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Degradation of organic contaminants through activating bisulfite by cerium(IV): A sulfate radical-predominant oxidation process

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Abstract

In this study, the activation of bisulfite by cerium(IV) (Ce(IV)/HSO_3^- process) is proposed for the first time to degrade organic contaminants. Experiments show that carbamazepine (CBZ), a representative recalcitrant contaminant of emerging concern, is oxidized by Ce(IV)/HSO_3^- treatment at pH_{ini} 3.0-7.0 when $O_{2(aq)}$ is present to promote HSO_3^- autoxidation. $SO_4^{\bullet-}$, $HO^{\bullet}$, and $SO_5^{\bullet-}$ were identified as active oxidants of CBZ based on the ESR spectra and the results of alcohol quenching experiments. Quantitative analysis indicates that $SO_4^{\bullet-}$ plays a major role, while $HO^{\bullet}$ and other