



## Photocatalysis of THM precursors in reclaimed water: the application of TiO<sub>2</sub> in UV irradiation

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Received 24 October 2014; Accepted 11 March 2015

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### ABSTRACT

In this study, ultraviolet (UV) irradiation followed by chlorination was employed for reclaimed water disinfection. In order to reduce trihalomethanes (THMs) from reclaimed water, suspended TiO<sub>2</sub> (10 mg/L) was added as photocatalyst in UV process to enhance the removal of THM precursors. Reduction of UV absorbance in 254 nm (UV<sub>254</sub>), dissolved organic carbon (DOC), and THMs formation was analyzed under different experimental conditions (exposure time, pH, TiO<sub>2</sub> doses, and TiO<sub>2</sub> forms). Excitation–emission matrix spectra technology was also used to investigate the changes of dissolved organic matters properties during UV and UV-TiO<sub>2</sub> process. Expansion of irradiation time resulted in a remarkable decrease in UV<sub>254</sub> and THM yields, but showed few influence on DOC removal. THMs yield decreased more than 50% with pH increased from 5 to 9 and rise in TiO<sub>2</sub> dosage also presented a positive effect on photocatalytic disinfection. In addition, a dramatic increase in removal rates of UV<sub>254</sub>, DOC, and THMs was observed when TiO<sub>2</sub> doses were increased from 3 to 15 mg/L. In terms of TiO<sub>2</sub> form, suspended TiO<sub>2</sub> exhibited a better removal capacity on UV<sub>254</sub>, DOC, and THMs by contrast with TiO<sub>2</sub> coated on granular active carbon.

*Keywords:* UV; TiO<sub>2</sub>; THMs; Photocatalysis; Chlorination

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