



Review

Current status and prospects of Fenton oxidation for the decontamination of persistent organic pollutants (POPs) in soils

Venny^a, Suyin Gan^{a,*}, Hoon Kiat Ng^b^a Department of Chemical and Environmental Engineering, The University of Nottingham Malaysia Campus, Jalan Broga, 43500 Semenyih, Selangor Darul Ehsan, Malaysia^b Department of Mechanical, Materials and Manufacturing Engineering, The University of Nottingham Malaysia Campus, Jalan Broga, 43500 Semenyih, Selangor Darul Ehsan, Malaysia

HIGHLIGHTS

- Fenton oxidation is an effective soil remediation technology for POPs.
- Column studies are more representative of in situ Fenton field applications.
- Bioremediation or EK coupled with Fenton process results in better POP degradation.
- Future work should focus on cost evaluation and post-treatment soil quality.

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ABSTRACT

Soil contamination by persistent organic pollutants (POPs) is a problem faced in many countries as a result of rapid industrialisation. The suitability of Fenton oxidation for degradation of recalcitrant POPs as a short-term remediation approach has led to intense research within the field over the last few decades. In this review article, the fundamental principles and governing factors of Fenton oxidation for treating soils contaminated with POPs such as polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), polychlorinated dibenzo-p-dioxins and furans (PCDD/Fs), are firstly discussed. Current practices of soil remediation through Fenton oxidation based on studies reported in the specialised literature are then reviewed with a focus on the potential of Fenton-bioremediation and electrokinetic (EK)-Fenton treatments in conjunction with in situ applications. An exhaustive bibliography on column studies is also covered in this work with emphasis on the technical approaches used. Finally, the last section of the article is focused on assisting soil scientists and environmental professionals in implementing in situ Fenton oxidation (ISFO) and provides some insights into future development of ISFO.

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Contents

1. Introduction	296
2. Fundamentals of Fenton chemistry	298
2.1. Mechanisms	298
2.2. Types of Fenton oxidation	299
2.3. Governing factors	299
2.3.1. POP aging and physicochemical properties	299
2.3.2. Soil texture, moisture and organic matter	301
2.3.3. Reaction pH	301
2.3.4. Temperature and reaction time	301
2.3.5. Reactant dosage	302
3. Applications of Fenton oxidation in remediation of POP-contaminated soils	302
3.1. Soil slurry studies	302
3.2. Integrated treatments	305

* Corresponding author. Tel.: +60 3 89248162; fax: +60 3 89248017.

E-mail address: suyin.gan@nottingham.edu.my (S. Gan).