Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A

Optimized Colorimetric Sensor Strip for Mercury (II) Assay Using Hierarchical Nanostructured Conjugated Polymers

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Supporting Information

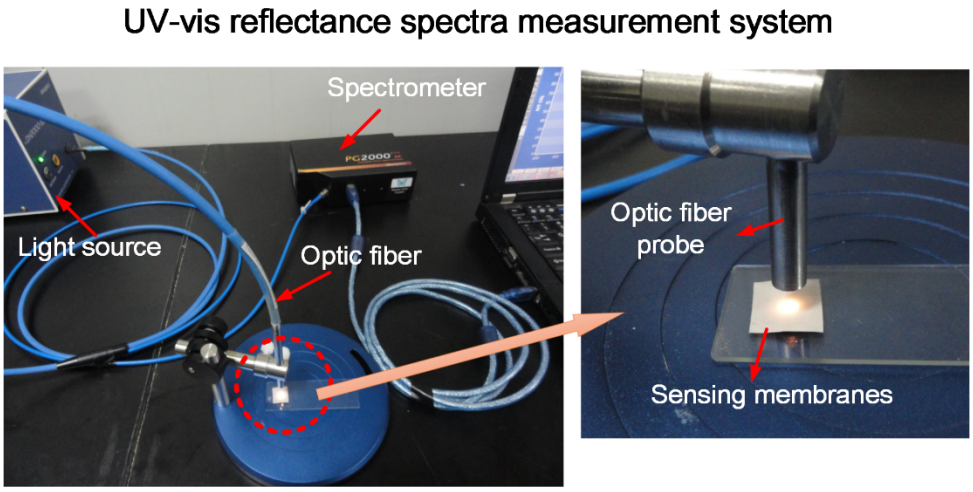

Fig. S1 Photograph shows the experimental detailed of the UV-vis reflection measuring system.

The experimental details of the measurement of the UV-vis reflectance spectra were as following. The PANI-LBNF colorimetric membranes were cut into 15×15 mm square strips and fixed on the surface of glass slides. The sensor strip was immersed into 200 mL test solution under gently stirring for 20 min, and then removed from the solution, dried at room temperature. For optical characterization, the normal-incidence reflectance spectra were performed by using a UV-vis reflectance spectra measurement system, as shown in Fig. S1.

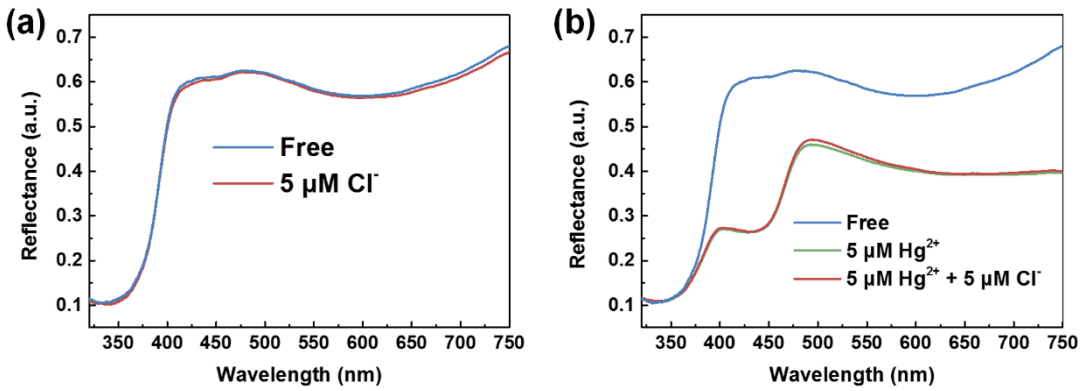

Fig. S2 (a) Reflectance spectra of free sample and sample after incubation for 20 min in 5 μM Cl^-. (b) Reflectance spectra of free smple, sample after incubation for 20 min in 5 μM Hg^{2+}, and sample after incubation for 20 min in the presence of both 5 μM Hg^{2+} and 5 μM Cl^-.

The selectivity test for the presence of Cl^- was shown in Fig. S2. As shown in Fig. S2a, the strip shows no reflectance response upon 5 μM Cl^- (NaCl solution), the reflectance spectrum is nearly the same with the free sample. This is due to no reaction could be occurred for PANI probes and Cl^-. Moreover, as shown in Fig. S2b, for the presence of both Hg^{2+} and Cl^- (NaCl and $Hg(NO_3)_2$ solution), the sensing strip shows similar reflectance response with the pure Hg^{2+} solution, indicating that the presence of Cl^- have no obvious effect for the Hg^{2+} detection. Although the Cl^- was easy to bonding with Hg^{2+} to form $HgCl_2$, it was hard to occur at low ion concentration. The typical solubility product (Ksp) of $HgCl_2$ was 2.6×10^{-15}, and the ion product (Kip) for 5 μM Hg^{2+} and Cl^- was 1.25×10^{-16}, thus the Kip was one older less than corresponding Ksp, which indicated that the majority of Hg^{2+} ions in the test solution.