

Supplementary Materials for

Tannic acid promotes the activation of persulfate with Fe (II) for highly efficient trichloroethylene removal

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Supplementary Tables

Table S1. Comparison of the removal of trichloroethylene from water in different systems.

Methods	Conditions	Initial pH	C_0 (mg L ⁻¹)	R_{mt} (%)	Refs.
		1.5	55.0	96.2	
		4.1	55.0	99.1	
TA- Fe (II)-PS	[TA]=80 mg L ⁻¹ , [Fe (II)]=1.5 mM, [PS]=15 mM, T=298 K	7.0	55.0	98.8	This work
		9.0	55.0	98.5	
		11.0	55.0	98.6	
nZVI/BC-PS	[nZVI] = 4.5 mM, nZVI/BC mass ratio=1:5 [PS] = 4.5 mM, T=298 K	10.0	19.7	82.3	1
Fe(II)- CA-PS	[PS]=1.44 mM, [CA]=0.432 mM, [Fe(II)]=0.288 mM, T=298 K	7.5	6.6	79.0	2

PEI-nZVI	[PEI-nZVI]=2 g L ⁻¹ , T=298 K	/	50.0	90.0	3
Dow Filmtec BW30XFR Membrane	pressure=5 bar, flow rate=10 m ³ h ⁻¹	6.5	100.0	100.0	4
<i>Acidimicrobiaceae sp. A6</i>	[<i>Acidimicrobiaceae sp. A6</i>]=1.8 × 10 ⁷ copies ml ⁻¹ , Fe(III)-NH ₄ ⁺ enrichment medium	4.5	1.0	24%	5

Note: C₀ is the initial concentration of trichloroethylene, R_{mt} is the removal percentage of trichloroethylene. TA=tannic acid, PS=persulfate, BC= Biochar, nZVI= Nanoscale zero-valent iron, CA= citric acid, PEI= polyethylenimine.

Supplementary Figures

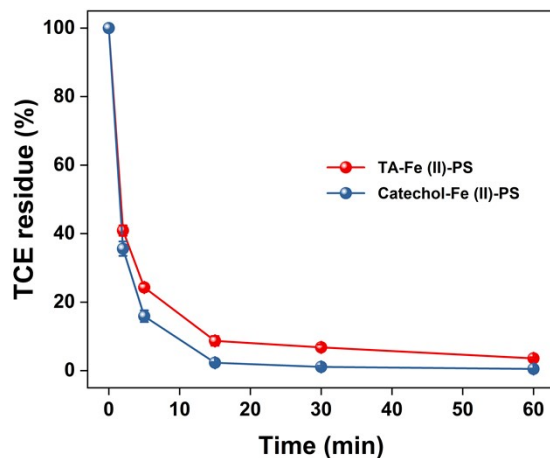


Fig. S1 (a) The comparison of the R_{st} of TCE in TA-Fe (II)-PS system and Catechol-Fe (II)-PS system. Conditions: $[TCE] = 55 \text{ mg L}^{-1}$, $[PS] = 15 \text{ mM}$, $[TA] = [\text{catechol}] = 50 \text{ mg L}^{-1}$, $[\text{Fe (II)}] = 3 \text{ mM}$.

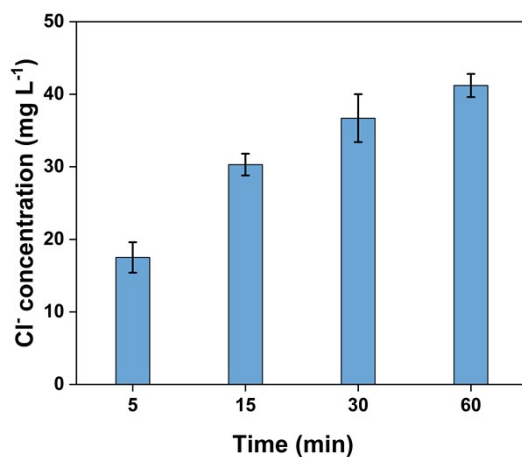


Fig. S2 The Cl⁻ concentrations in TA-Fe (II)-PS system during TCE removal. Conditions: $[TCE] = 55 \text{ mg L}^{-1}$, $[PS] = 15 \text{ mM}$, $[TA] = [\text{catechol}] = 50 \text{ mg L}^{-1}$, $[\text{Fe (II)}] = 3 \text{ mM}$.

References

1. J. Yan, L. Han, W. Gao, S. Xue and M. Chen, *Bioresour. Technol.*, 2015, **175**, 269-274.
2. R. Škarohlíd, L. McGachy, M. Martinec and Z. Rošková, *Environ. Technol. Innov.*, 2020, **19**, 101004.
3. K.-S. Lin, N. V. Mdlovu, C.-Y. Chen, C.-L. Chiang and K. Dehvari, *J. Clean. Prod.*, 2018, **175**, 456-466.
4. T. J. Ainscough, D. L. Oatley-Radcliffe and A. R. Barron, *Membranes*, 2021, **11**, 61.
5. J. Ge, S. Huang, I. Han and P. R. Jaffé, *Environ. Pollut.*, 2019, **247**, 248-255.