

# Synthesis of silver impregnated carbon nanotubes and cyclodextrin polyurethanes for the disinfection of water

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## Abstract

Silver impregnated carbon nanotubes and cyclodextrin polymers were synthesised by first functionalising carbon nanotubes in a mixture of nitric and sulphuric acid before impregnating them with silver nanoparticles. The silver impregnated functionalised carbon nanotubes were then polymerised with  $\beta$  cyclodextrin using hexamethylene diisocyanate as the linker. The polymers were characterised using various techniques. The polymers were then tested for their ability to destroy bacteria in water and were found to reduce bacterial cell counts in water spiked with *E. coli* (ATCC 25925) to as low as zero cfu/ml. Furthermore, the polymers could absorb 58% of para-nitrophenol from water spiked with this organic compound, which is a known pollutant in water.

**Keywords:** safe drinking water, bacteria, carbon nanotubes, cyclodextrins, nanoparticles