Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Supplementary Information

Cysteamine-functionalized biomimetic chromotropic hydrogel for naked-eye detection and adsorption of mercury ions

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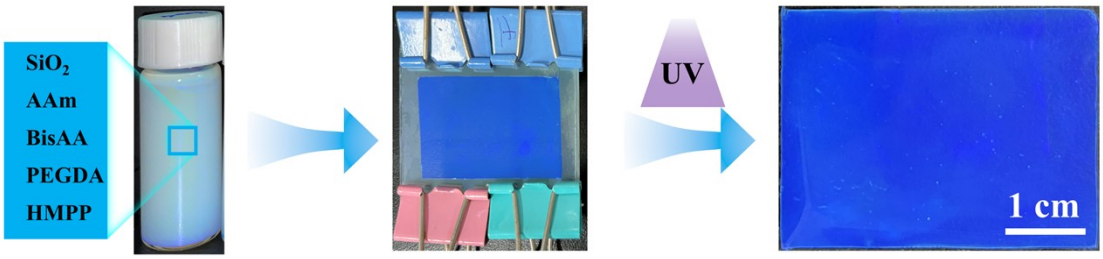

Figure S1. The schematic diagram of the preparation of BCH.

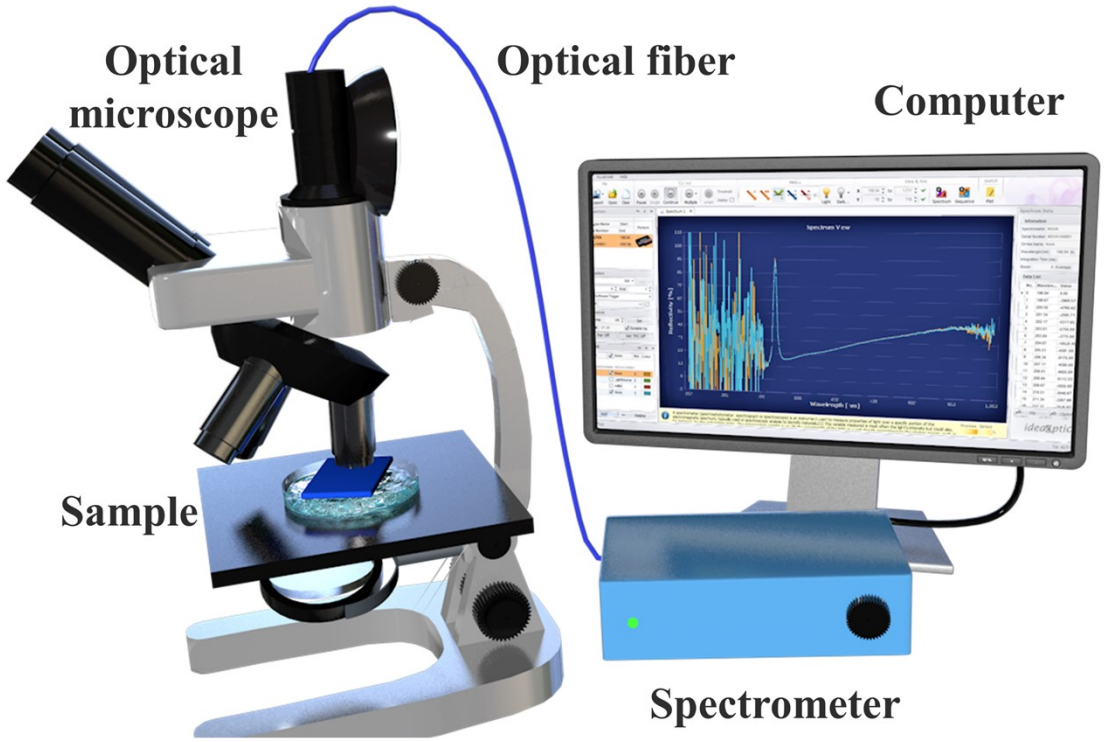

Figure S2. The schematic diagram of the reflectance spectrum of a sample tested by a fiber optic spectrometer.

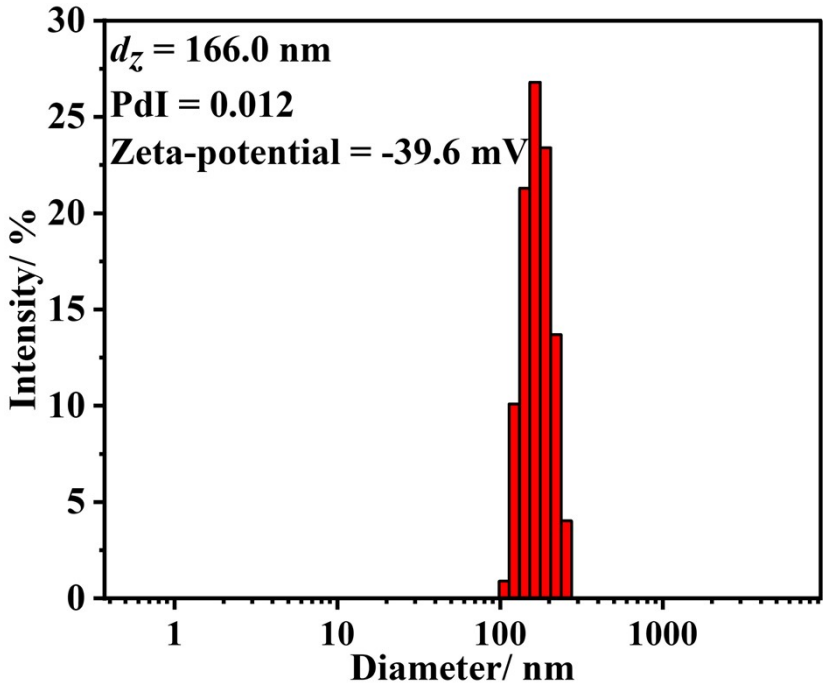

Figure S3. The hydrodynamic diameter distribution of SiO_2 nanoparticles in the aqueous solution.

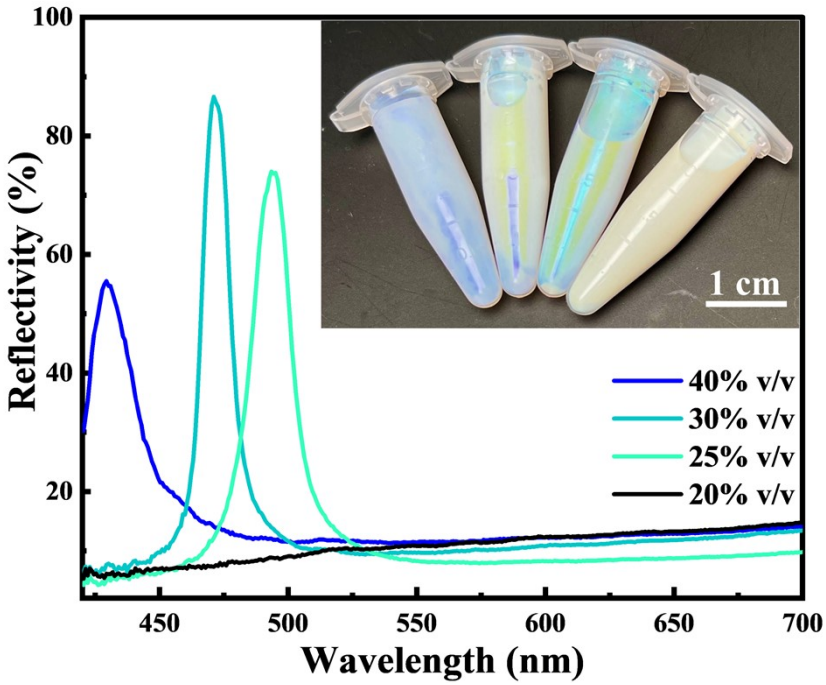

Figure S4. Reflection spectra of pre-polymerization solutions with different volume fractions of SiO_2 (the inset is the corresponding digital photo).

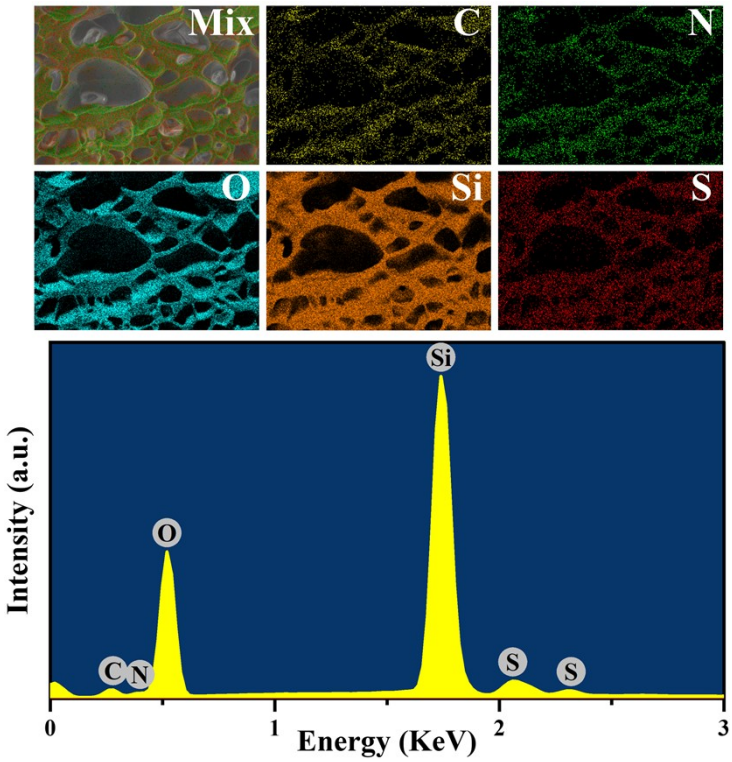

Figure S5. Elemental (C, N, O, Si and S) spectra and EDX spectra of Cys-BCH.

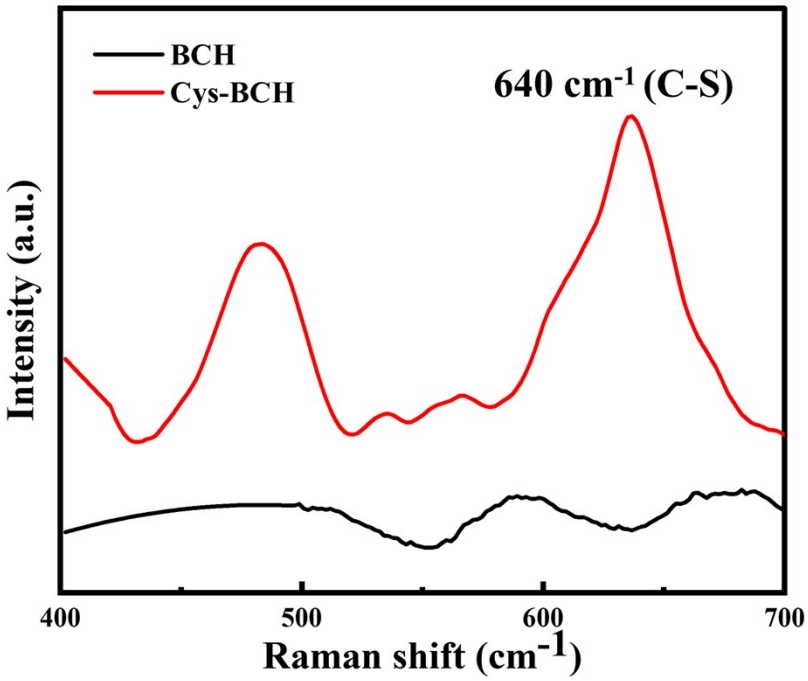

Figure S6. Raman spectra of BCH and Cys-BCH.

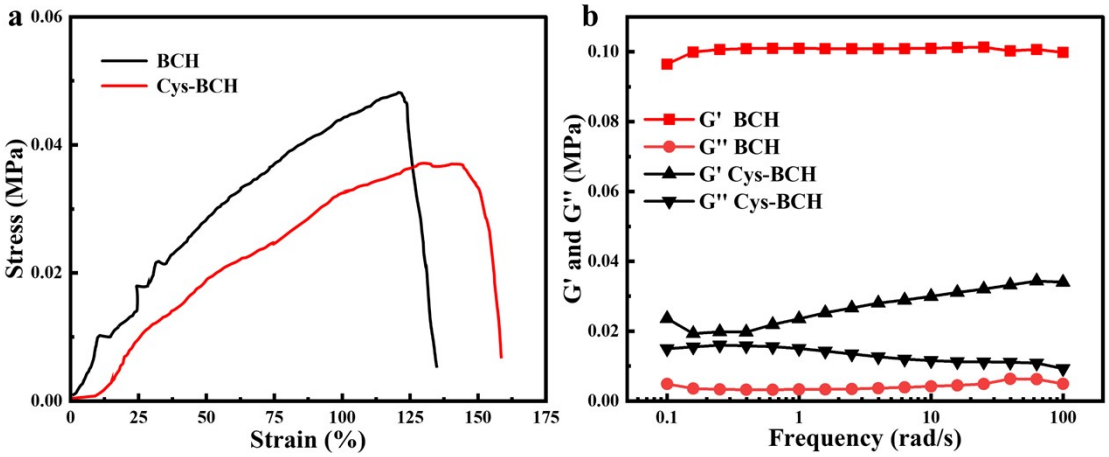

Figure S7. Mechanical properties of BCH and Cys-BCH: (a) tensile strain-stress curves and (b) storage modulus (G') and loss modulus (G") as a function of angular frequency.

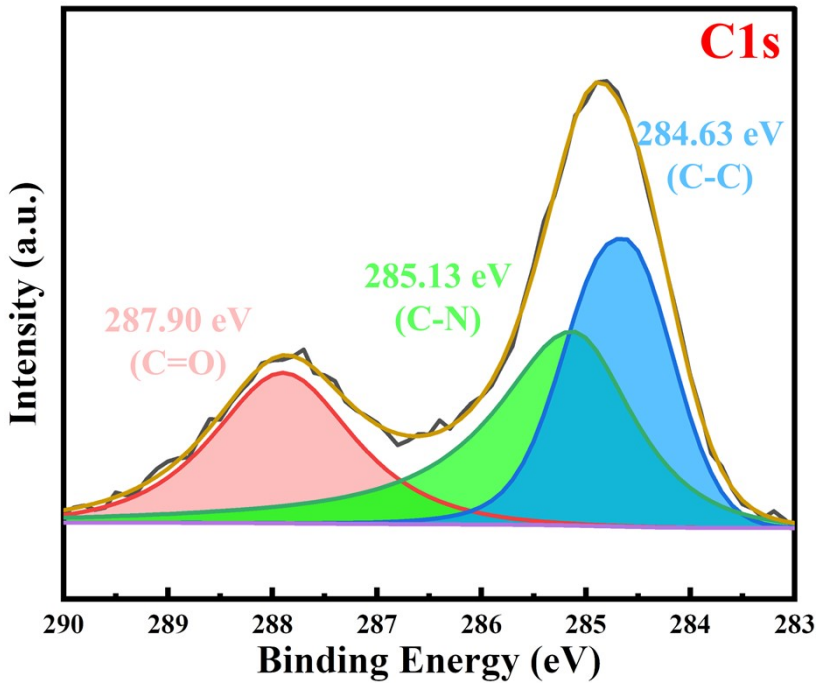

Figure S8. The high-resolution XPS spectrum of C 1s on Cys-BCH.

Table S1. Different parameters value of kinetics models at a temperature of 303 K.

Kinetics model	Parameters	Values
Pseudo-first-order	k_1	0.0411
	R^2	0.974
	Q_e	0.0946
Pseudo-second-order	k_2	0.0180
	R^2	0.999
	Q_e	0.1894

Table S2. Equilibrium adsorption concentration (C_e), saturated adsorption capacity (Q), and adsorption efficiency (η) under different initial Hg^{2+} concentrations (C_i).

C_i [mM]	C_e [mM]	Q [mmol·g^{-1}]	η [%]
0.1	0.00117	0.01977	98.83
0.3	0.00886	0.05823	97.05
0.5	0.02788	0.09443	94.42
1	0.08215	0.18357	91.79
2	0.64450	0.27110	67.78
3	1.45620	0.30876	51.46
4	2.44560	0.31088	38.86

Table S3. Different parameters value of isotherms models at the same temperature.

Isotherm model	Parameters	Values
Langmuir	Q_m	0.3123
	K_L	17.2777
	R^2	0.989
Freundlich	K_F	0.2719
	n	3.9493
	R^2	0.933

Table S4. Comparison of detection and adsorption performance of various functional materials simultaneously featuring Hg^{2+} detection and adsorption abilities.

Materials	Adsorption capacity	Adsorption time	Detection range	Detection limit	Refs
Cysteamine-functionalized photonic gel	62.7 mg/g	2 h	0.1nM-10 μM	0.3 nM	This work
Thioether-based fluorescent COF	Not given	Not given	0.125 μM - 33.3 μM	0.125 μM	Ref.1
Luminescent MOF	380 mg/g	The removal rate is 99.1% in 30 min	16 nM-19.6 μM	16 nM	Ref.2
Al-MOF based on thione derivatives	1110 mg/g		2 nM-2.1μM	4 nM	Ref.3
Thiourea functionalized 1D photonic crystal film	739.6 mg/g	12 h	1 nM-800μM	1 nM	Ref.4
Fluorescence probe on mesoporous silica	482 mg/g	3 h	0.185 μM-100 μM	0.185 μM	Ref.5
Fluorescent supramolecular polymer	Not given	12 h	0.3 μM-15 μM	0.3 μM	Ref.6

References

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