

Evaluation of the cupric oxide photocatalytic activity for Rhodamine B

Lilian Cruz Santos^{1,2}, Camila Rodrigues Sciena^{1,2}, João Otávio Donizette Malafatti^{1,2}, Elaine Cristina Paris^{1,2}

¹Universidade Federal de São Carlos - Campus: São Carlos, ²Embrapa Instrumentação Agropecuária - São Carlos

e-mail: lilian.cruz@gmail.com

Cupric oxide (CuO) has been a hot topic among the studies on transition metallic oxides due to interesting properties such as, p-type semiconductor, narrow band gap (1.2 eV in bulk), high-temperature superconductors and giant magneto resistance materials. CuO nanostructures with large surface area and potential size effects possess superior physical and chemical properties that remarkably differ from those of their micro or bulk counterparts. These nanostructures have been extensively investigated because of their interesting properties and promising applications in batteries, solar cells, gas sensors, and removal of arsenic and organic pollutants promising applications in various fields [1]. In this work, CuO nanoparticles with different morphology were produced for photodegradation of textile dyes. The pure cupric oxide were obtained from one-step hydrothermal synthesis, employing a solution containing copper acetate and urea, at 150C for 24 h [2]. The obtained structures was characterized by scanning electron microscope with field emission gun (SEM-FEG), transmission electron microscope (TEM), X ray diffraction (XRD), Fourier transformed infrared spectroscopy (FTIR), and gas adsorption (BET method). The photo-degradation of rhodamine B (RhB) was performed at ambient temperature under visible light after the addition of H₂O₂. The physical-chemical characterizations confirmed the successfully synthesis of nanoparticles CuO and high surface area. CuO nanostructures showed good photocatalytic activity in degradation of the aqueous solution of RhB, since in 30 min the coloration was disappeared.

[1] Q. Zhang, et al. Prog. Mater. Sci., 60 (2014), pp. 208-337.

[2] W. Jia, et al. Mater. Res. Bull., 44 (2009), pp. 1681-1686.