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Copper and silver impregnated carbon nanotubes incorporated into cyclodextrin polyurethanes for the removal of bacterial and organic pollutants in water

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ABSTRACT

Increasing demand for safe drinking water and the problems associated with some existing water treatment methods have made it vital for the development of new technologies to address these challenges. This study explores the use of nanosized silver and copper impregnated on polyurethanes for possible use in water disinfection. It also investigates the adsorption of organics by the metal impregnated polyurethanes in water. Copper and silver nanoparticles were immobilized on carbon nanotube and embedded in water-insoluble cyclodextrin polyurethane polymers. The polyurethanes were characterized by various techniques such as BET, TEM, SEM and EDX and evaluated for their adsorption and bacteria reduction capacity using spiked water samples containing bacteria (*Escherichia coli* and *Salmonella typhi*) and a model organic pollutant (*para*-nitrophenol) in water. The metal impregnated polyurethanes inactivated up to 3 logs of bacteria but had a maximum adsorption of 55% of the model organic pollutant.

Keywords: Bacteria; Carbon nanotubes; Cyclodextrins; Nanoparticles

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