

Supporting Information

**Synchronous oxidation and sequestration for As(III) from aqueous
solution by modified CuFe_2O_4 coupled with peroxymonosulfate: A
fast and stable heterogeneous process**

Fu Liu, Jian-Feng Wu, Guang-Chao Zhao *

School of Ecology and Environment, Anhui Normal University, Wuhu 241000, P. R. China.

E-mail: gczhao@mail.ahnu.edu.cn

Test S1

The As(V) concentration was determined by using the modified molybdate-based method.¹ Briefly, 1 ml of reaction solution was diluted with 2% HCl rather than HNO₃ immediately after withdrawing due to the presence of nitrate leads to color instability, and then mixed with 0.5 ml specified molybdate agent in a 10 ml vials. Of note, samples must be spiked to at least 20 μM PO₄³⁻. The absorbance of mixed solution was measured at 880 nm with a UV-vispectrophotometer (TU-1901, China) after 20 min.¹

Table S1. Comparison of the As(III) adsorption capacity between various Fe-based spinel adsorbents.

Adsorbents	Reaction conditions	As(III) Adsorption capacity (mg/g)	Ref.
CoFe ₂ O ₄	pH = 3.0, T = 25°C	100	2
MnFe ₂ O ₄	pH = 6.9	27.27	3
CuFe ₂ O ₄	pH = 4.2, T = 35°C	41.2	4
CCF	pH = 7.0, T = 50°C	45	5
Mn _{0.5} Cu _{0.5} Fe _{1.2} Al _{0.8} O ₄	pH = 6.0, T = 40°C	0.053	6
CuFe ₂ O ₄ /PMS	pH = 7.0, T = 30°C	63.9	7
CuAl ₂ O ₄ /PMS	pH = 7.0, T = 25°C	66.25	8
CuFe ₂ O ₄ -Foam/PMS	pH = 7.0, T = 25°C	105.78	Present work

Table S2. Kinetics constants for As(III) adsorption by the CuFe₂O₄-Foam/PMS system.

Pseudo-second-order model			
	k ₂ (g/mg/min)	q _e (mg/g)	R ²
① Different system	-	-	-
CuFe ₂ O ₄ -Foam/PMS	0.0168	18.76	0.9998
CuFe ₂ O ₄ -Foam alone	0.0032	18.72	0.9925
CuFe ₂ O ₄ /PMS	0.0148	9.04	0.9989
② Adsorbent dose	-	-	-
Half piece	0.0085	18.45	0.9963
One piece	0.0168	18.76	0.9998
Two pieces	0.0730	18.62	0.9999

Three pieces	0.1632	18.55	0.9999
③ Oxidant dose (μM)	-	-	-
50	0.0146	18.65	0.9996
100	0.0168	18.76	0.9998
200	0.0221	18.73	0.9996
400	0.0286	18.69	0.9997
④ pH	-	-	-
3.0	0.0199	18.73	0.9995
5.0	0.0167	18.73	0.9992
7.0	0.0168	18.76	0.9998
9.0	0.0156	18.76	0.9994
11.0	0.0119	18.18	0.9976
⑤ Temperature ($^{\circ}\text{C}$)	-	-	-
10	0.0149	18.73	0.9990
25	0.0168	18.76	0.9996
40	0.0170	18.76	0.9993
50	0.0185	18.73	0.9994
60	0.0203	18.69	0.9995

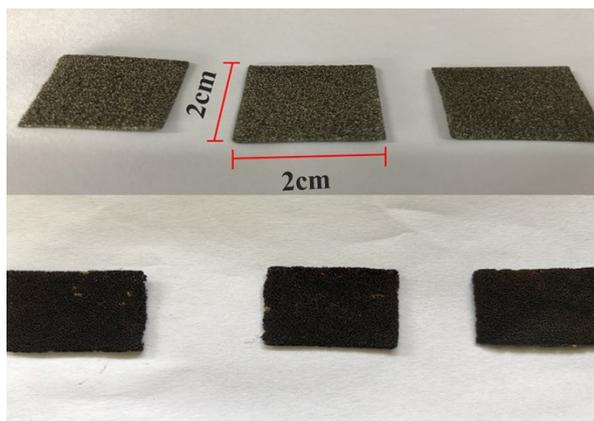


Fig. S1. The appearance of Fe-Ni foam and CuFe₂O₄-Foam

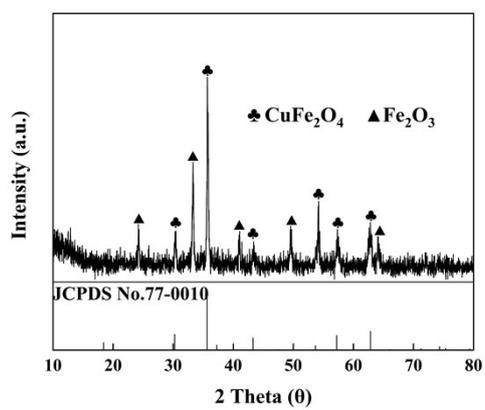


Fig. S2. The XRD images of bare CuFe₂O₄.

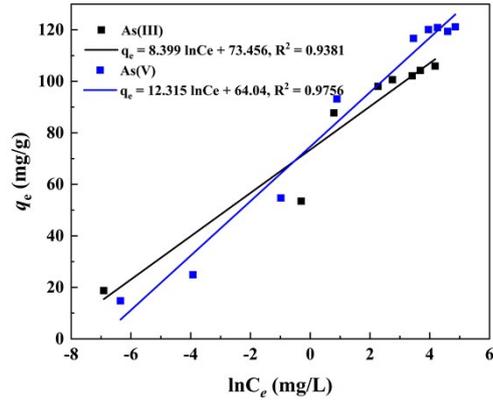


Fig. S3. The fitting curve of As(III) and As(V) removal data by Temkin model.

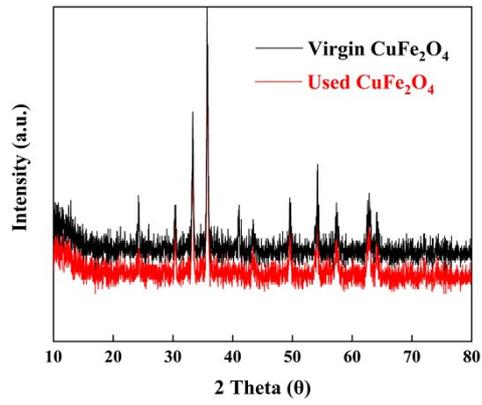


Fig. S4. XRD images of virgin and used CuFe_2O_4 .

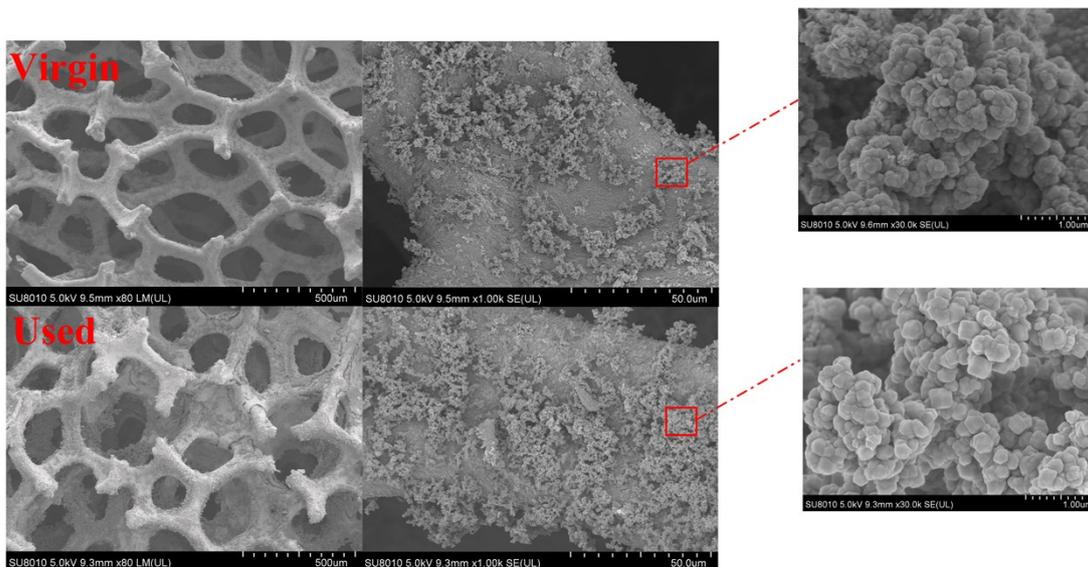


Fig. S5. SEM images of virgin and used (without regeneration) CuFe_2O_4 .

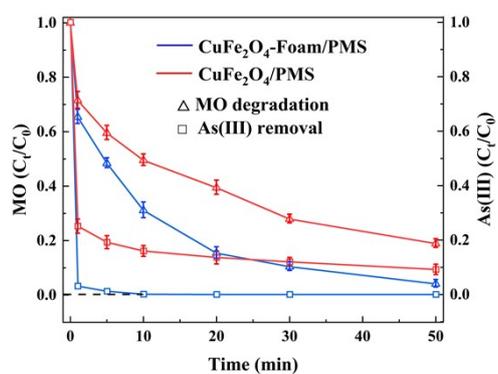


Fig. S6. Simultaneous removal of As(III) and degradation of MO. Conditions: one piece adsorbent, 400 μM PMS, pH 7.0, 25 $^\circ\text{C}$, 1 mg/L As(III), and 10 μM MO.

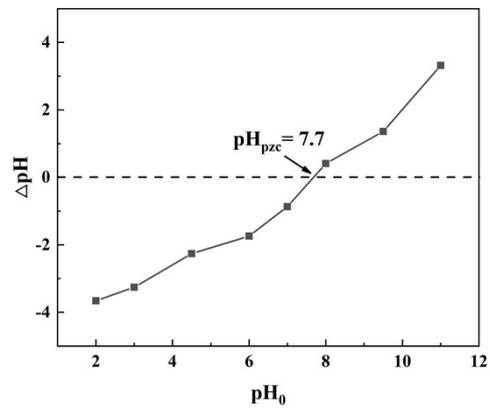


Fig. S7. pH_{pzc} of CuFe_2O_4 -Foam.

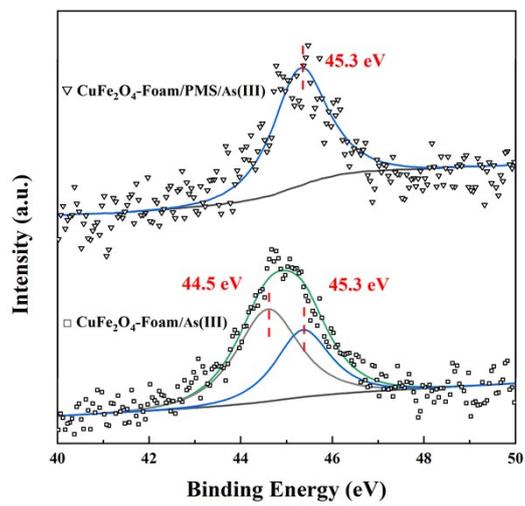


Fig. S8. XPS As 3d spectra of the CuFe_2O_4 -Foam with or without PMS.

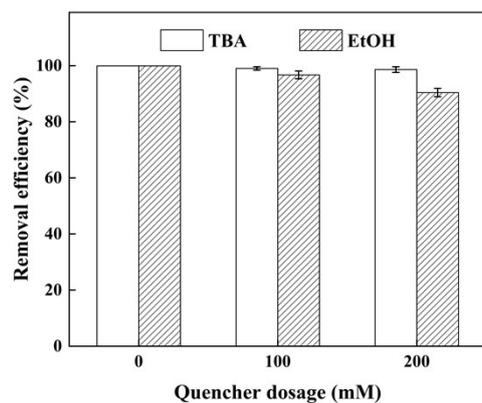


Fig. S9. Removal efficiency of As(III) in presence of different quenchers, reaction time for (b) :180 min.

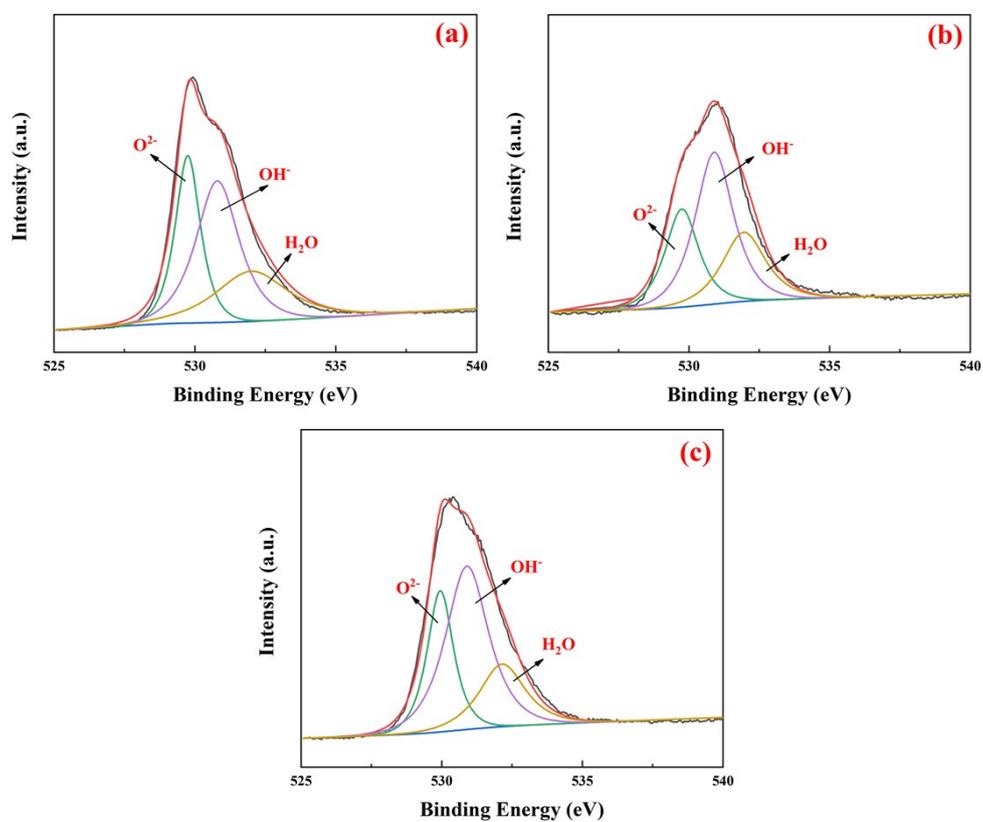


Fig. S10. XPS O 1s spectra of virgin CuFe₂O₄-Foam (a), with (b) or without PMS (c).

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