Supporting Information

Trichloroethylene degradation by various forms of iron activated persulfate

oxidation with or without the assistance of ascorbic acid

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- Figure S1 Variations of pH within various forms of iron activated persulfate oxidation in the presence or absence of AsA with initial PS concentrations of (a) 1 mM, (b) 10 mM and (c) 100 mM. [TCE]₀ = 0.46 mM; [AsA]₀ = 10 mM; [Fe²⁺]₀ and [Fe³⁺]₀ = 10 mM; [iron mineral] = 0.5 g/60 mL; [soil] = 10 g/60 mL; reaction time = 72 h.
- **Figure S2** TCE degradation by various forms of iron in the presence or absence of AsA. $[TCE]_0 = 0.46 \text{ mM}; [AsA]_0 = 10 \text{ mM}; [Fe^{2+}]_0 \text{ and } [Fe^{3+}]_0 = 10 \text{ mM};$ [iron mineral] = 0.5 g/60 mL; [soil] = 10 g/60 mL; reaction time = 72 h.
- Figure S3 Variations of (a) TCE; (b) PS; (c) AsA; (d) total iron and (e) ferrous ion as a function of reaction time in the iron mineral/AsA/PS systems. $[TCE]_0 =$ 0.46 mM; $[PS]_0 = 10$ mM; $[AsA]_0 = 10$ mM; [iron mineral] = 0.5 g/60 mL.

| PS Activator | $\Delta PS/\Delta TCE$ (with AsA 10 mM) | | |
|--------------------------------|---|----------|-----------|
| | PS 1 mM | PS 10 mM | PS 100 mM |
| w/o iron | 39 | 36 | 45 |
| Fe ²⁺ | n.a. | 47 | 204 |
| Fe ³⁺ | n.a. | 28 | 195 |
| FeOOH | 33 | 21 | 62 |
| Fe ₂ O ₃ | n.a. | 22 | 61 |
| Soil | 13 | 21 | 81 |

Table S1. $\Delta PS/\Delta TCE$ in different IAP systems with the assistance of ascorbic acid

Note: $\Delta PS/\Delta TCE$ represents the molar ratio of the PS decomposed versus TCE degraded at 72 h. n.a., not available due to no TCE degradation.



Figure S1 Variations of pH within various forms of iron activated persulfate oxidation in the presence or absence of AsA with initial PS concentrations of (a) 1 mM, (b) 10 mM and (c) 100 mM. [TCE]₀ = 0.46 mM; [AsA]₀ = 10 mM; [Fe²⁺]₀ and [Fe³⁺]₀ = 10 mM; [iron mineral] = 0.5 g/60 mL; [soil] = 10 g/60 mL; reaction time = 72 h.



Figure S2 TCE degradation by various forms of iron in the presence or absence of AsA. $[TCE]_0 = 0.46 \text{ mM}; [AsA]_0 = 10 \text{ mM}; [Fe^{2+}]_0 \text{ and } [Fe^{3+}]_0 = 10 \text{ mM};$ [iron mineral] = 0.5 g/60 mL; [soil] = 10 g/60 mL; reaction time = 72 h.



Figure S3 Variations of (a) TCE; (b) PS; (c) AsA; (d) total iron and (e) ferrous ion as a function of reaction time in the iron mineral/AsA/PS systems. $[TCE]_0 = 0.46 \text{ mM};$ $[PS]_0 = 10 \text{ mM}; [AsA]_0 = 10 \text{ mM}; [iron mineral] = 0.5 \text{ g/60 mL}.$