Curtin University

DEPARTMENT OF CHEMISTRY

SEMINAR SERIES

Mitigation of I-DBPs and Control of Bromate Formation during Ozonation pre-Treatment

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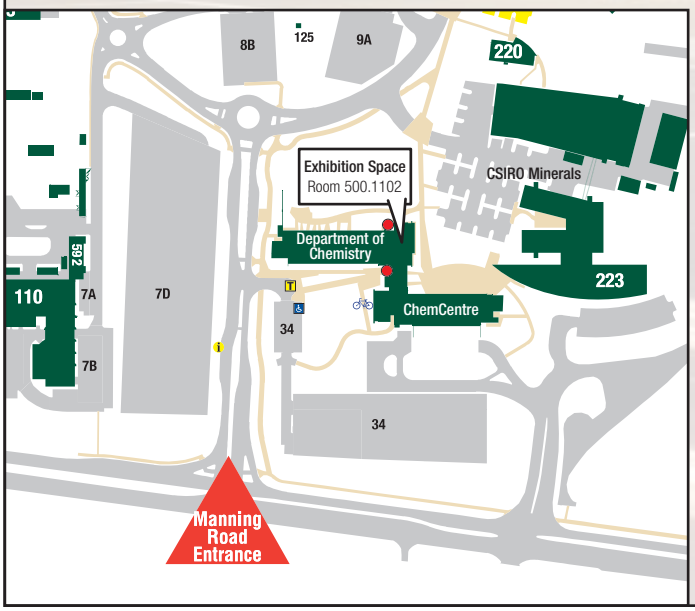
The presence of iodinated disinfection by-products (I-DBPs) in drinking water poses a potential health concern since it has been shown that I-DBPs are generally more genotoxic and cytotoxic than their chlorinated and brominated analogues. I-DBPs are formed during oxidation/disinfection of iodide-containing waters by reaction of the transient hypoiodous acid (HOI) with natural organic matter (NOM). In this study, we demonstrate that ozone pre-treatment selectively oxidizes iodide to iodate and avoids the formation of I-DBPs. Iodate is non-toxic and is therefore a desired sink of iodine in drinking water. Complete conversion of iodide to iodate while minimizing the bromate formation to below the guideline value of 10 mg L-1 was achieved for a wide range of ozone doses in five raw waters with DOC and bromide concentrations of 1.1-20 mg L-1 and 170-940 mg L-1, respectively. Lowering the pH effectively further reduced bromate formation but had no impact on the extent of iodate and bromoform formation (the main trihalomethane (THM) formed during ozonation). Experiments carried out with pre-chlorinated/post-clarified samples already containing I-DBPs, showed that ozonation effectively oxidized I-THMs. Therefore, in iodide-containing waters, in which I-DBPs can be produced upon chlorination or especially chloramination, a pre-ozonation step to oxidise iodide to iodate is an efficient process to mitigate

I-DBP formation.



Friday, 16th August 2013 at 4:00 PM
Exhibition Space, Building 500, Room 1102

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