Supplementary Information (SI) for Nanoscale.

Supplementary Material

The boosting adsorption of uranium (VI) on phosphorylated Fe_3O_4@MnO_2@UiO-66-$(OH)_2$

Keda Zhu, Maoning Xu, Quanqi Yang, Zhengwen Han, Wanjing Jia, Jianjun Wang*

College of Environmental Science and Engineering, North China Electric Power University, Beijing, China, 102206.

S1 Characterization of FMU-P

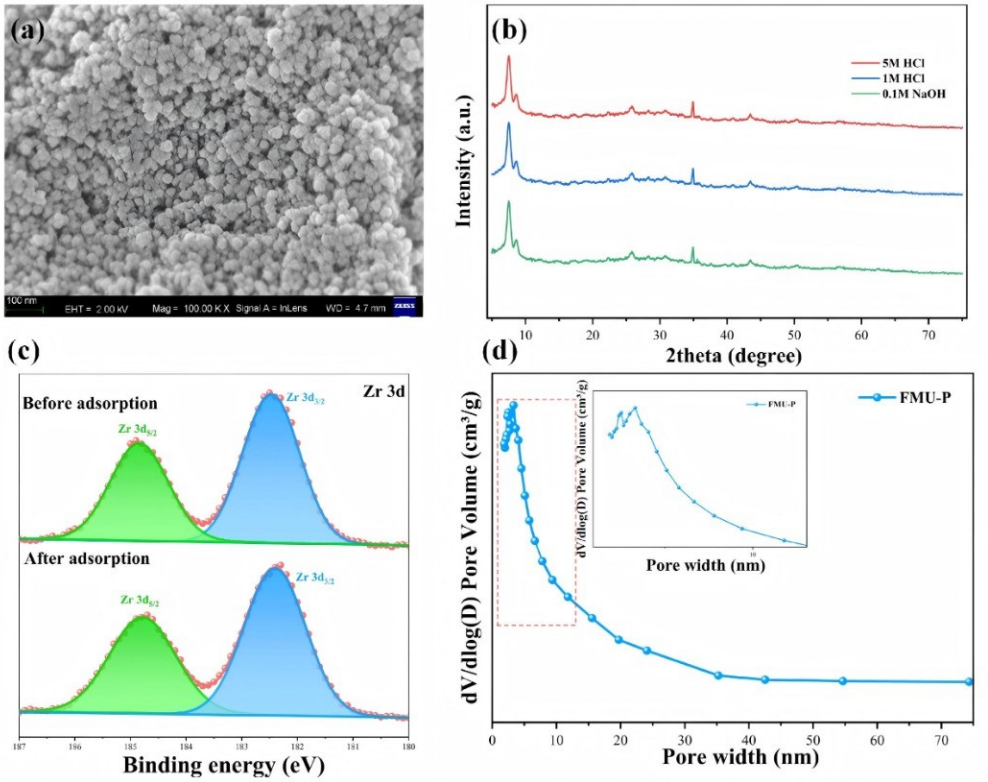

Figure. S1 Characterization of FMU-P (a) SEM; (b) XRD after acid-based treatment; (c) XPS Zr 3d; (d) pore width of FMU-P.

S2 Langmuir and Freundlich isothermal models

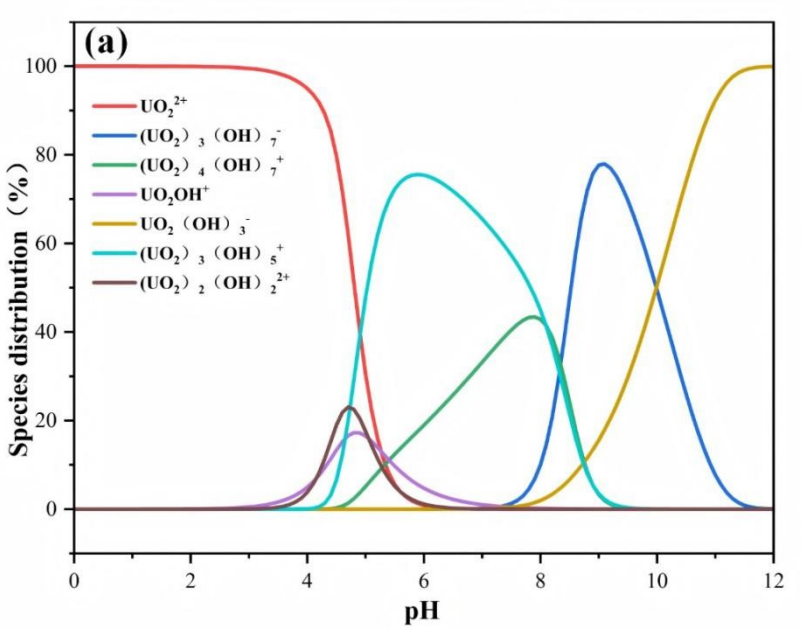

Figure. S2 (a) distribution of U(VI) at different pH.

Table S1 Isothermal model fitting of U(VI) on FMU and FMU-P.

Adsorbent	Langmuir Fitting			Freundlich Fitting		
	q_e (mg/g)	R^2	b	K_F	1/n	R^2
298.15K FMUP	697.7732	0.9882	0.5002	251.8593	2.9455	0.9354
313.15K FMUP	743.8239	0.9907	0.5704	333.3047	3.9606	0.9234
298.15K FMU	367.1557	0.9753	0.1807	107.3196	3.4057	0.9729
313.15K FMU	394.2757	0.9059	0.4257	145.1671	3.6649	0.9519

S3 Magnetic Recovery Effect Demonstration

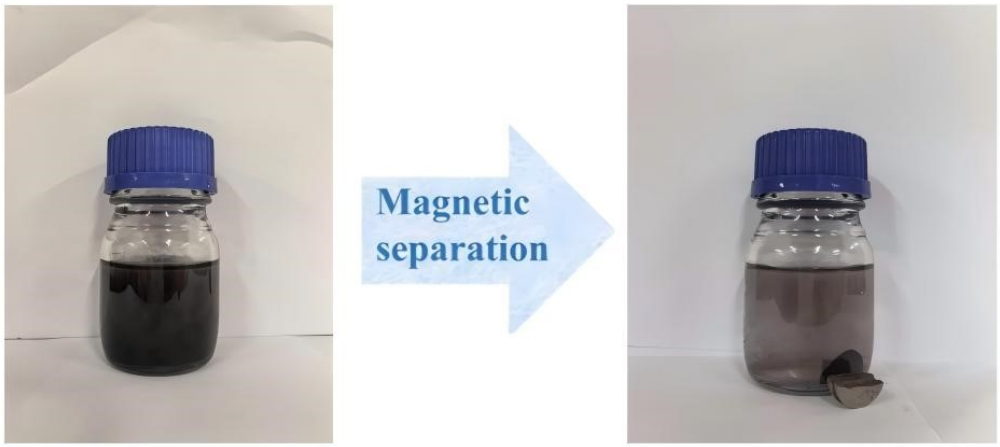

Figure. S3 magnetic recovery effect demonstration.

S4 Adsorption capacity and BET data after acid-base treatment

The chemical stability of FMU-P under strong acid and basic conditions was conducted as following: 20 mg of FMU-P was dissolved completely into 5 M HCl ,1 M HCl and 0.1 M NaOH solution and reacted for 24 h. Subsequently, adsorption tests were conducted. Adsorption fitting results were shown in Figure.S4 and Table S2. Table S3 was the pore size and specific surface area of FMU-P after acid-based treatment. The valves decreased compared with

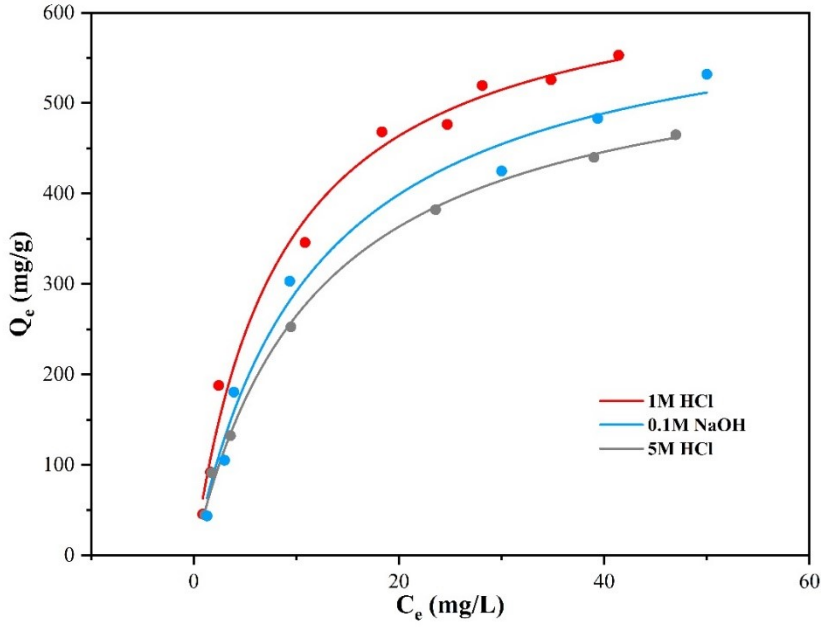

Figure. S4 Langmuir model fitting of U(VI) on FMU-P after acid-base treatment

Table S2 Langmuir model fitting of U(VI) on FMU-P after acid-base treatment

FMU-P	q_e (mg/g)	R^2	b	Degree of decline (%)
5M HCl 24h	578.0586	0.9877	0.08464	17.15
1M HCl 24h	659.9305	0.9890	0.1183	5.42
0.1M NaOH 24h	630.4562	0.9853	0.08625	9.65

Table S3 The pore size and specific surface area of FMU-P

FMU-P	Pore size (nm)	specific surface area (m^2/g)
5M HCl 24h	14.75	183.06
1M HCl 24h	16.59	296.05
0.1M NaOH 24h	15.43	240.42