Supporting Information

Vanadium substituted heteropolyacids ($H_{3+m}PW_{12-m}V_mO_{40}$) encapsulated into Fe_3O_4@UiO-66 magnetic core-shell microspheres as brilliant catalysts for oxidative desulfurization under oxygen

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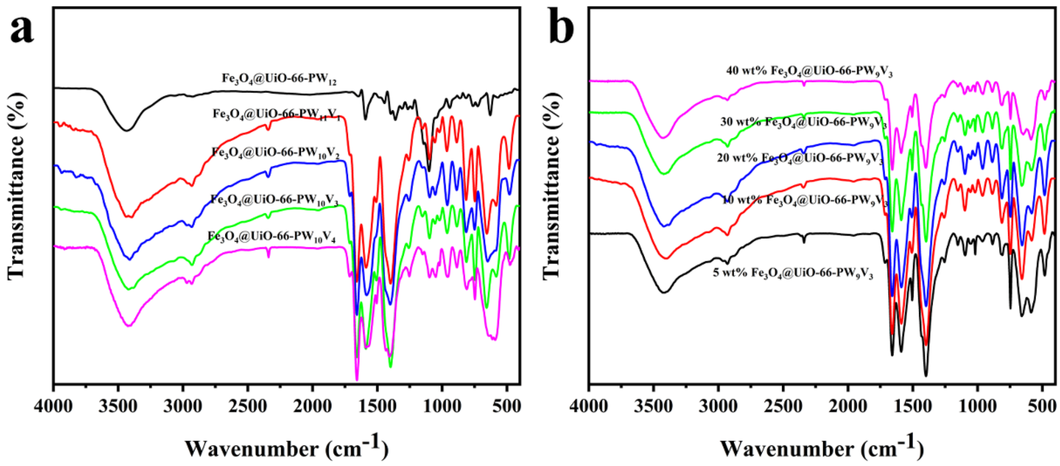

Fig. S1. FT-IR spectra of (a) the loading different HPA catalysts Fe_3O_4@UiO-66-HPA, and (b) the different HPA loading amount catalysts Fe_3O_4@UiO-66-PW_9V_3.

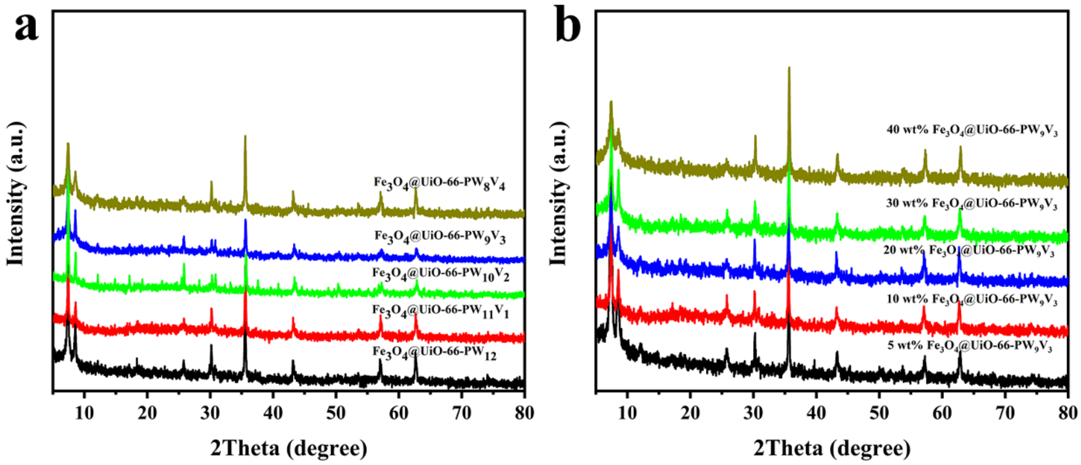

Fig. S2. XRD patterns of (a) the loading different HPA catalysts Fe_3O_4@UiO-66-HPA, and (b) the different HPA loading amount catalysts Fe_3O_4@UiO-66-PW_9V_3.

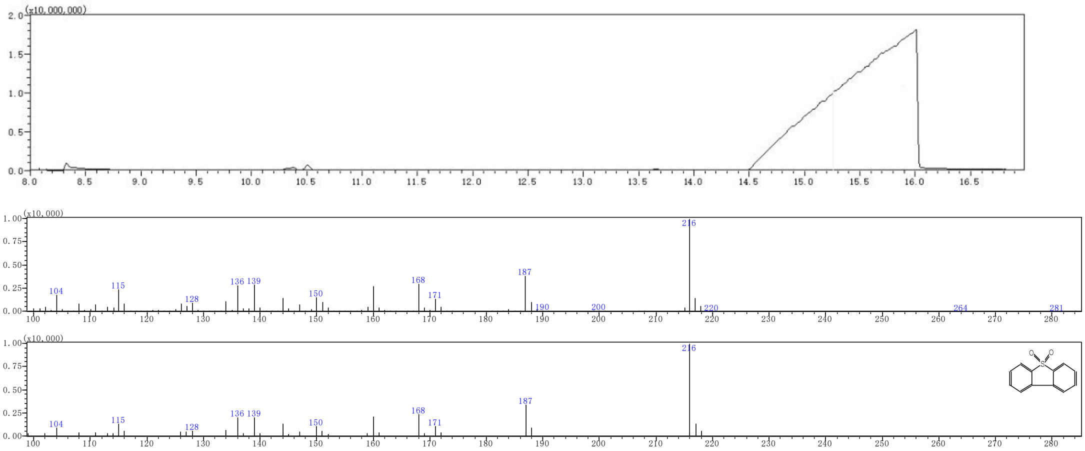

Fig. S3. The GC-MS analysis of the product extracted by CH_3CN after ODS.

Table S1. ICP data of different catalysts.

Catalyst	W (wt%)	V (wt%)	W/V (mol ratio)	HPA (wt%)
5 wt% Fe_3O_4@UiO-66-PW_9V_3	2.81	0.26	2.99	4.68
10% wt% Fe_3O_4@UiO-66-PW_9V_3	5.83	0.53	3.03	9.72
20% wt% Fe_3O_4@UiO-66-PW_9V_3	11.54	1.06	3.02	19.23
30% wt% Fe_3O_4@UiO-66-PW_9V_3	15.93	1.46	3.02	26.55
40% wt% Fe_3O_4@UiO-66-PW_9V_3	20.50	1.88	3.01	34.16
After used 10 times	10.97	1.01	3.00	17.37

Table S2. The comparison between ODS results of different HPA based catalysts.

Catalyst	Oxidant	Temperature (°C)	Time (min)	DBT conversion (%)	Reference
MoV/Zr/SBA	TBHP	60	75	98.5	S1
HPA-PMI_n [a]	H_2O_2	50	120	98.9	S2
$[Co(BBPTZ)_3][HPMo_{12}O_{40}]$ [b]	TBHP	50	480	99.16	S3
PTA@MIL-101(Cr)	H_2O_2	50	120	99	S4
Co-POM@MOF-199@MCM-41	O_2	80	160	99.1	S5
$K_6P_2W_{18}O_{62}$/GO	air	60	300	96.10	S6
Fe_3O_4@UiO-66-PW_9V_3	O_2	60	180	99.85	this work

[a] This catalyst represents a porous nanoflower catalyst self-assembled from HPA and polyionene denominated poly(2, p-methylphenylionene) (PMI_n).

[b] This catalyst says a cationic triazole-based MOF encapsulating HPA, BBPTZ=4,4-bis(1,2,4-triazol-1-ylmethyl)biphenyl].

Reference

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