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DISINFECTION OF *E. coli* CONTAMINATED WATER USING TUNGSTEN TRIOXIDE-BASED PHOTOELECTROCATALYSIS

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Abstract

Semi-conductor oxide enhanced photocatalysis is a sustainable technology suitable for disinfection of water contaminated with pathogens. Disinfection of *Escherichia coli* was investigated using an immobilized thin film tungsten trioxide (WO₃) photocatalyst in a visible light-driven photoelectrocatalytic batch cell (PECB). Disinfection efficiency was monitored under dark electrocatalytic, photolytic and photoelectrocatalytic conditions and assessed using a culture-based approach. Optimal disinfection efficiency (>99 % within 15 minutes) occurred when the WO₃ catalyst was illuminated under closed circuit conditions. Non-detection of colony forming units showed no re-growth of the pathogen during post-irradiation studies, indicating cell death. The WO₃ photocatalyst is a potentially useful disinfection technology as its utilization of visible parts of the solar spectrum optimizes solar energy for treatment of contaminated waters.

Key words: disinfection, *E. coli*, photoelectrocatalysis, tungsten trioxide, wastewater

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