

**Electronic Supplementary Information**

**A Cu (II)-triggered release system by L-cysteine  
functionalized gold nanoparticles for “on-demand”  
molecular delivery and bioimaging in cells**

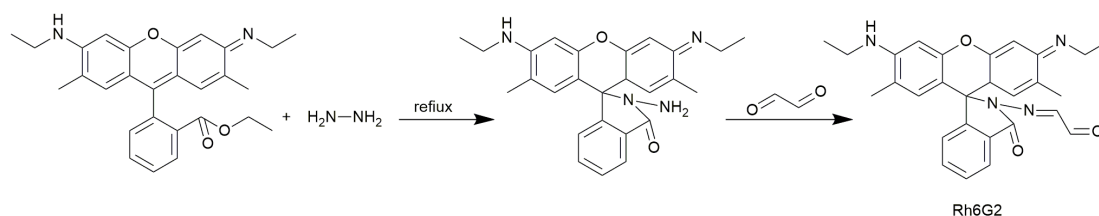
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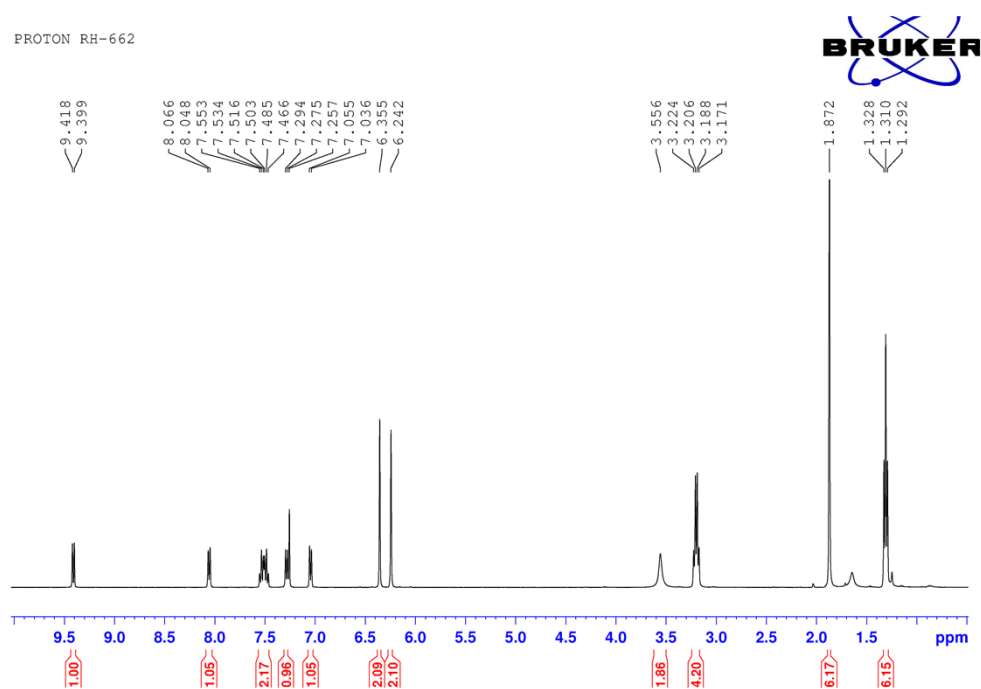
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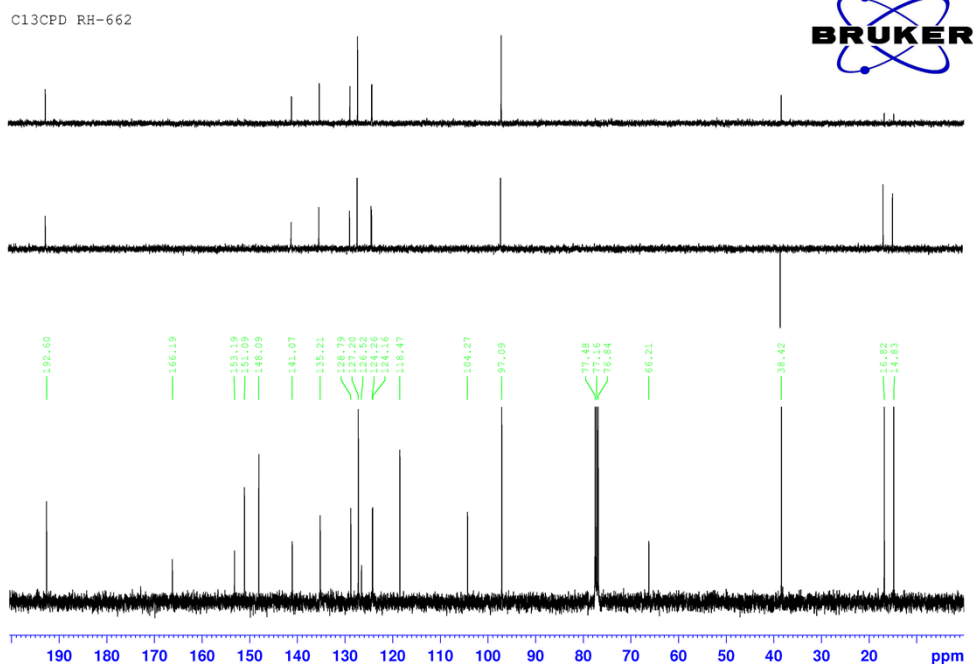
**Synthesis of Rh6G2:** 3 g of rhodamine 6G was mixed with 40 mL of  $N_2H_4 \cdot H_2O$  (20 M), and dissolved in 100 mL  $CH_3OH$  were stirred and heated to reflux at 80 °C for 4 h. Then glyoxal was added to continue the reaction until the color gradually changed from pink to yellow. The solution was cooled to room temperature, separated and purified.  $^1H$ -NMR (400 MHz,  $CDCl_3$ ):  $\delta$  9.41 (d, 1H, J = 7.6 Hz), 8.05 (d, 1H, J = 7.2 Hz), 7.52 (m, 2H), 7.28 (t, 1H, J = 7.6 Hz), 7.04 (d, 1H, J = 7.6 Hz), 6.36 (s, 2H), 6.24 (s, 2H), 3.56 (s, 2H), 3.21 (m, 4H), 1.87 (s, 6H), 1.31 (t, 6H, J = 6.8 Hz).  $^{13}C$  NMR (100 MHz,  $CDCl_3$ ):  $\delta$  192.60, 166.19, 153.19, 151.09, 148.09, 141.07, 135.21, 128.79, 127.20, 126.52, 124.26, 124.16, 118.47, 104.27, 97.09, 76.48, 77.16, 76.84, 66.21, 38.42, 16.82, 14.83. Calcd for, Q-ToFMs  $[M + H]^+$ : 469.2240. Found: 469.2225.0.



**Fig. S1** The synthetic route of Rh6G2.

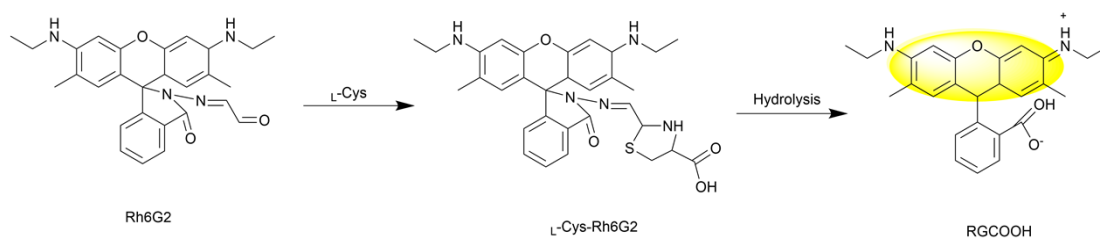


**Fig. S2**  $^1H$  NMR spectra of Rh6G2.

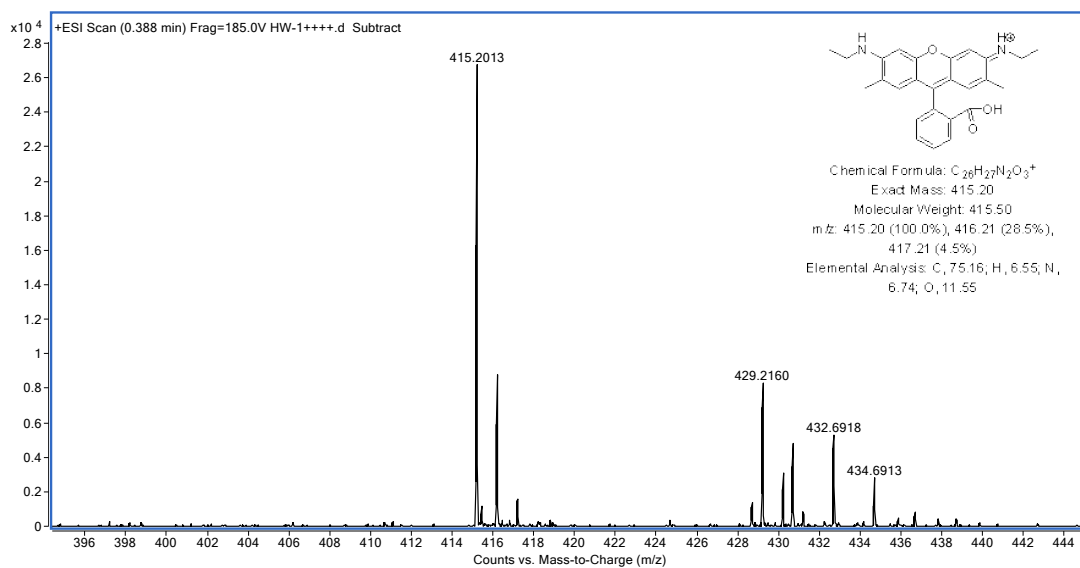


**Fig. S3**  $^{13}\text{C}$  NMR spectra of Rh6G2.

**Synthesis of  $L$ -Cys-Rh6G2:**  $L$ -Cys-Rh6G2 were prepared as follows: 200  $\mu\text{L}$  of  $L$ -Cys stock solution (0.75 mM) was added into 2 mL Rh6G2 stock solution (75  $\mu\text{M}$ ) and reacted for 2 h under the protection of nitrogen at room temperature to acquire  $L$ -Cys-Rh6G2.



**Fig. S4** Schematic diagram of  $L$ -Cys binding to Rh6G2.



**Fig. S5** Mass spectra of RGCOOH.

**Table S1.** DLS, and TEM and Zeta Potential characterization results of the GNPs, GNP-L-Cys and GNP-L-Cys-Rh6G2.

sample	DLS size (nm)	TEM size (nm)	Zeta Potential (mV)
GNPs	13.64±1.6	13.08±0.8	-34.33±3.2
GNP-L-Cys	15.80±1.9	14.9±0.9	-26.33±2.1
GNP-L-Cys-Rh6G2	21.19±2.5	16.26±0.9	-19.13±1