray diffraction (XRD), scanning electron microscopy (SEM) and transmission electron microscopy (TEM) were used to characterize the nanocomposites. The synthesized Ag/CuO nanocomposites showed several rod-shape “petals” with a diameter of about 100-150 nm. TEM images showed a uniform dispersion of silver nanoparticles with diameters less than 90 nm on the CuO flower-like structures. XRD analysis has confirmed the presence of both Ag and CuO in the formed nanocomposites. Bacterial test showed high zone inhibition for *Escherichia coli* (Gram-negative) using the synthesized nanostructures with increasing efficiency as with the increasing amount of Ag nanoparticles. The photocatalytic activity of the samples was observed by monitoring the photodegradation of methylene blue dye. In this report, a simple, nontoxic and inexpensive method is presented for the one-step synthesis of Ag/CuO nanostructures, which may be potentially useful for catalytic and antibacterial applications.

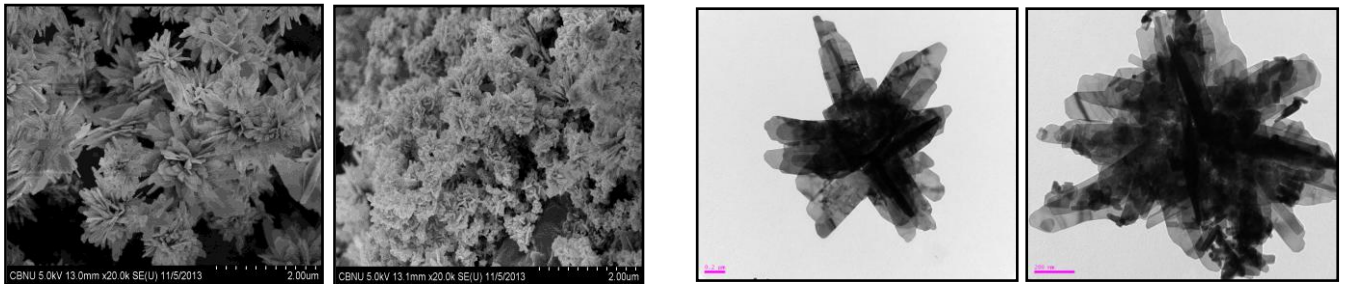
Influence

References

[1] R. Sathyamoorthy, K. Mageshwari, *Physica E* 2012;47:157-161

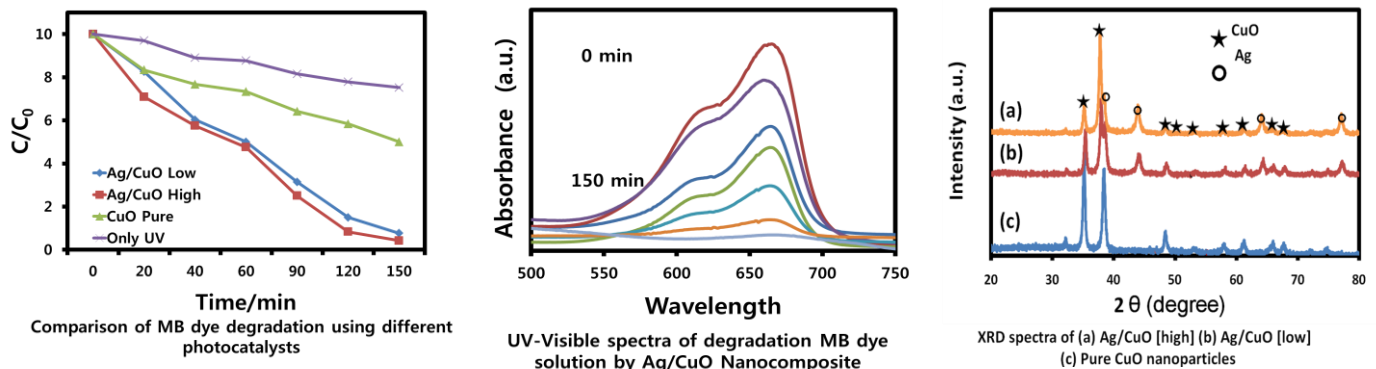
[2] Zhipeng Cheng, Jiming Xu, Hui Zhong, Xiaozhong Chu, Juan Song, *Materials Lett* 2011;65:2047-2050

Figures



FE-SEM images of (a) Pure CuO and (b) Ag/CuO nanocomposite

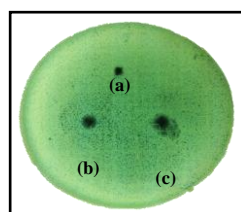
TEM images of (a) Pure CuO and (b) Ag/CuO Nanocomposite



Comparison of MB dye degradation using different photocatalysts

UV-Visible spectra of degradation MB dye solution by Ag/CuO Nanocomposite

XRD spectra of (a) Ag/CuO [high] (b) Ag/CuO [low] (c) Pure CuO nanoparticles



Zone of inhibition tests for (a) Pure CuO (b) Ag/CuO [low] (c) Ag/CuO [high] towards gram-negative *E. coli*