Supporting Information

Chemiluminescence Assay for Sensitive Detection of Iodide Based on Extracting Hg^{2+} from T-Hg^{2+}-T Complex

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Hg^{2+} detection

0.1 μM DNA solution was prepared in Tris-ClO_4 buffer (20 mM, pH = 9.0). Different concentrations of Hg^{2+} were respectively added to the solution for 30 min. Then to this solution was added K^+ (final concentration 20 mM). After 30 min, hemin (final concentration 0.15 μM) was added for another 1h at room temperature. Finally, luminol (0.5 mM) and H_2O_2 (10 mM) were added to the solution immediately for chemiluminescence measurements. The final concentrations of Hg^{2+} varied from 10 pM to 10 μM.

In the absence of Hg^{2+}, 20 mM K^+ induced 0.1 μM G-rich single-stranded DNA to form K^+-stabilized G-quadruplex (with hemin as a cofactor), which could catalyze H_2O_2-mediated oxidation of luminol and produce a chemiluminecence at 421 nm (curve a) as shown in Figure S1A. With the concentration of Hg^{2+} increased, the chemiluminescence at 421 nm was decreased until no change was observed when 5 μM Hg^{2+} was used (from curve a to i). The change of the chemiluminescence intensity (ΔI) as a function of the logarithm of Hg^{2+} concentration was shown in Fig. S1B. Thus, it was believed that 5 μM Hg^{2+} was enough to induce 0.1 μM G-rich single-stranded DNA to form the stem-loop structure containing T-Hg^{2+}-T.

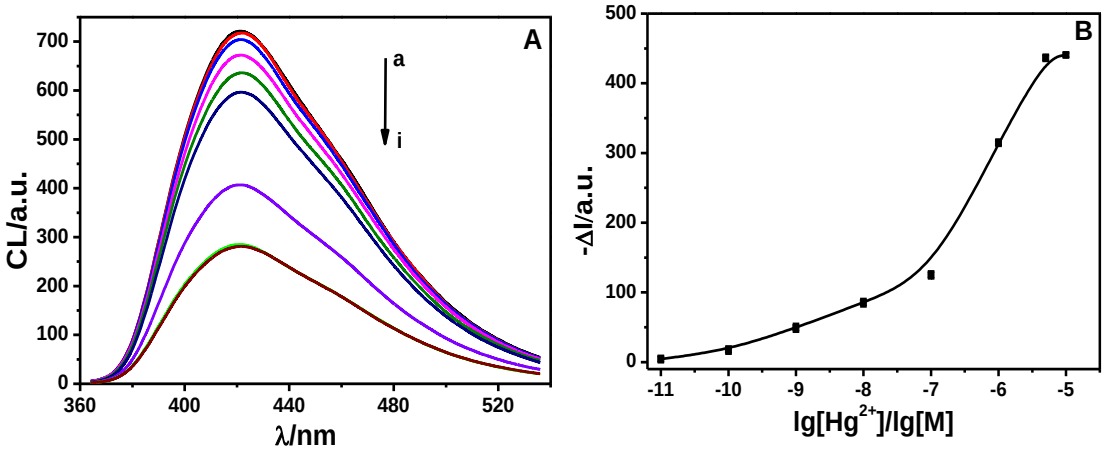

Fig. S1. (A) Chemiluminescence intensity generated by (a) hemin + DNA; (b-i) hemin + DNA in the presence of different concentrations of Hg^{2+}: 10^{-11}, 10^{-10}, 10^{-9}, 10^{-8}, 10^{-7}, 10^{-6}, 5×10^{-6}, 10^{-5} M. (B) The derived calibration curve corresponding to the relative chemiluminescence intensity ΔI, ($\Delta I=I-I_0$, I_0 and I are chemiluminescence intensities in the absence and the presence of Hg^{2+}, respectively) at λ = 421 nm. Error bars were derived from three individual measurements. Experimental conditions: 0.1 μM DNA, 0.15 μM hemin, 0.5 mM luminol, 10 mM H_2O_2 and 20 mM K^+ in 20 mM Tris-ClO_4 buffer (pH = 9.0).

Table S1. Determination of I^- in lake water sample

Iodide added (mol/L)	**Iodide found (mol/L)**	
	Proposed method	ICP
0	—	—
1×10^{-6}	0.93×10^{-6}	1.103×10^{-6}
5×10^{-6}	4.87×10^{-6}	5.137×10^{-6}
1×10^{-5}	1.1×10^{-5}	1.026×10^{-5}