Supplementary Materials

Table S1. Setup of Pre-Experiment.

System Labels	Micro/nano hematite a (mg)	Micro/nano carbon black a (mg)	Pyrene (μg/L)	As (III) (mg/L)
IO-As	0-1000	0	0	10
IO-Pyr	0-1000	0	80	0
CB-Pyr	0	0-1000	80	0
CB-As	0	0-1000	0	10

a 0-1000 refers to dosages of micro/nano hematite and carbon black ranged from 0 to 1000 mg (0, 5, 10, 25, 50, 100, 500, and 1000 mg)

Table S2. Adsorption isotherms of As(III) and pyrene reported in the literatures

Adsorbent	Adsorbate	Initial concentration	Isotherm model	qmax (mg/g)	References
Iron oxide nanoparticles	As(III)	1–7 mg/L	Langmuir	2.9 mg/g	[37]
Magnetite particles	As(III)	2 mg/L	Langmuir	3.70 mg/g	[38]
Fe_3O_4 nanoparticles	As(III)	32.32 mg/L	Langmuir	7.18 mg/g	[39]
Mixed α- Fe_2O_3 and γ-Fe_2O_3	As(III)	0–60 mg/L	Langmuir	46.5 mg/g	[30]
Carbon Nanotubes	pyrene	15 mg/L	Dubinin-Ashtakhov	42.7 mg/g	[40]
Activated Carbon	pyrene	8 mg/	Langmuir	104.5 mg/g	[41]
regenerable graphene wool	pyrene	300-800 ng/L	Langmuir	20 mg/g	[42]

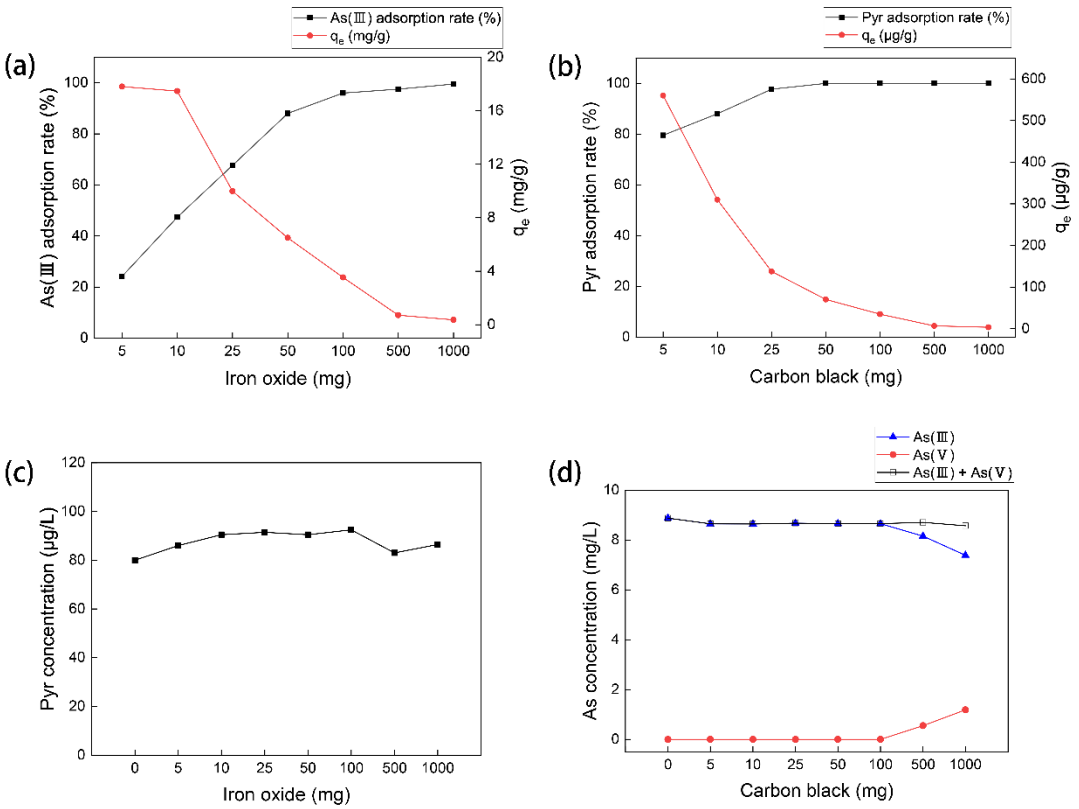

Figure S1. Adsorption of pyrene and As (Ⅲ) by micro/nano carbon black and iron oxide.
(a) Adsorption rate and adsorption capacity of As (Ⅲ) over the dosage of micro/nano iron oxide;
(b) Adsorption rate and adsorption capacity of pyrene over the dosage of micro/nano carbon black;
(c) Concentration of pyrene in the liquid over the dosage of micro/nano iron oxide;
(d) Concentration of f As in the liquid over the dosage of micro/nano carbon black.