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Ferrate(VI) based chemical oxidation for the remediation of aged PCB contaminated soil: Comparison with conventional oxidants and study of limiting factors

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Abstract

Ferrate (Fe(VI)) has emerged as an efficient oxidant to treat organic pollutants in aqueous solution. However, its application has never been assessed to remediate the contaminated soils. Here, we report the first study to use Fe(VI) for chemical oxidation of PCBs in historically contaminated soils obtained from an industrial wasteland. The first part of this study explores the efficiency of ferrate(VI) to degrade PCBs under various experimental conditions (liquid/solid ratio, oxidant dose, temperature and reaction time). Integrated application of Fe(VI) with conventional oxidants (hydrogen peroxide H_2O_2, persulfate $S_2O_8^{2-}$ and peroxymonosulfate HSO_5^-) was also tested. Conventional oxidants resulted in only 2 –