Supplementary Material (ESI) for Journal of Materials Chemistry

Supplementary data

Benzo-15-crown-5 Functionalized Polydiacetylene-Based Colorimetric Self-Assembled Vesicular Receptors for Lead Ion Recognition

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Materials and Characterization:

Synthesis of amphiphilic benzo-15-crown-5-substituted diacetylene

DA (317 mg, 0.85 mmol) was dissolved in 15 mL THF and the oxalyl chloride (1.5 mL, 0.017mol) was added dropwise. The resulting mixture was stirred at room temperature for 30 min and then one drop of fresh DMF was added as catalyst. Above mixture solution was sequentially stirred at room temperature for 5 h. Then THF and excess oxalyl chloride were removed by rotating evaporator. The traces of oxalyl chloride were removed by co-evaporation with 5 mL hexane for three times. The obtained acid chloride was dissolved in 5 mL THF and then a solution of 200 mg (0.71 mmol) BC, 0.5 mL Et_3t and 40 ml THF were added dropwise. The resulting mixture was stirred at room temperature for about 20h under the protection of a drying tube of $CaCl_2$. The crude product was purified by column chromatography on silica gel with chloroform: methanol=20:1(v/v) to give BCDA as white dusty. Yield: 65%, Anal.Calcd. for C39H61NO6: C 73.24, H 9.546, N 2.19; Found C 73.25, H 9.756, N 2.10.

^{1}H NMR ($CDCl_3$, 400 MHz,δ in ppm): δ=7.35 (s, 1H), 6.82(d, J=8.8Hz, 1 H), 6.74 (d, J=8.8Hz, 2 H), 7.23 (d, J=8.8Hz, 2 H), 4.10-4.08 (m, 4 H), 3.89-3.82 (m, 4 H), 3.71 (s,

8 H), 2.29 (t, J=7.5Hz, 2 H), 2.20 (t, J=9.6 Hz 4 H), 1.68-1.62 (m, 2 H), 1.48-1.43 (m, 4 H), 1.32-1.21 (m, 26 H), 0.83 (t, J=6.6Hz, 3 H). ^{1}H NMR spectra was shown in Fig. S1

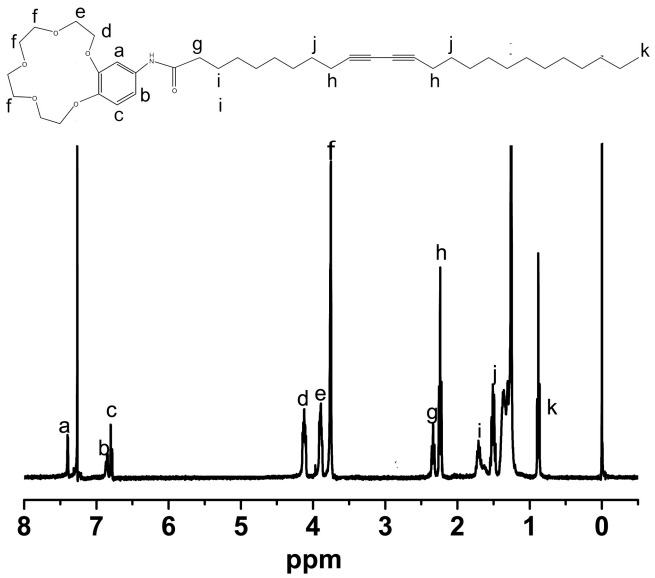

Fig.S1 1H NMR spectrum of BCDA recorded in $CDCl_3$.

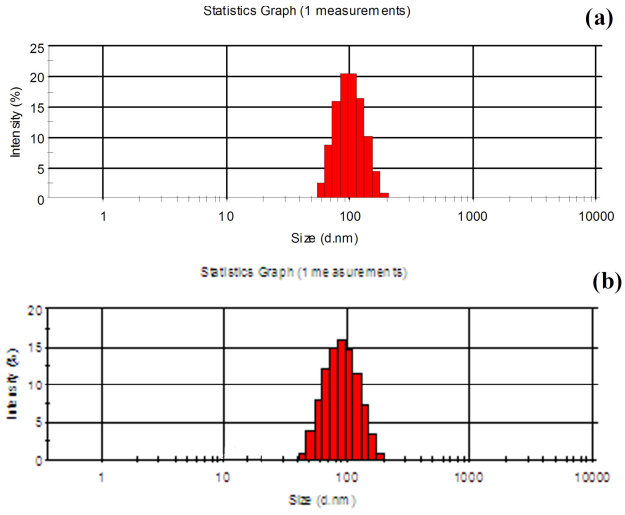

Figure S2. Particle size distribution of PBCDA/PDA composite vesicles measured by DLS:(a) before and (b) after irradiation by UV (254 nm)

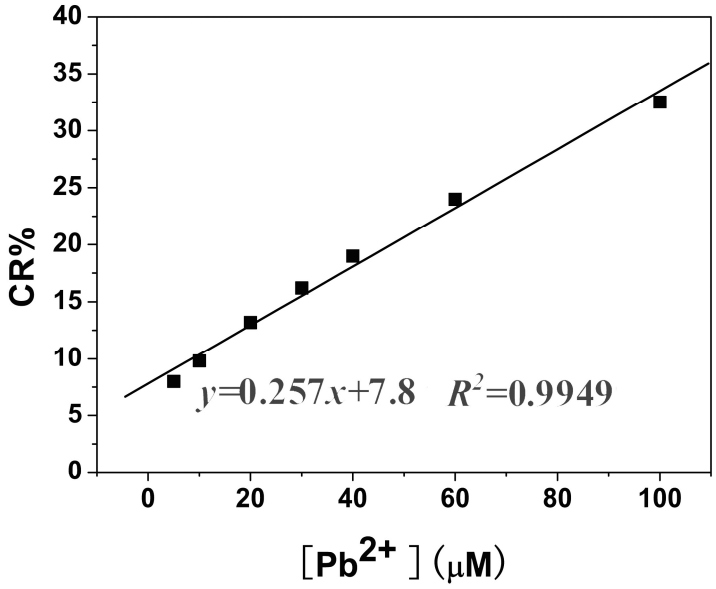

Figure S3. The linear response of the probe (PBCDA/PDA composite vesicles) to Pb^{2+} ions concentration from 5×10^{-6} M to 1×10^{-4} M.

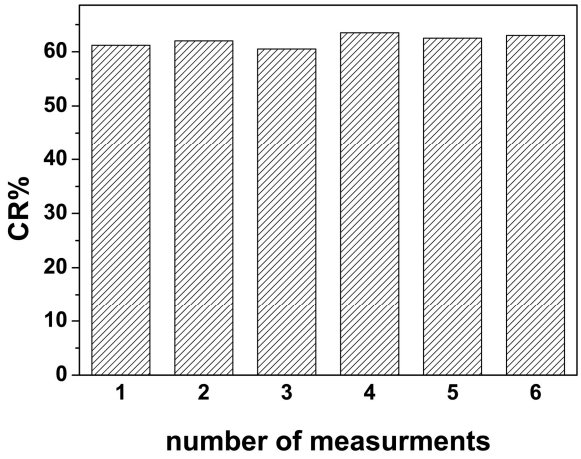

Figure S4. Reproducibility of the use of the probe (PBCDA/PDA composite vesicles) at 1×10^{-3} M Pb^{2+} ions concentration.

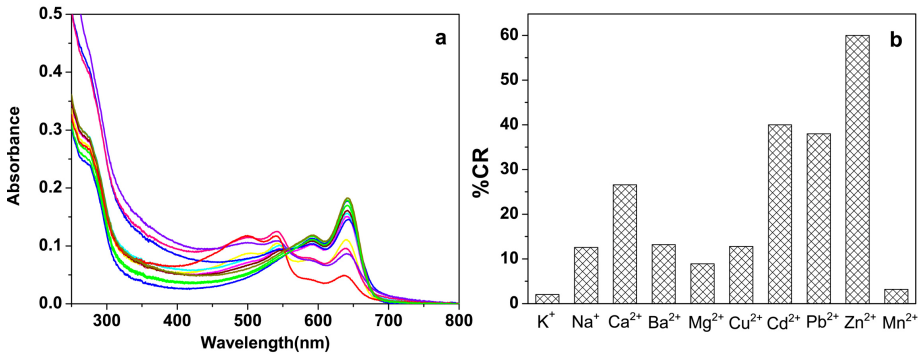

Figure S5. (a) UV-visible spectra and (b) colorimetric response (CR %) of vesicular PDA (monomer: 5×10^{-5} mol/L) in the presence of different ions (HEPES 10mmol, pH = 7.2, 1×10^{-3} mol/L)

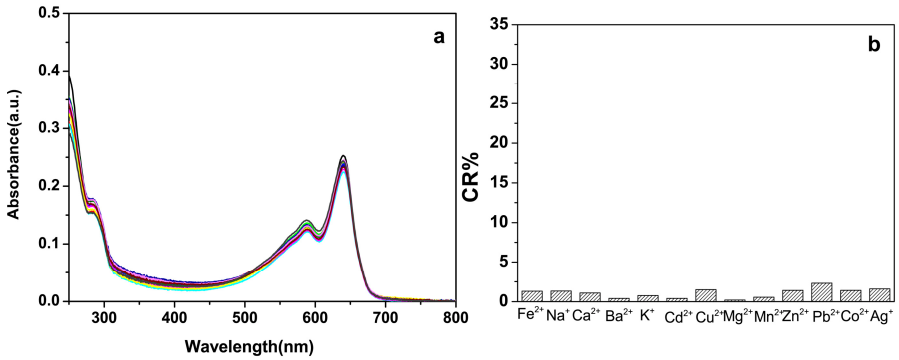

Figure S6. (a) UV-visible spectra and (b) colorimetric response (CR %) of vesicular PBCDA (monomer: 5×10^{-5} mol/L) in the presence of different ions (HEPES 10mmol, pH = 7.2, 1×10^{-3} mol/L).

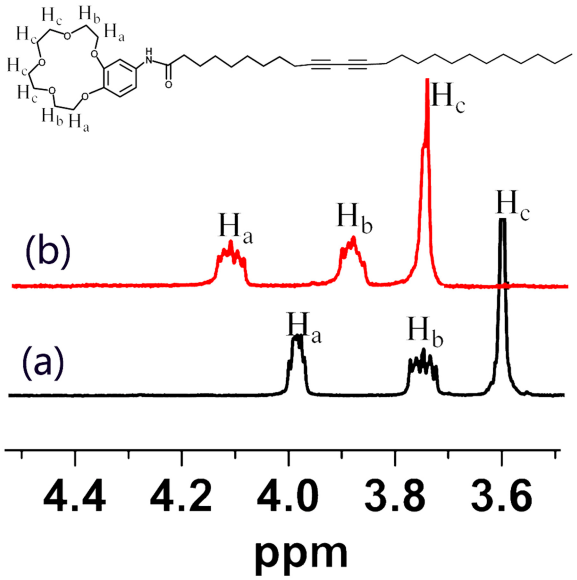

Figure S7. ^{1}H NMR of PBCDA/PDA composite vesicles (a) before and (b) after addition of $Pb(NO_3)_2$ (1×10^{-3} M) in DMSO-*d*6.