

Supplementary Information

Copper ion based metal–organic frameworks nanomaterials with roughness-enhanced protein adhesion for high-efficiency hemoglobin separation

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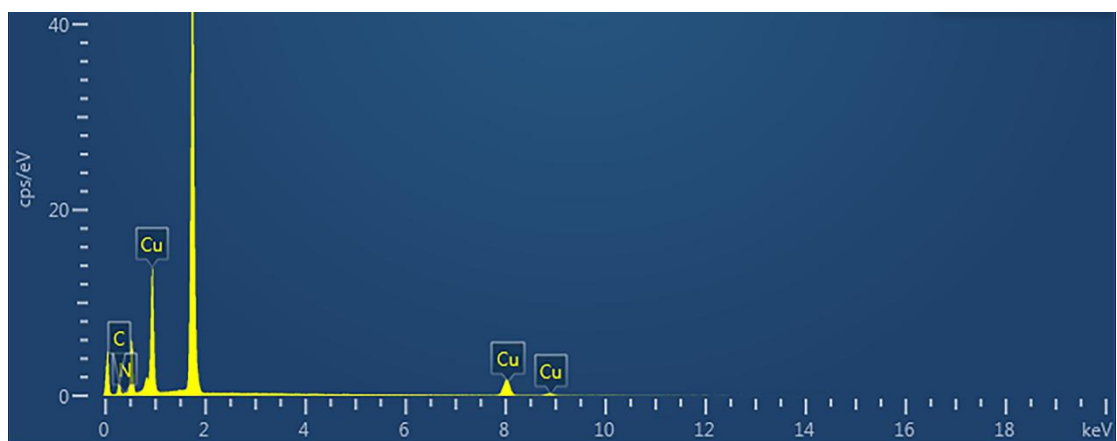


Fig. S1 EDX analysis of Cu-MOF.

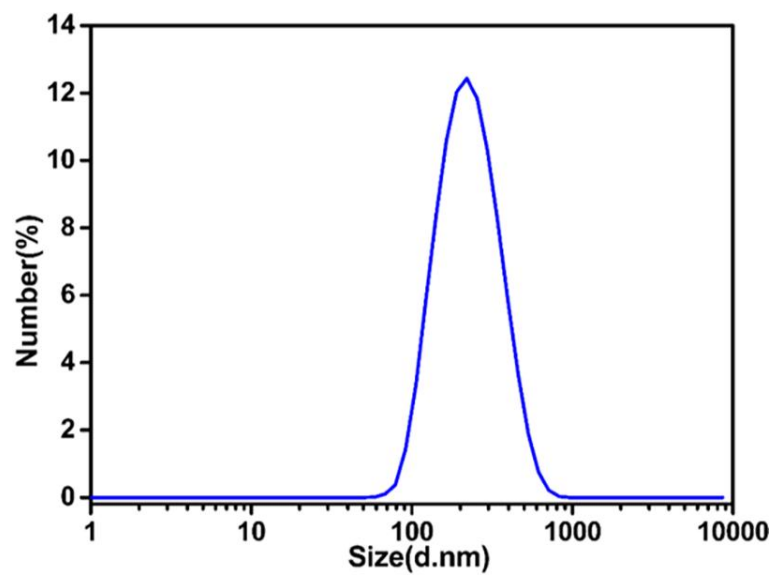


Fig. S2 Particle sizes of Cu-MOF.

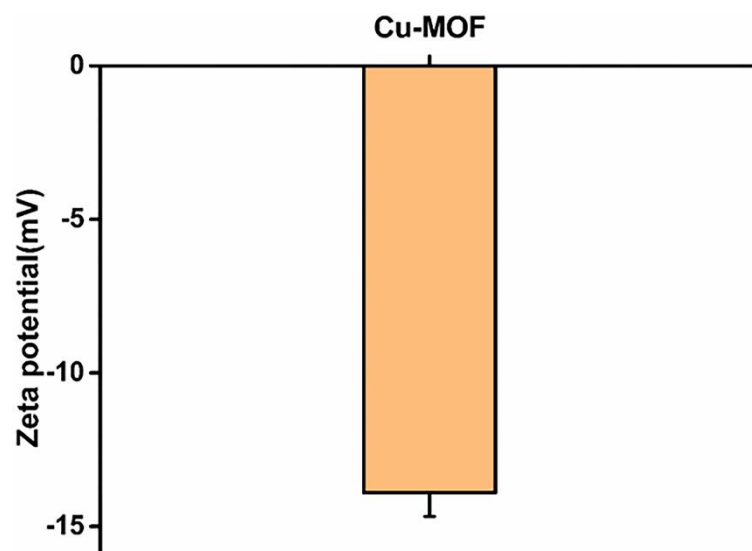


Fig. S3 Zeta potentials of Cu-MOF.

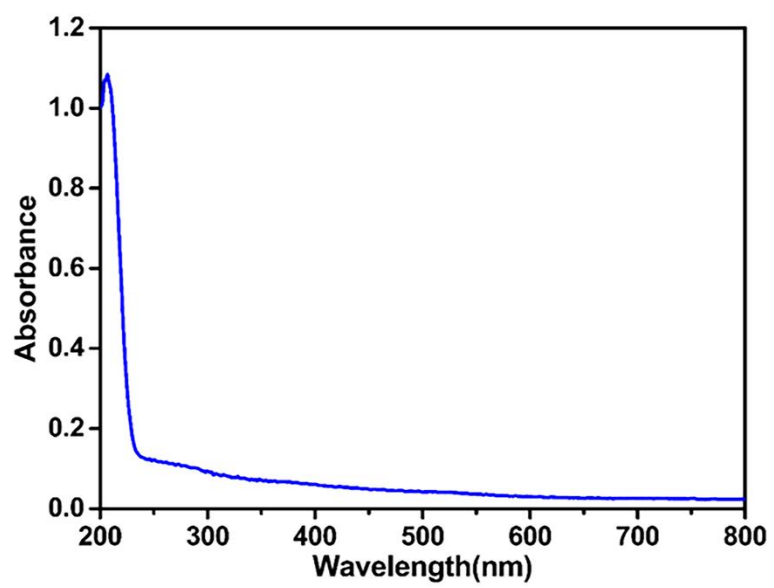


Fig. S4 UV-vis spectrum of Cu-MOF.

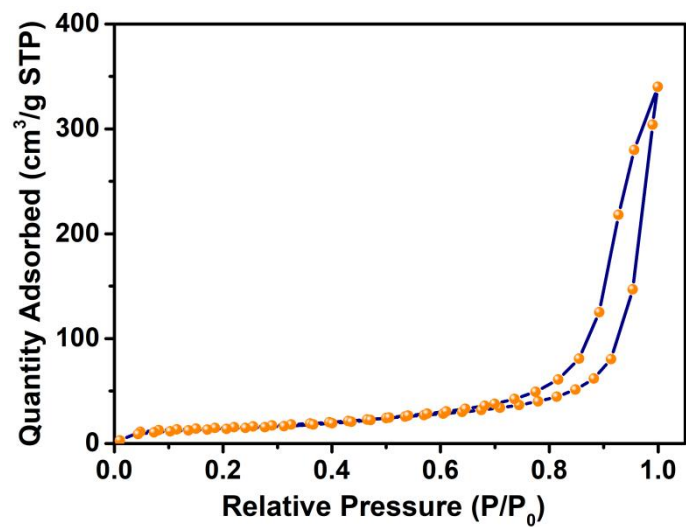


Fig. S5 The N₂ adsorption-desorption isotherms curves of Cu-MOF.

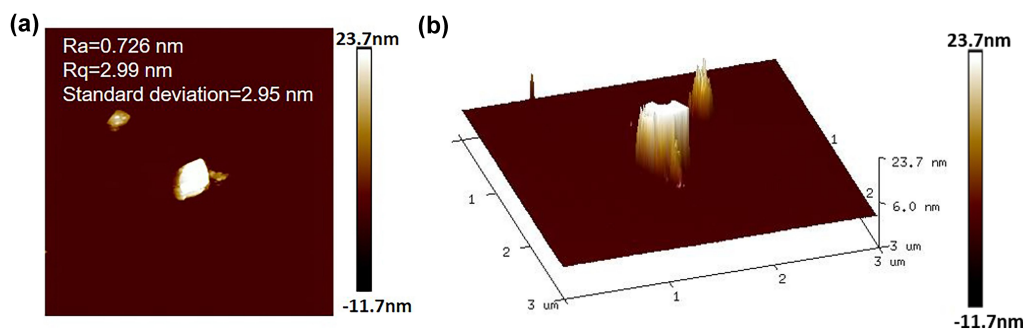


Fig. S6 (a) AFM images and (b) 3D surface topography of Cu-MOF.

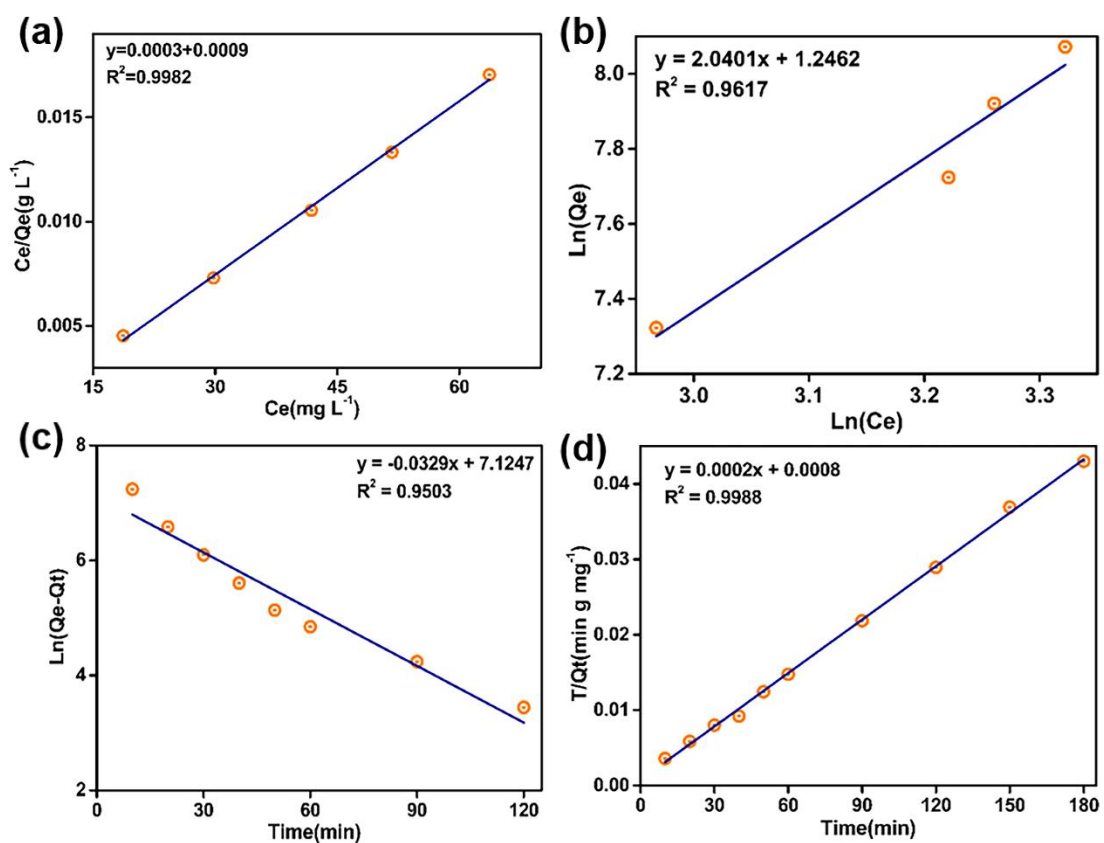


Fig. S7 (a) Langmuir model, (b) Freundlich model, (c) Pseudo-first-order model, and (d) Pseudo-second-order model.

Table S1. Langmuir and Freundlich parameters of Cu-MOF for BHB adsorption.

Langmuir		Freundlich	
$Q_m(\text{mg g}^{-1})$	R^2	$1/n$	R^2
4161.7	0.9982	7.691	0.9617

Table S2. Comparison of the adsorption capacity of BHp on different MOF-based adsorbent materials.

Adsorbents	Adsorption capacity (mg g ⁻¹)	Reference
Fe ₃ O ₄ @NiFe LDH	3287.67	1
PDA@F127/ZIF-67	834.3	2
Fe ₃ O ₄ @ZIF-8	6222	3
HKUST-1/TiO ₂ NM	179.2	4
Y(BTC)(H ₂ O) ₆	555.6	5
LaMOF-GO ₃	193	6
Cu-MOF	4161.7	This work

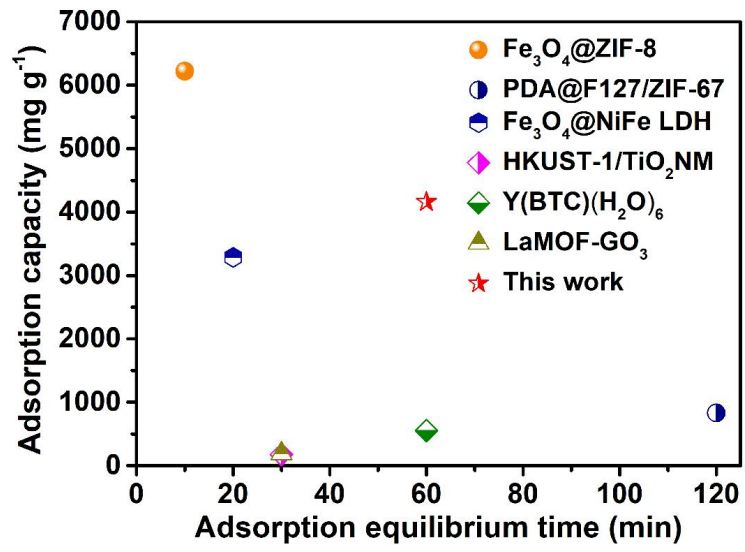


Fig. S8 Adsorption performance of reported representative MOF.

Table S3. Adsorption kinetics parameters of Cu-MOF for BHb adsorption.

Pseudo-first-order			Pseudo-second-order model		
k_1 (min^{-1})	Q_e (mg g^{-1})	R_1^2	k_2 (g (mg min)^{-1})	Q_e (mg g^{-1})	R_2^2
0.0519	2176.72	0.9503	0.0005	5000	0.9988

Intraparticle diffusion model	Initial phase			Secondary phase		
	k_{p1} ($\text{mg (g min}^{1/2})^{-1}$)	C_1 (mg g^{-1})	R_1^2	k_{p2} ($\text{mg (g min}^{1/2})^{-1}$)	C_2 (mg g^{-1})	R_2^2
	350.46	1779.5	0.9582	25.307	3870.2	0.9316

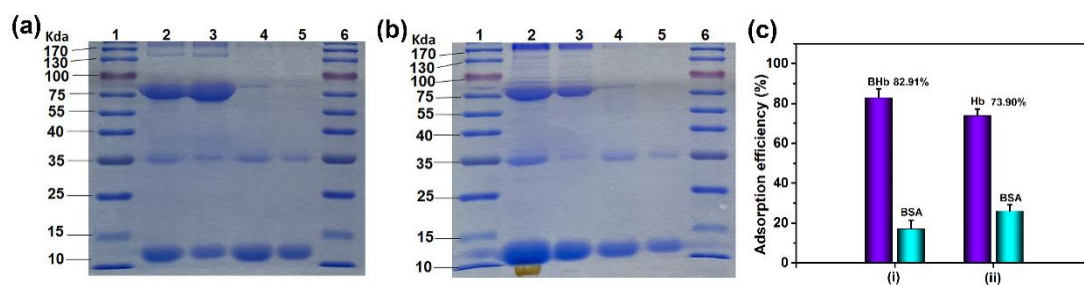


Fig. S9 SDS-PAGE assay results. (a) BHB and BSA binary solution and (b) Bovine whole blood. Line 1 and 6: protein molecular weight marker, line 2: (a) $200 \mu\text{g mL}^{-1}$ BHB and BSA binary solution, (b) 20-fold bovine whole blood, line 3: the supernatant after the enrichment by Cu-MOF, line 4: the elute, line 5: $200 \mu\text{g mL}^{-1}$ BHB standard solution. (c) Calculation of the adsorption efficiency of Cu-MOF on BHB/Hb in (i) BHB and BSA binary solution and (ii) bovine whole blood by Image J.

References

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