Electronic supplementary information

1. Characterization of carbon soot

Under TEM, there were carbon nanoparticles observed with diameters about 22 nm, which aggregated with each other. The main peaks in IR spectrum were found at 3460cm^{-1} for -OH and 1633cm^{-1} for C=C. The typical G band and D band of graphite structure were evidenced at 1563 cm^{-1} and 1346 cm^{-1} in Raman spectrum. There was no Fe detected in carbon soot according to XPS analysis. The carbon atoms were in forms of C-C (63.52%) and C-O (36.48%) according to C1s XPS spectrum with a shake-up signal.

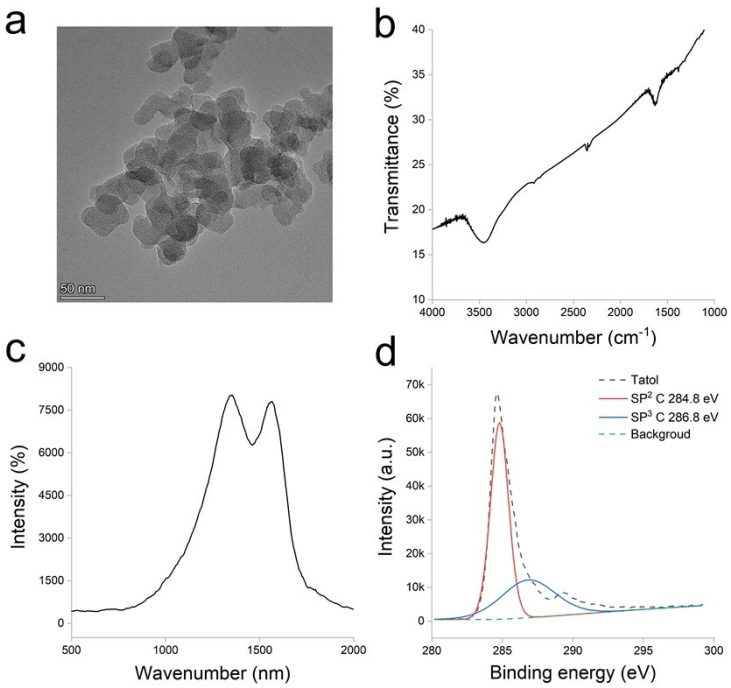

Fig. S1. Characterization of C40 carbon soot. (a) TEM image; (b) FTIR spectrum; (c) Raman spectrum; (d) C1s XPS spectrum.

2. Stability of CNSI-Fe

Table S1. Stability of CNSI-Fe within 6 h.

Indicator	Time point			
	0 h	0.5 h	3 h	6 h
Color	Black	Black	Black	Black
pH	3.2	3.0	2.9	2.9
Size change (%)	0	-0.23	0.23	-0.41
Zeta potential	-14.7	-12.8	-19.8	-14.9
Fe^{2+} (%)	103.7	102.0	103.8	101.0
Fe^{3+} (%)	0.35	0.35	0.35	0.35

3. Preparation protocols of CNSI-Fe

(1) $FeSO_4$ was dissolved in ultrapure water, filled with N_2 and then adjusted the pH to 2.8 with H_2SO_4. After the filtration with a 0.45 μm filter, the solution was lyophilized for storage. (2) NaCl and Poloxamer were dissolved in water, filtered by 0.22 μm filter, and added with carbon soot (50 mg/mL). The mixture was homogenized at 18000 rpm for 5 min, followed by the treatment by a homogenizer at 20000 psi for three times. After sterilization, CNSI was obtained for storage. (3) Before use, $FeSO_4$ and CNSI were mixed at designed quantities to obtain CNSI-Fe.

4. Measurements of Fe^{2+} contents

$FeSO_4$ (30 mg) was dissolved in 2 mL of CNSI. At 5 min after mixing, CNSI-Fe was divided into two sets of 1 mL. Separately, 4 mL of CNSI was added with 1 mol/L of HCl (36 mL) as the blank. Then, 3.6 g of $Fe(NH_4)_2SO_4 \cdot 6H_2O$ was dissolved in 100

mL of HCl (0.1 mol/L) as the standard sample. The blank and CNSI-Fe was added with 2 mL of standard sample and mixed well. These mixtures were titrated with $KMnO_4$ (0.02 mol/L) by potentiometric titration. The content of Fe(II) was calculated by Equation S1, where V_t is the $KMnO_4$ consumption of CNSI-Fe sample, V_b is the $KMnO_4$ consumption of blank, and C is the actual concentration of $KMnO_4$.

$$\text{Fe(II) (\%)} = \frac{(V_t - V_b) * C * 15.19 * 55.845}{0.02 * 2 * 30 * 151.91} \quad \text{(S1)}$$