Supporting Information for

A dual-signal sensing system based on organic dyes-LDHs film for fluorescence detection of cysteine

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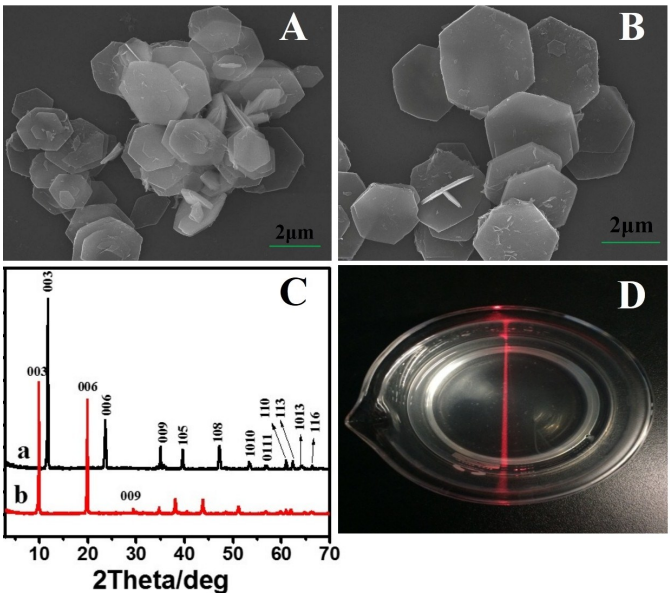

Fig. S1 SEM images of (A) MgAl-CO_3-LDH and (B) MgAl-NO_3-LDH; (C) XRD patterns of MgAl-CO_3 LDH (a) and MgAl-NO_3 LDH (b); (D) The digital picture of MgAl-NO_3 colloidal suspension.

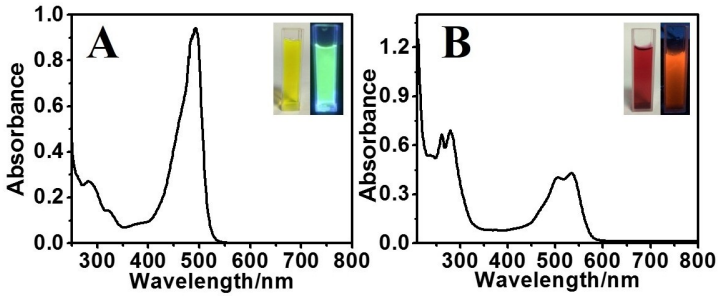

Fig. S2 UV-vis absorption spectrum of (A) calcein and (B) NFR solution (inset: solution colors under daylight (left) and UV light (right), respectively).

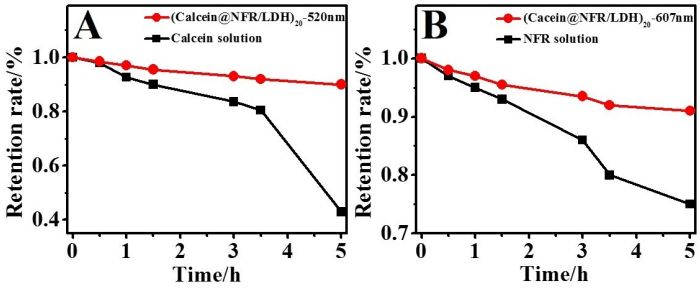

Fig. S3 The fluorescence intensity change of (A) (calcein@NFR/LDH)$_{20}$ UTFs and calcein solution; (B) (calcein@NFR/LDH)$_{20}$ UTFs and NFR solution after exposure of ultraviolet lamp.

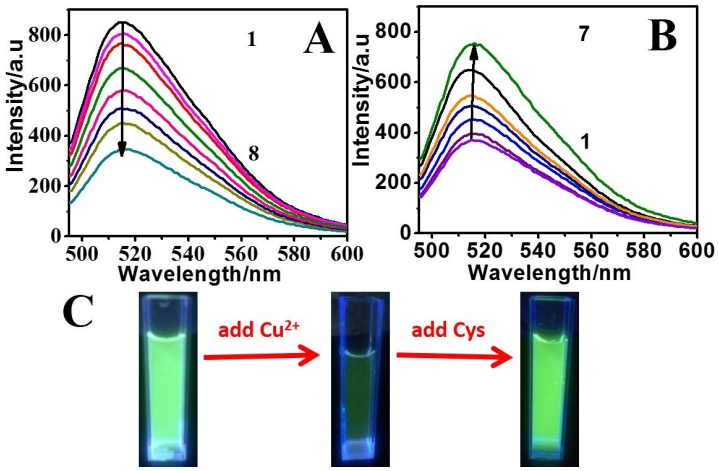

Fig. S4 (A) Fluorescence spectra of calcein-Cu^{2+} solution in Tris-HCl buffer of pH=6, $C_{calcein}$=1.0×10^{-4} M; The concentration of Cu^{2+}: 0.0, 1.0, 2.0, 4.0, 8.0, 12.0, 24.0, 50.0×10^{-6} M, respectively; (B) Fluorescence spectra of calcein-Cu^{2+}solution in the presence of Cys (1-7: 0.0, 2.0, 4.0, 10.0, 20.0, 40.0，100.0×10^{-4} M). All samples were tested with λ_{ex}=490 nm, slit width of 3nm; (C) The calcein solution, calcein-Cu^{2+} solution and calcein-Cu^{2+}solution in the presence of Cys under 365 nm UV illumination.

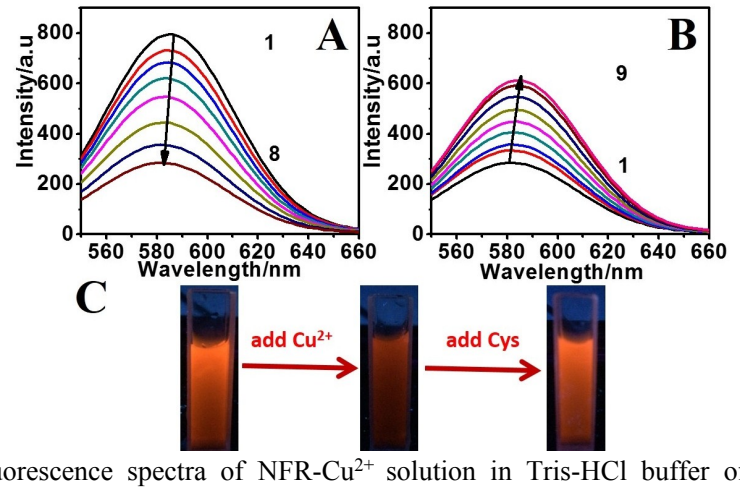

Fig. S5 (A) Fluorescence spectra of NFR-Cu^{2+} solution in Tris-HCl buffer of pH=6, C_{NFR}= 1.0×10^{-4} M; The concentration of Cu^{2+}: 0.0, 2.0, 4.0, 8.0, 12, 24, 48, 100×10^{-6} M; (B) Fluorescence spectra of NFR-Cu^{2+}solution in the absence and presence of Cys in Tris-HCl buffer of pH=6. Cys (1–9): 0.0, 2.0, 4.0, 6.0, 8.0, 10.0, 12.0，14.0, 20.0×10^{-4} M. All samples was tested with λ_{ex}=490 nm, slit width of 5 nm; (C) The pure NFR solution, NFR-Cu^{2+} solution and NFR-Cu^{2+}solutionin the presence of L-cysteine under 365 nm UV illumination.

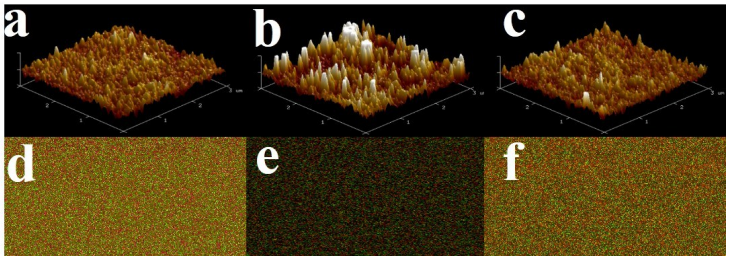

Fig. S6 Tapping-mode AFM images of (a) $(calcein@NFR/LDH)_{20}$ UTFs, (b) $(calcein@NFR/LDH)_{20}$ UTFs after interaction with Cu^{2+} and (c) UTFs-Cu^{2+} complex after interaction with Cys; Confocal fluorescent microscopy images of (d) $(calcein@NFR/LDH)_{20}$ UTFs, (e) $(calcein@NFR/LDH)_{20}$ UTFs after interaction with Cu^{2+} and (f) UTFs-Cu^{2+} complex after interaction with Cys. (the concentration of Cu^{2+} is 4.8×10^{-6} M, Cys is 1.2×10^{-6}M)

Table S1 The fluorescence intensity changes of $(calcein@NFR/LDH)_{20}$ UTF-Cu^{2+} system upon addition of Cys, Hcy, GSH and Na_2S.

Substances	F/F_0 (520nm)	F/F_0 (607nm)
Cys	2.30	4.89
Hcy	1.62	2.47
GSH	1.48	2.35
Na_2S	1.35	1.52