Supplementary Information

for

Surface quinone-induced formation of aqueous reactive sulfur species controls pine wood biochar-mediated reductive dechlorination of hexachloroethane by sulfide

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Table S1 Fitting parameters for reduction kinetics of hexachloroethane.[a]

Sample	System	k_{obs} (h^{-1})[b]	R^2
P-char	Whole	$(7.2 \pm 0.3) \times 10^{-3}$	0.993
	Supernatant	$(6.0 \pm 0.5) \times 10^{-3}$	0.939
MCNT	Whole	$(1.7 \pm 0.1) \times 10^{-2}$	0.970
	Supernatant	$(1.4 \pm 0.5) \times 10^{-3}$	0.972
graphite	Whole	$(2.6 \pm 0.2) \times 10^{-2}$	0.964
	Residue	$(4.1 \pm 0.8) \times 10^{-3}$	0.879
Blank		$(1.6 \pm 0.5) \times 10^{-3}$	0.906

[a] Reaction conditions: 2 μM hexachloroethane, 8 mM Na_2S, pH 7.50, and room temperature.

[b] Fitted by pseudo-first-order model.
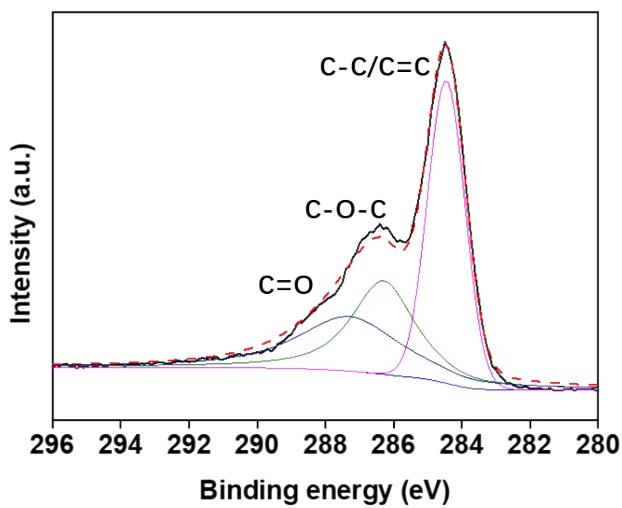
Fig. S1 Deconvolution of C1s peak in X-ray photoelectron spectroscopy (XPS) spectra of P-char. The peaks with the binding energies of 284.3 eV, 286.5 eV, and 287.5 eV are assigned to the carbon atoms in aromatic rings (C-C/C=C), epoxy/ether (C-O-C), and carbonyl (C=O), respectively.
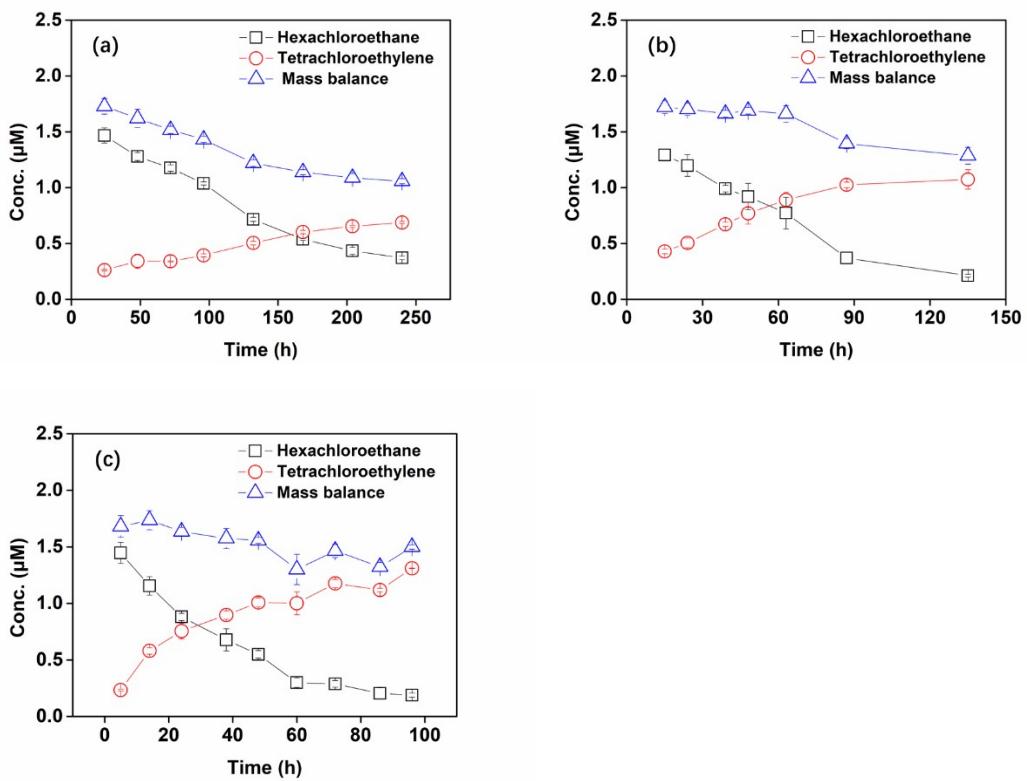
Fig. S2 Mass balance for hexachloroethane reduction mediated by different carbonaceous materials, plotted as concentration changes of hexachloroethane and tetrachloroethane (product) with time. Error bars represent standard deviations calculated from triplicate samples. (a) P-char. (b) MCNT. (c) Graphite. Reaction conditions: 2 μM nitrobenzene, 8 mM Na_2S, pH 7.50, and room temperature.
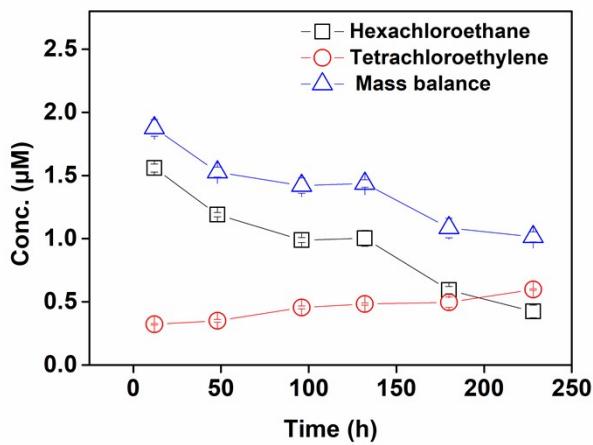
Fig. S3 Mass balance for hexachloroethane (initially at 2 μM) reduction by supernatant collected with filtration of suspension of P-char pre-reacted with Na$_2$S (8 mM) at pH 7.5 for 72 h, plotted as concentration changes of hexachloroethane and tetrachloroethane (product) with time. Error bars represent standard deviations calculated from triplicate samples.
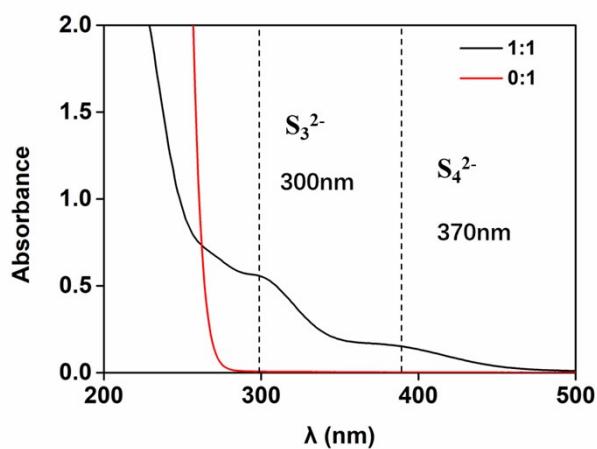
Fig. S4 UV-vis spectra of synthetic polysulfide prepared by mixing S^0 and Na_2S (totally in 8 mM) at 1:1 ratio in aqueous solution.
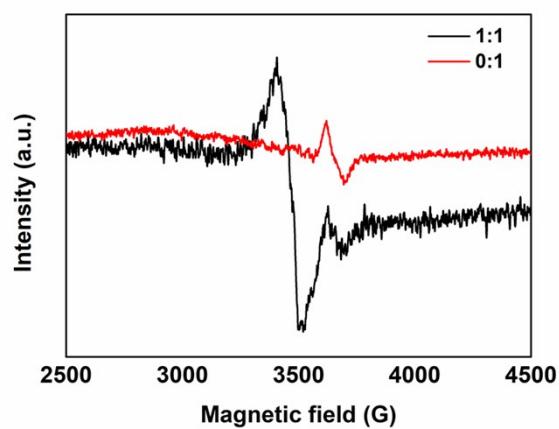
Fig. S5 EPR spectra of synthetic polysulfide prepared by mixing S^0 and Na_2S (totally in 8 mM) at 1:1 ratio in DMF, along with the spectra of Na_2S only (0:1 ratio).