Reduction of Low-MW Model Compounds by Ozonation and O3/UV Processes

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摘要

Abstract

In this investigation, the low-molecular-weight organic matters, such as resorcinol, phloroglucinol, and p-hydroxybenzoic acid, were selected as organic precursors during the ozonation and chlorination processes. The research work focused on evaluating the effects of hydroxyl radical and ozone molecule on the reduction of organic precursors and disinfection by-products DBP formation, and assessing the carcinogenic risk with respect to DBP formation potentials between ozonation and O3 /UV processes. The two-stages ozone decomposition model, O3= O30Fe−K1·t+1−Fe−K2·t, was developed throughout this investigation. In addition, a linear correlation between alkalinity and hydroxyl radical was found in the course of ozonation process. The destruction of organic precursors by hydroxyl radical exhibits better performance than that by ozone. According to the risk assessment on the ozonation process, water samples treated by the O3 /UV and O3 pH 5 process exhibit the lower risk. Therefore, both the O3 /UV and ozonation processes with proper operation can reduce the organic precursors, thereby providing safe drinking water.