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EFFECT OF MICROWAVES ON PHOTOCATALYTIC DEGRADATION OF PHENOL AND CRESOLS IN A MICROWAVE-ULTRAVIOLET REACTOR

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Abstract

A Microwave-Ultraviolet reactor was developed and the effect of microwaves on photodegradation of various phenols was studied using the reactor. The degradation study was carried out by six methods - microwave irradiation, photodegradation with UV light, microwave and ultraviolet radiations (microwave irradiation in presence of TiO_2 , photodegradation with UV light in the presence of TiO_2 and also simultaneous MW and UV irradiations in the presence of TiO_2). The relative efficiencies of the degradation methods were evaluated in terms of time taken, rate of degradation and catalyst requirement. The reaction rate constants were also evaluated for each method and compared. The microwave-ultraviolet method in presence of TiO_2 proved to be faster method than any other methods for degradation of all model phenols studied and its reaction rate was two times greater in comparison with conventional photodegradation method. It was also 2 times faster than conventional photocatalytic method in the removal of Total Organic Carbon.

Key words: Advanced oxidation process, phenol and cresols, microwave-ultraviolet treatment, photocatalytic degradation

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