

Constituting Visually Detection System for Lead(II) on Polydiacetylene-Glycine Embedded Nanofibrous Membranes

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Experiment

Assembly of PDA-Gly Liposomes

By dissolving the as-prepared PCDA-Gly in a small amount of CHCl_3 (10 mL). Then remove the solvent under a N_2 stream. After the addition of 5 mM HEPES buffer at pH 7.4 (10 mL), the mixture was sonicated at 80°C for 30 min. The final concentration of PCDA-Gly in the resulting solution was 1.0 mM. Irradiation of the solution for 1 min at 254 nm using a hand-held UV lamp provided solutions of PDA-Gly. The liposomes solution was then stored at 4°C overnight before use.

Lead(II) detection using PDA-Gly liposomes

To confirm the colorimetric response of PDA-Gly liposomes to Pb^{2+} , a series of Pb^{2+} solution with different concentration were introduced into the 1 mM PDA-Gly liposomes solution. After 20 min of incubation, optical images were obtained and UV-vis adsorption spectra were taken from Ideaoptics PG 2000+ fiber optic spectrometer.

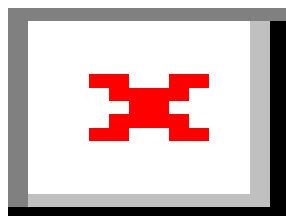


Fig. S1. ^1H NMR of PCDA-Gly in CDCl_3 .

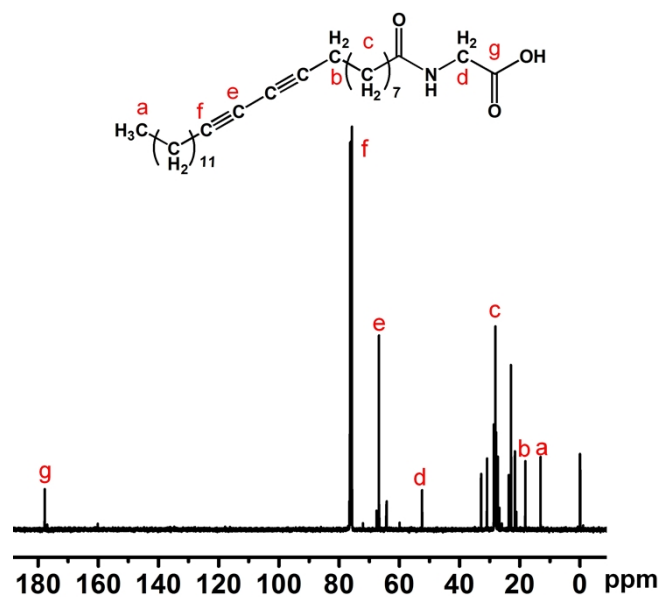


Fig. S2. ^{13}C NMR of PCDA-Gly in CDCl_3 .

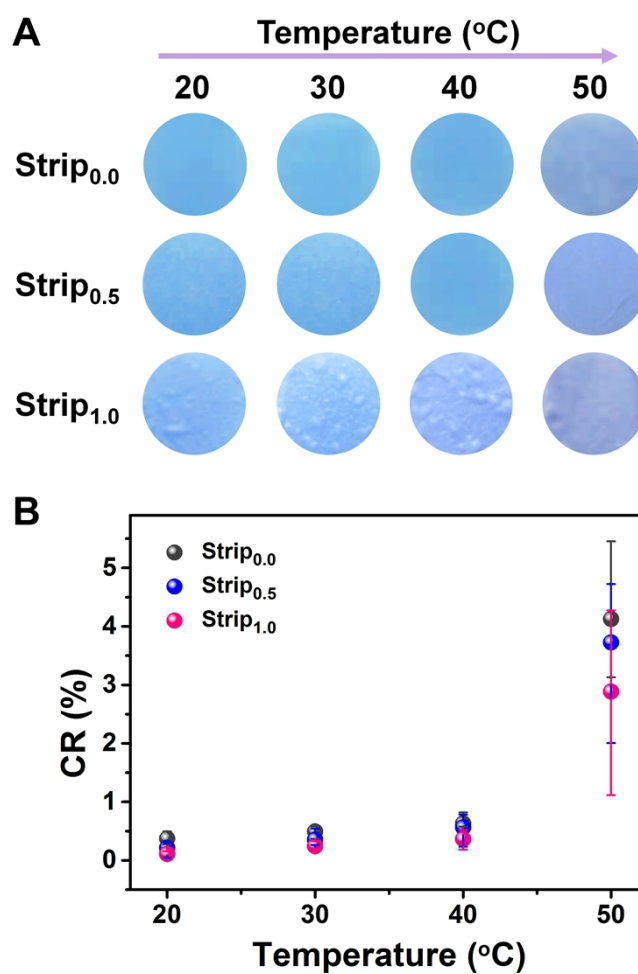


Fig. S3. (A) The optical images of three types of strips from left to right display the

color changes caused by temperature, upon heating from 20 to 50 °C. (B) The corresponding CR% of strips at each temperature point.

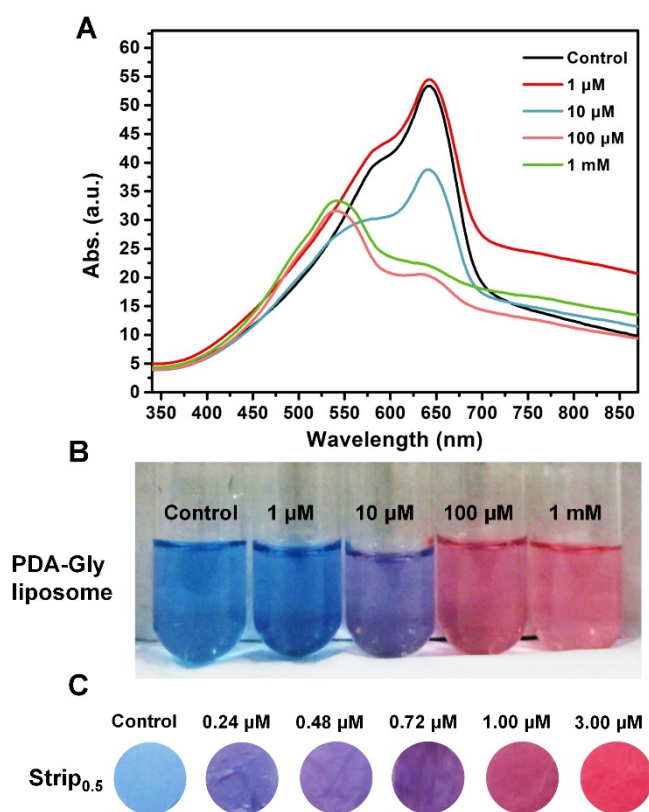


Fig. S4. UV-vis spectra (A) and photographs (B) illustrating the colorimetric response of PDA-Cly liposomes. Photographs (C) illustrating the colorimetric response of PAN NFM based strips

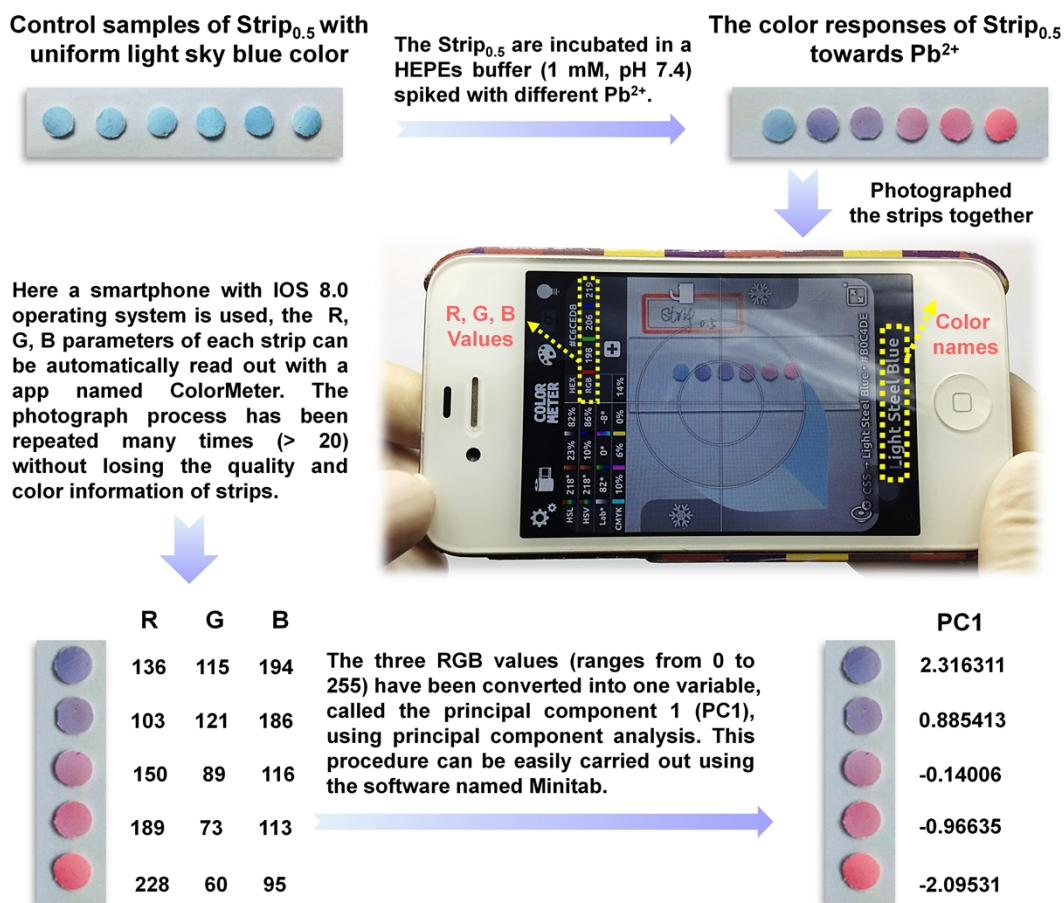


Fig. S5. Schematic a reprehensive procedure used to calculate principle component by a scalable RGB technique under the assistance of a smartphone.

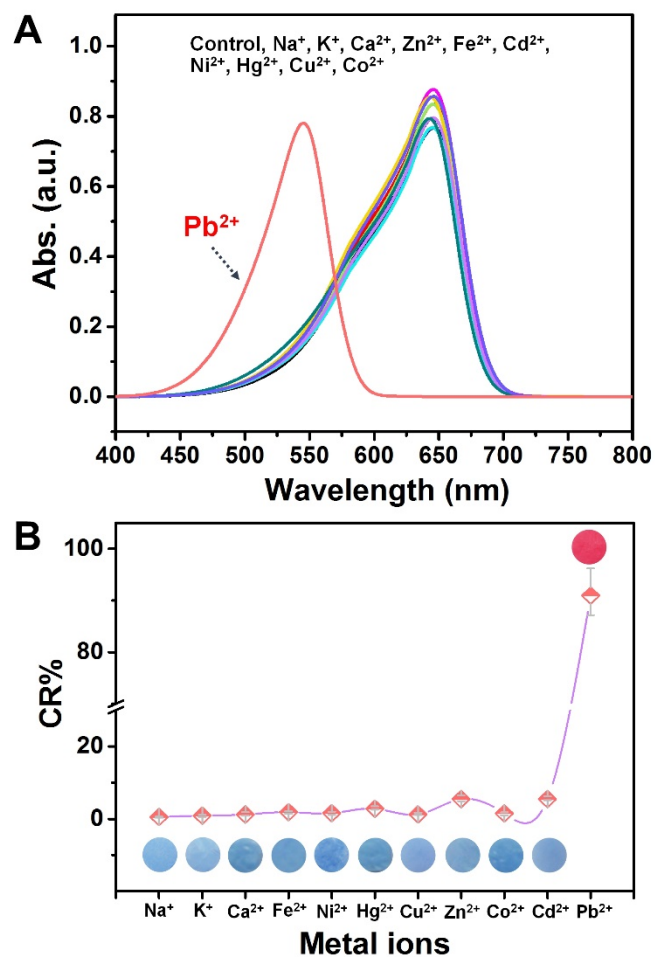


Fig. S6. (A) UV-vis spectra and (B) CR % of strip_{0.5} in the presence of Pb²⁺ (3 μM) and various other metal ions (30 μM), including Na⁺, K⁺, Ca²⁺, Fe²⁺, Ni²⁺, Hg²⁺, Cu²⁺, Zn²⁺, Co²⁺, and Cd²⁺ in HEPES buffer. Insets show the corresponding color change photographs.

Table S1. RGB parameters obtained from the digital pictures of sensory strip cut from the sensory membranes.

[Pb ²⁺] (μ M)	Membrane								
	0% SiO ₂			0.5% SiO ₂			1% SiO ₂		
	R	G	B	R	G	B	R	G	B
0.24	113	155	205	103	121	186	82	118	209
0.48	126	132	188	121	102	139	58	94	172
0.72	151	127	182	150	89	116	61	85	167
1.00	168	112	177	179	73	110	60	83	165
3.00	172	108	175	228	60	95	55	66	168

Table S2. Principal component analysis.

Component	Membrane								
	0% SiO ₂			0.5% SiO ₂			1% SiO ₂		
	Eig	Var	Cum	Eig	Var	Cum	Eig	Var	Cum
		%	%		%	%		%	%
PC1	2.9198	0.973	0.973	2.8733	0.958	0.958	2.8164	0.939	0.939
PC2	0.0657	0.022	0.995	0.1206	0.040	0.998	0.1433	0.048	0.987
PC3	0.0145	0.005	1.000	0.0061	0.002	1.000	0.0403	0.013	1.000

Table S3. Component weights.

Variable	Membrane		
	0% SiO ₂	0.5% SiO ₂	1% SiO ₂
	PC1	PC1	PC1
R	-0.572593	-0.573567	0.585673
G	0.581445	0.588588	0.566867
B	0.577978	0.569724	0.579352

Table S4. Principal components (PC1).

[Pb ²⁺] (μ M)	Membrane		
	0% SiO ₂	0.5% SiO ₂	1% SiO ₂
0.24	2.54869	2.31631	2.90856
0.48	0.72950	0.88541	-0.27151
0.72	-0.26753	-0.14006	-0.53289
1.00	-1.35082	-0.96635	-0.70955
3.00	-1.65985	-2.09531	-1.39461