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Treatment of phenolic wastewaters in single baffle reactor by Solar/TiO_2/H_2O_2 process

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ABSTRACT

The treatment of phenolic wastewaters by means of H_2O_2-promoted TiO_2 photocatalysis was investigated in single baffle reactor concerning the effect of major operating factors, namely H_2O_2 dosage and method of addition on process efficiency. Addition of hydrogen peroxide enhances considerably treatment efficiency and its beneficial role is associated with increased production of radicals due to its reaction with conduction band electrons and other reactive species. When compared to rate of degradation, the solar/TiO_2/H_2O_2 process is two to three times faster than the solar/TiO_2 process. For untreated samples of 400 mg/L phenol concentration, from pharmaceutical industry the BOD/COD ratio is 0, while solar photocatalytic treatment of 4 h enhanced the biodegradability values to 0.44. Results of this study open new research window for a more complex approach to photocatalytic experiments where photocatalysis can be combined with hydrogen peroxide.

Keywords: Solar photocatalysis; Phenolic wastewater; Single baffle reactor; Solar/TiO_2/H_2O_2biodegradability

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