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RESEARCH PAPERS

臭氧氧化阳离子红染料的动力学研究

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摘要 The ozonation of Cationic Red X-GRL in a semi-batch reactor was studied with variation of the gas flowrate, initial Cationic Red X-GRL concentration, temperature, and pH value. By the evaluation of the liquid masstransfer coefficient, the interfacial area, and the stoichiometric ratio between ozone and Cationic Red X-GRL, therate constants and the kinetic regime of the reaction between ozone and Cationic Red X-GRL were investigated byapplying the experimental data to a model based on the film mass transfer theory. The results obtained support asecond order overall reaction, first order with respect to both ozone and dye, and the rate constants were correlatedby a modified Arrhenius Equation of temperature and pH value with activation energy of 18.06kJ@mol-1. Hattanumber of the reaction was found to be between 0.026 and 0.041, it indicates that the reaction occurs in the liquidbulk, corresponding to the slow kinetic regime.

关键词 ozonation Cationic Red X-GRL reaction kinetics dye mass transfer

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Kinetics of the Reaction Between Ozone and Cationic Red X-GRL

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Abstract

The ozonation of Cationic Red X-GRL in a semi-batch reactor was studied with variation of the gas flowrate, initial Cationic Red X-GRL concentration, temperature, and pH value. By the evaluation of the liquid masstransfer coefficient, the interfacial area, and the stoichiometric ratio between ozone and Cationic Red X-GRL, therate constants and the kinetic regime of the reaction between ozone and Cationic Red X-GRL were investigated byapplying the experimental data to a model based on the film mass transfer theory. The results obtained support asecond order overall reaction, first order with respect to both ozone and dye, and the rate constants were correlatedby a modified Arrhenius Equation of temperature and pH value with activation energy of 18.06kJ@mol-1. Hattanumber of the reaction was found to be between 0.026 and 0.041, it indicates that the reaction occurs in the liquidbulk, corresponding to the slow kinetic regime.

Key words ozonation Cationic Red X-GRL reaction kinetics dye mass transfer

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