



Photocatalysis of Naphthenic Acids in Water

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ABSTRACT

Naphthenic acids (NAs) are soluble in water and are concentrated in oil sand process water (OSPW) as a result of caustic oil sands extraction processes. Significant environmental and regulatory attention has been focused on the naphthenic acids. A laboratory scale photocatalysis system was developed using UV254 florescent lamps. Experiments were conducted to determine the NA degradation efficiency of this system in presence of TiO₂ catalyst. Degradation kinetics for total NAs as well as individual z-families was calculated. The developed treatment system was able to degrade OSPW NAs with half life values ranging between 1.55 and 4.80 h. This system also completely reduced the acute toxicity associated with NAs (up to 5 min. IC50 v/v > 90%) based on Microtox assays.

KEYWORDS

Photocatalysis, Naphthenic Acids, Treatment, Kinetics, Toxicity

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