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

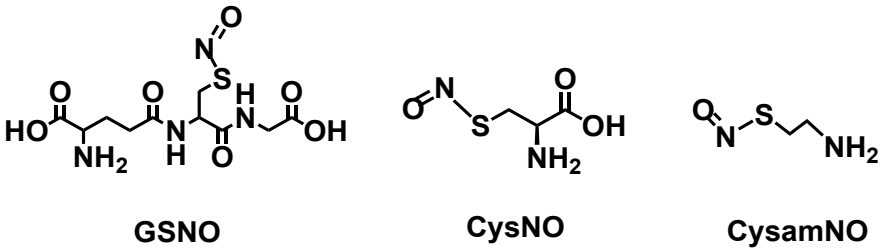
Supporting Information

Versatile metal organic frameworks as catalysis and indicator of nitric oxide

Pinghua Ling,*, Xianping Gao, Xinyu Sun, Pei Yang and Feng Gao*

Laboratory of Functionalized Molecular Solids, Ministry of Education, Anhui Key Laboratory of Chemo/Biosensing, College of Chemistry and Materials Science, Anhui Normal University, Wuhu 241002, P. R. China.

Experimental Section



Scheme S1. Molecular structures of bioavailable RSNO: s-nitrosoglutathione (GSNO), s-nitrosocysteine (CysNO), and s-nitrosocysteamine (CysamNO).

FT–IR spectroscopy

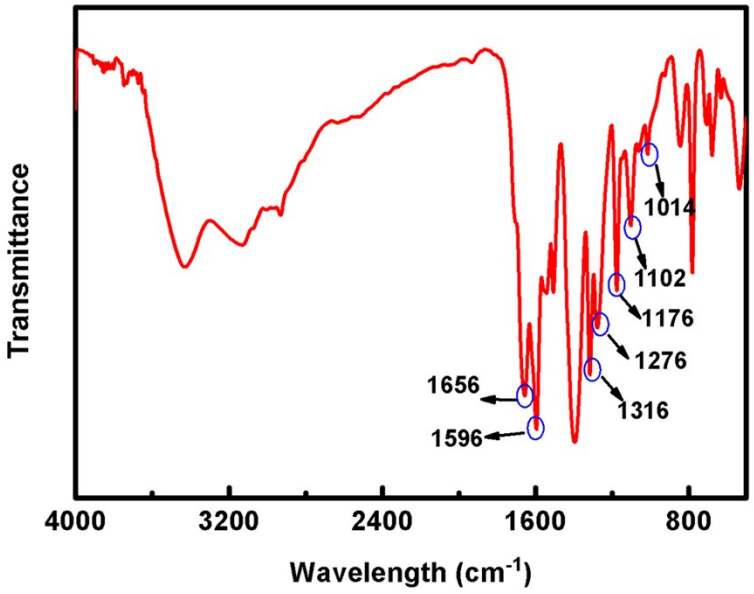


Fig. S1. FTIR spectrum of Cu-MOFs.

TGA analysis

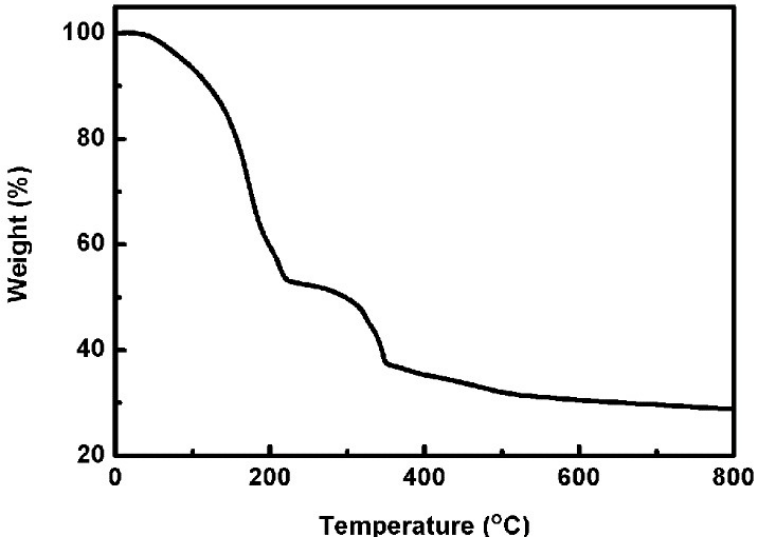


Fig. S2. Thermogravimetric analysis (TGA) curve of Cu-MOFs.

FL Behaviors of Cu-MOFs towards CysamNO and GSNO

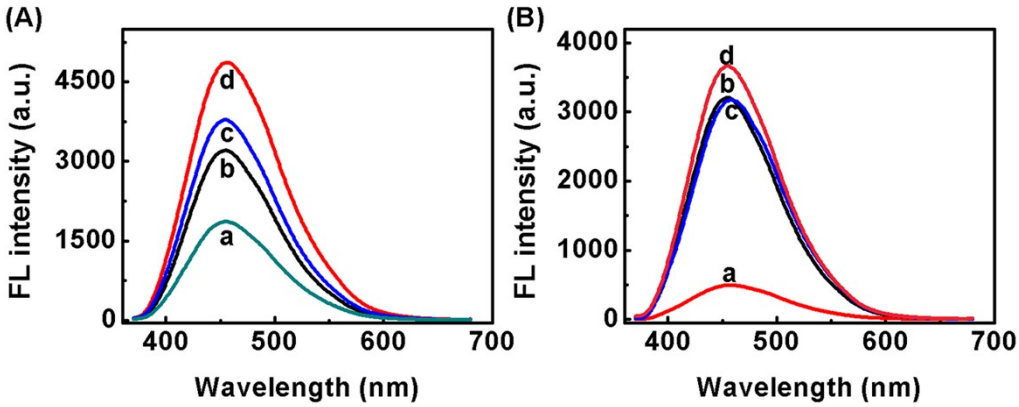


Fig. S3. Fluorescence emission spectra of Cu-MOFs in response to (A) 60 μM CysamNO (a), 2.5 μM NO (b), (b) +60 μM CysamNO (c), and (a) + 2.5 μM NO (d), and (B) 60 μM GSNO (a), 2.5 μM NO (b), (b) +60 μM GSNO (c) and 60 μM GSNO + 2.5 μM NO (d). The emission wavelength was at 450 nm.

Catalytic test

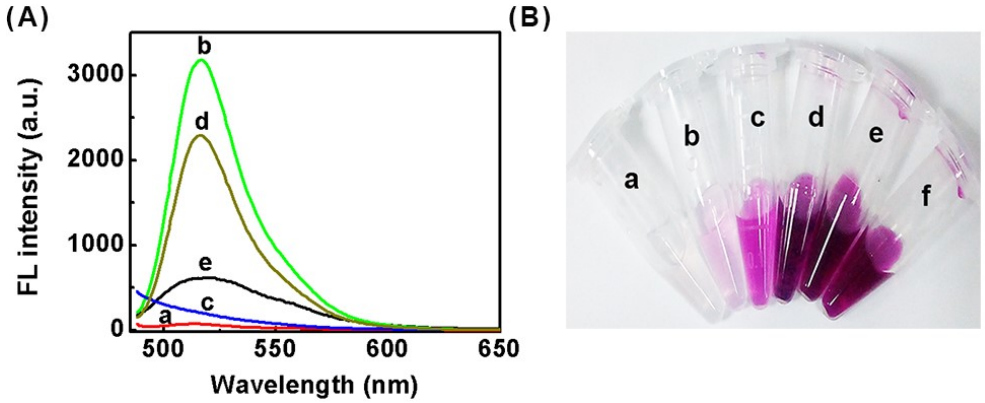


Fig. S4. (A) Fluorescence emission spectra of DAF-FM DA without (a), and with 0.17 mM NO (b), Cu-MOFs (c), (c) + 0.17 mM NO (d), and (c) + 0.5 mM CysNO (e). (B) The photographs of the NO assay kit, in response to Cu-MOFs (a), standard (b), 0.33 mM NO (c), 1.7 mM GSNO (d), 1.7 mM CysNO (e) and 1.7 mM CysamNO (f). Ex =470 nm, Em= 515 nm.

XPS characterization

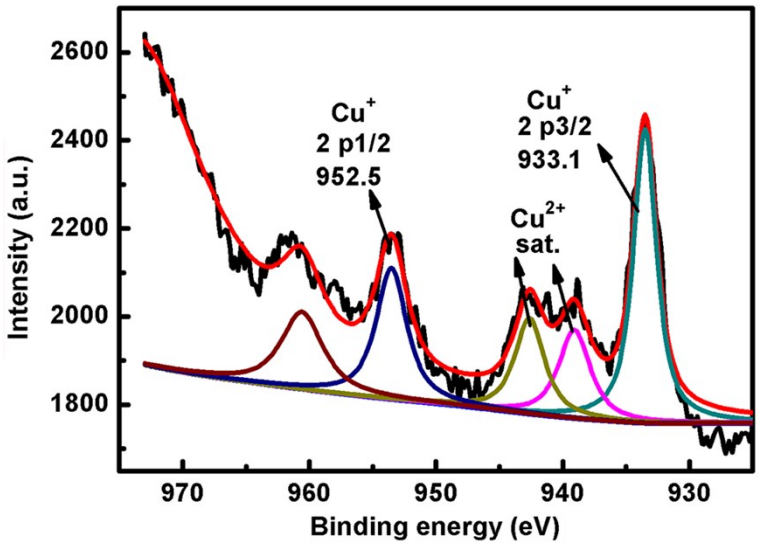


Fig. S5. XPS spectroscopy of Cu-MOFs immersing into NO-saturated solution for 3 h.

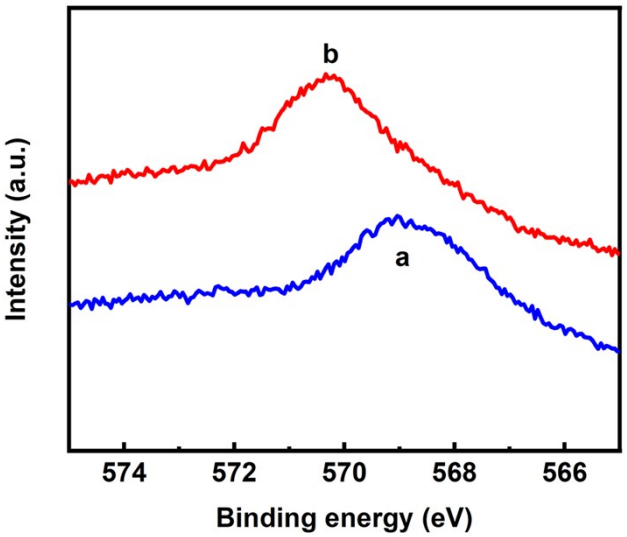


Fig. S6. Auger spectra (Cu $L_3M_{4,5}M_{4,5}$ peak) of the Cu-MOFs (a) and Cu-MOFs immersing into GSNO (10 mM) for 3 h (b).

Table S1. Emission Lifetimes (τ) of Different Samples

Samples	τ_1 (ns)	τ_2 (ns)
MOFs	0.33	
MOFs+NO	0.46	2.66
MOFs+CysamNO	0.47	2.53

Fluorescence Response of Cu-MOF to Concentration of NO

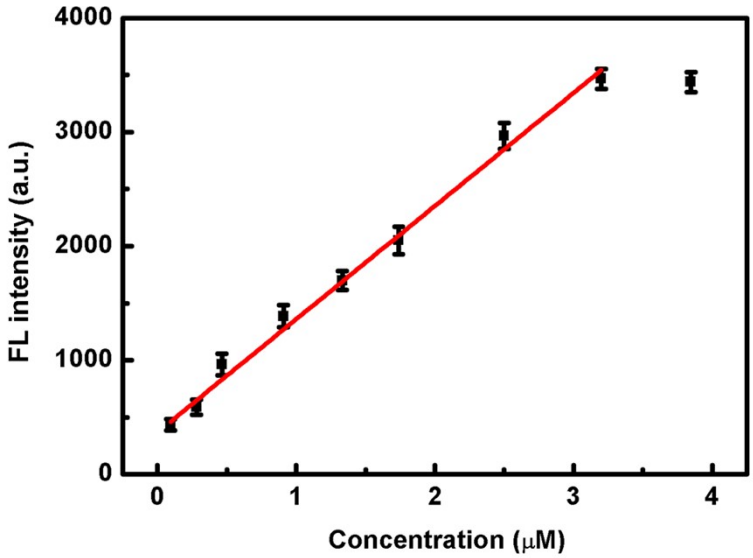


Fig. S7. Fluorescence intensity vs. concentrations of NO determined by the Cu-MOFs (E_m = 450 nm).

Stability of Cu-MOFs under in Vitro and In Vivo Conditions

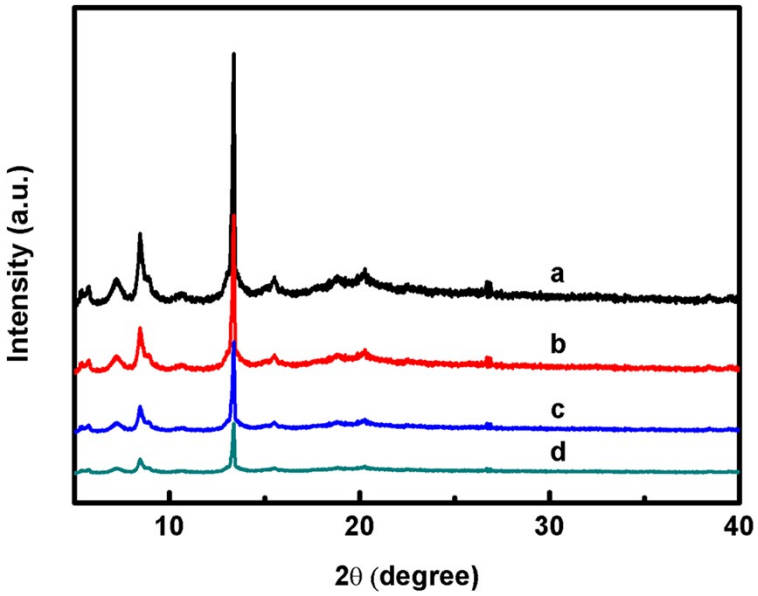


Fig. S8. pXRD patterns of Cu-MOF immersed in pH 7.4 PBS (a); DMEM (maintained with 5% CO_2 buffer) (b); 0.1 M GSNO in PBS (c); NO-saturated PBS (37 °C, pH 7.4) (d) at 37 °C for 12 h.

Evaluation of Cytotoxicity of Cu-MOFs

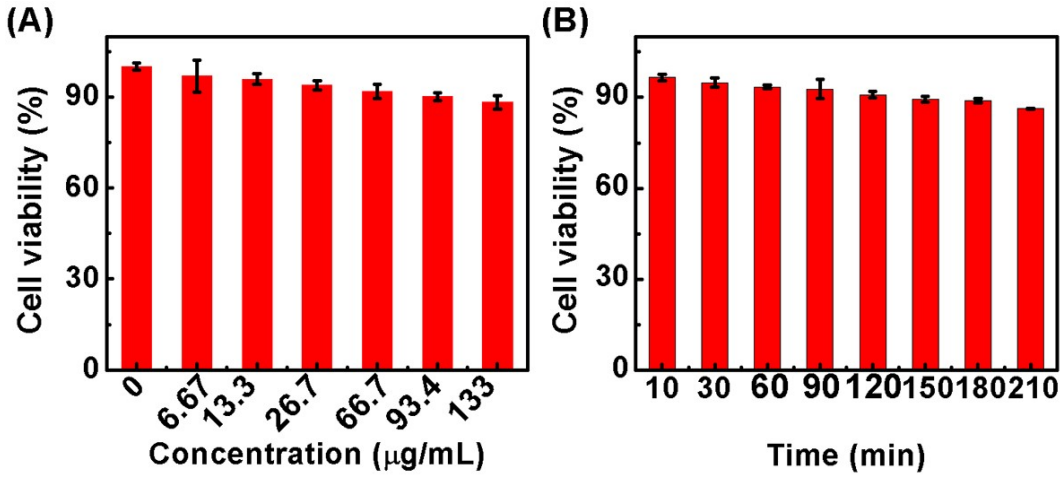


Fig. S9. Cell viability test of Cu-MOFs with different (A) concentrations, (B) incubation time in HeLa cell line.

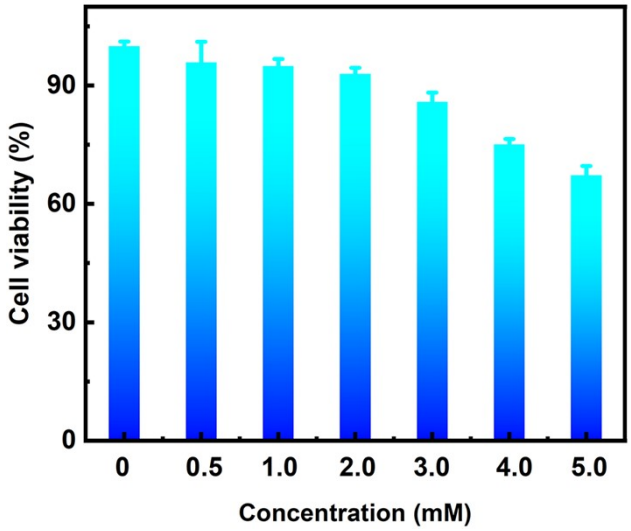


Fig. S10. Cell viability test of Cu-MOFs with different concentrations of Sodium Nitroprusside

Optimization of Cu-MOFs Concentrations and Incubation Time

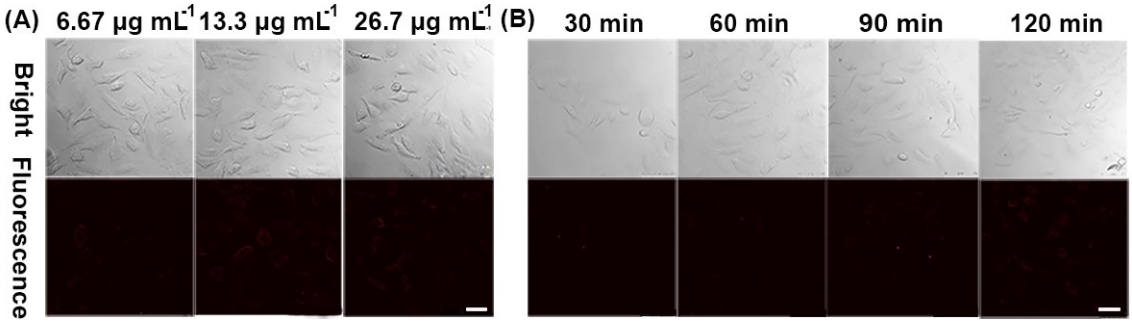


Fig. S11. Confocal microscopy using HeLa cells at different (A) concentrations and (B) incubation time of Cu-MOFs. Scale bar represents 40 μm (Ex=405 nm).

Cellular Behaviors of Cu-MOFs

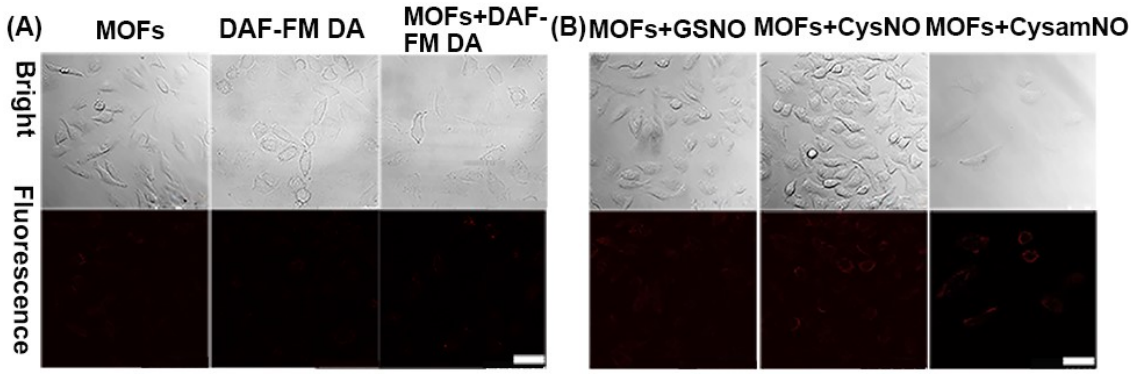


Fig. S12. Confocal microscopy using HeLa cells (A) intracellular luminescence response to Cu-MOFs (Ex= 405 nm), DAF-FM DA (Ex=488 nm) and DAF-FM DA+Cu-MOF (Ex=488 nm), and (B) Cu-MOFs+20 μM GSNO, 20 μM CysNO and 20 μM CysamNO. Scale bar represents 50 μm (Ex=405 nm).

Demonstration of Self-Controlled

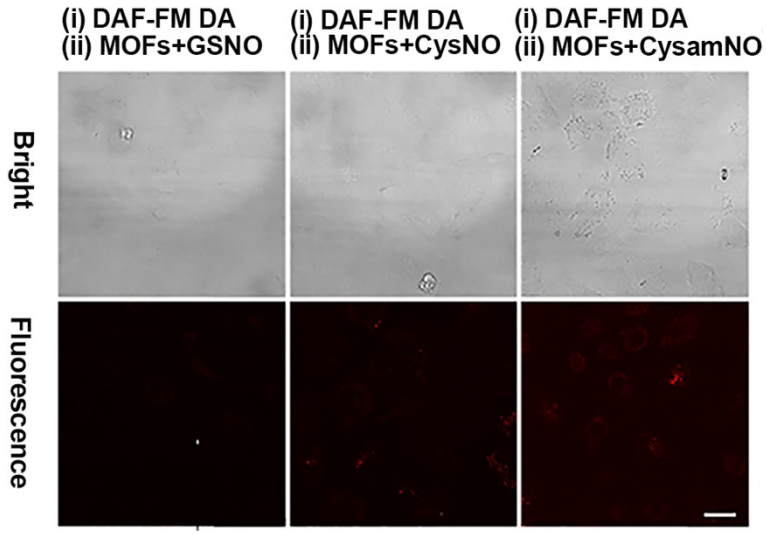


Fig. S13. Confocal microscopy using HeLa cells to study the property of Cu-MOFs self-controlled by DAF-FM DA. The cells were incubated for 30 min at 37 °C with DAF-FM DA (5 mM) and then incubated for another 90 min with 20 μM GSNO, CysNO and CysamNO, and 26.7 μg/mL Cu-MOFs. Scale bar represents 30 μm (Ex=488 nm).