

Kinetics of the relation between ozone and p-hydroxybenzoic acid in a semibatch reactor

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摘要.

The kinetic regime in the ozone and p-hydroxybenzoic acid reaction system at pH 3 and 7 can be considered a slow reaction, whereas at pH 10 the rapid reaction mainly occurred in the liquid film and developed in the fast absorption kinetic regime. On the basis of the discussion of kinetic regime and the experimental observations, the kinetic expressions for the p-hydroxybenzoic acid, glyoxal, and dissolved ozone concentration can be developed for both pH 3 and 7 and were verified with the experimental data. The reaction rate constants were also calculated. The agreement between the experimental observations and the model predictions was reasonably good. However, at pH 7, a positive deviation in the decaying glyoxal profile and the overestimation for the p-hydroxybenzoic acid and dissolved ozone concentration were found. The reasons for the discrepancy between the predicted and measured concentrations were also discussed.