Supporting Information

Fluorescence Turn-On Detection of Mercury Ions Based On the Controlled Adsorption of a Perylene Probe onto the Gold Nanoparticles

Juanmin Li,[ab] Jian Chen,[a] Yang Chen,[ab] Yongxin Li,[a] Sohail Anjum Shahzad,[ac] Yan Wang,[ab] Meiding Yang[ab] and Cong Yu[ab]*

[a]State Key Laboratory of Electroanalytical Chemistry, Changchun Institute of Applied Chemistry, Chinese Academy of Sciences, Changchun 130022, P. R. China

[b]University of Chinese Academy of Sciences, Beijing 100049, P. R. China

[c]Department of Chemistry, COMSATS Institute of Information Technology, Abbottabad 22060, Pakistan

Corresponding Author:

E-mail: congyu@ciac.ac.cn

Fax: (+86) 431-8526-2710

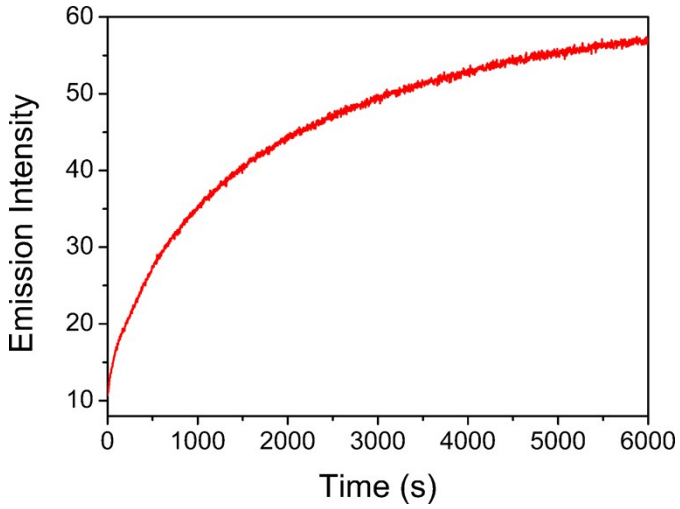

Fig. S1 Emission intensity changes at 488 nm of the perylene probe as a function of reaction time. Final concentrations: phosphate buffer 20 mM (pH 7.0), Au NPs 1.3 nM, perylene probe 200 nM, $NaBH_4$ 100 μM, Hg^{2+} 2.0 μM.

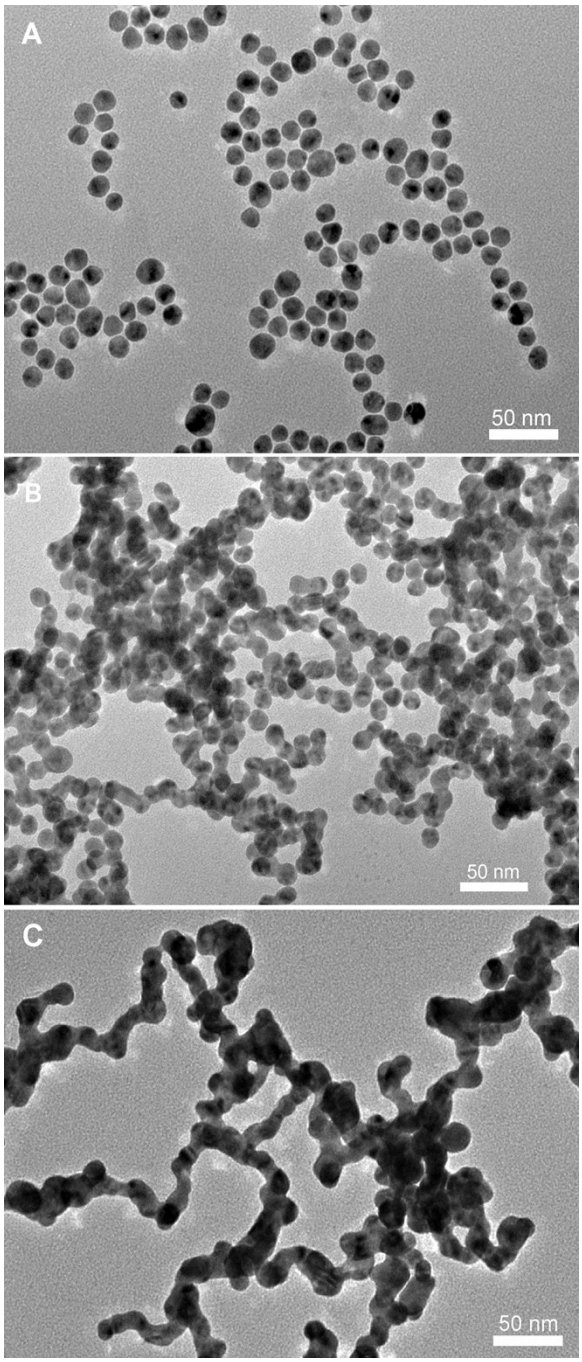

Fig. S2 TEM images of the Au NPs (**A**) and the Au/Hg amalgam in the presence of Hg^{2+} of different concentrations [2.0 μM (**B**), 4.0 μM (**C**)]. Final concentrations: phosphate buffer 20 mM (pH 7.0), Au NPs 1.3 nM, $NaBH_4$ 100 μM.

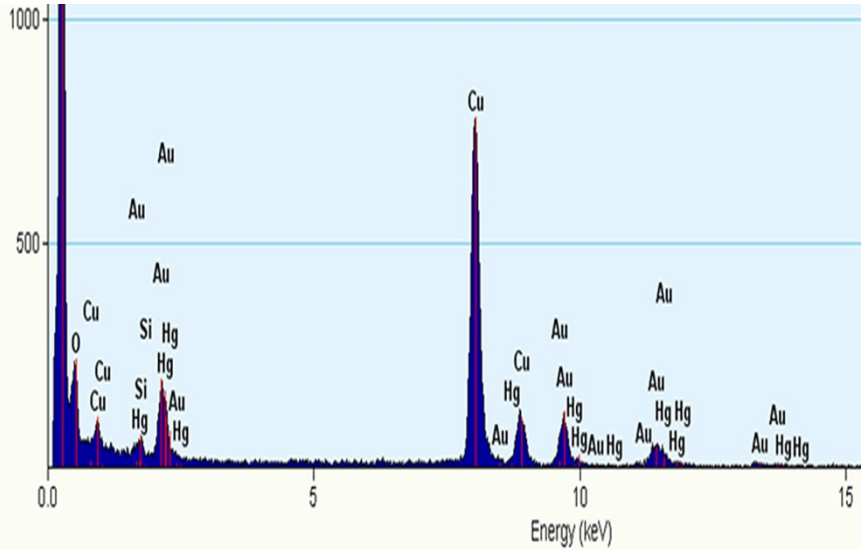

Fig. S3 EDS spectrum of the Au/Hg amalgam. The Cu bands were originated from the copper grid substrate employed in TEM. Final concentrations: phosphate buffer 20 mM (pH 7.0), Au NPs 1.3 nM, $NaBH_4$ 100 μM, Hg^{2+} 4.0 μM.

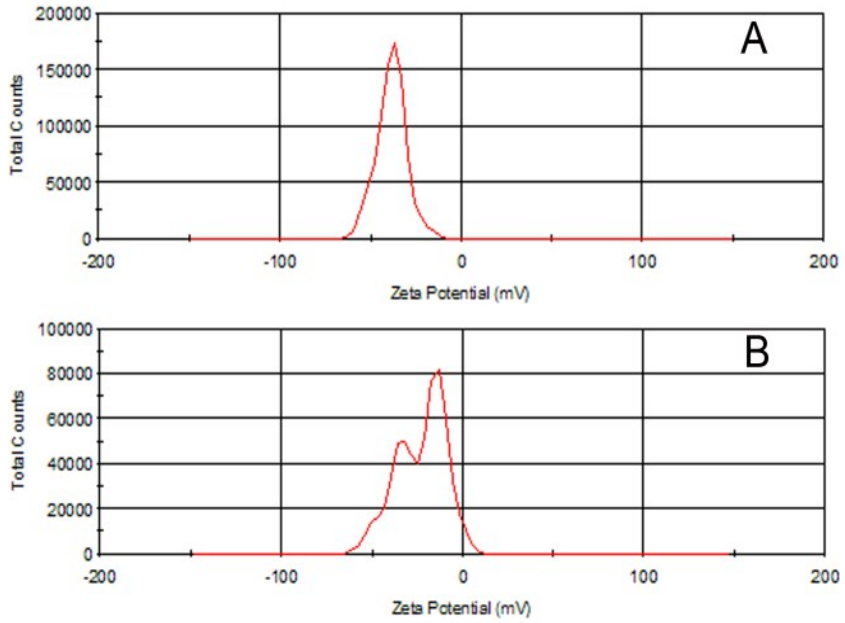

Fig. S4 Zeta potential values of the Au NPs (A) and the Au/Hg amalgam (B). Final concentrations: phosphate buffer 20 mM (pH 7.0), Au NPs 1.3 nM, $NaBH_4$ 100 μM, Hg^{2+} 2.0 μM.

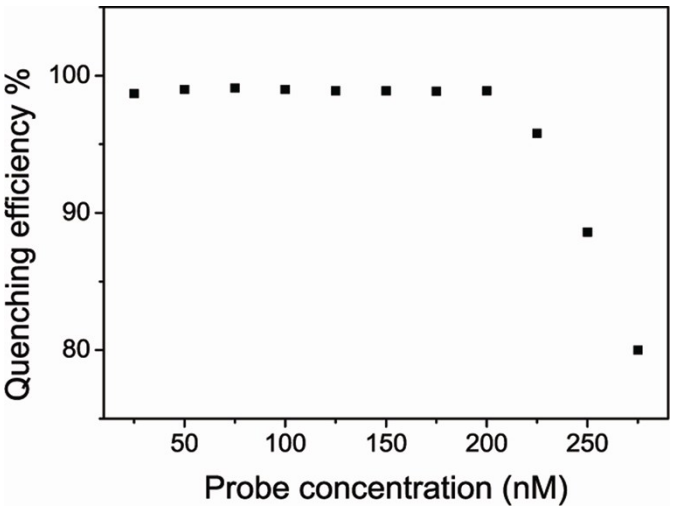

Fig. S5 Changes in quenching efficiency with perylene probe concentration. Final concentrations: phosphate buffer 20 mM (pH 7.0), Au NPs 1.3 nM, perylene probe 25, 50, 75, 100, 125, 150, 175, 200, 225, 250 and 275 nM, respectively.

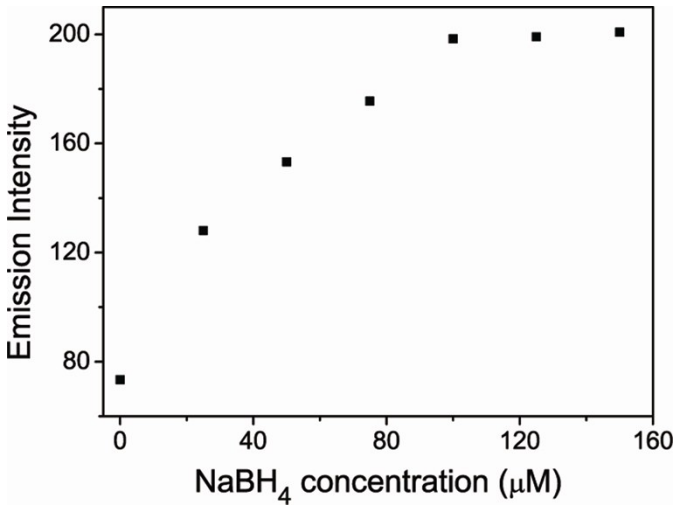

Fig. S6 Changes in emission intensity of the perylene probe at 488 nm as a function of $NaBH_4$ concentration. Final concentrations: phosphate buffer 20 mM (pH 7.0), Au NPs 1.3 nM, Hg^{2+} 2.0 μM, $NaBH_4$ 0, 25, 50, 75, 100, 125 and 150 μM, respectively.

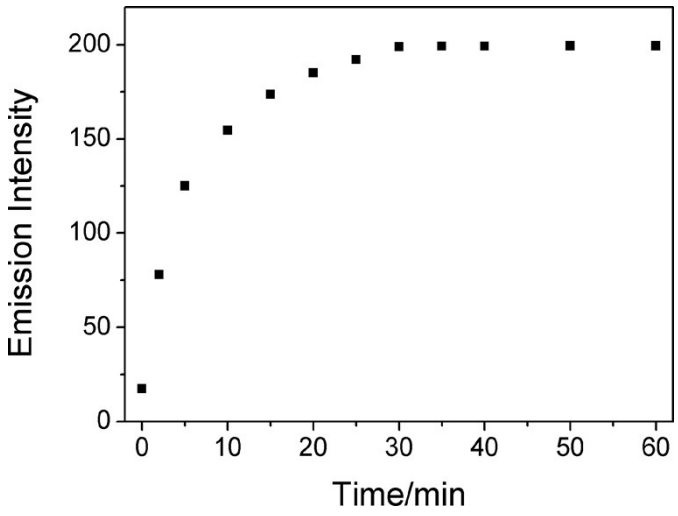

Fig. S7 Changes in emission intensity of the perylene probe at 488 nm as a function of the reaction time. Final concentrations: phosphate buffer 20 mM (pH 7.0), Au NPs 1.3 nM, perylene probe 200 nM, $NaBH_4$ 100 μM, Hg^{2+} 2.0 μM.

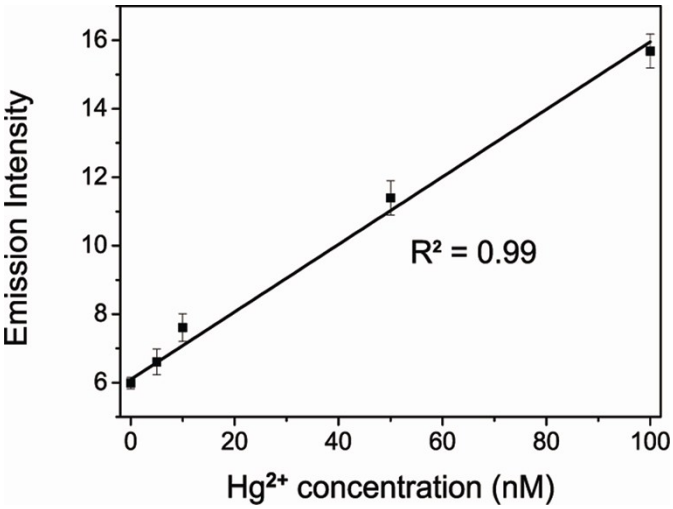

Fig. S8 Plot of the changes in emission intensity of the perylene probe at 488 nm against Hg^{2+} of different concentrations (0 – 100 nM). Final concentrations: phosphate buffer 20 mM (pH 7.0), Au NPs 1.3 nM, perylene probe 200 nM, $NaBH_4$ 100 μM.

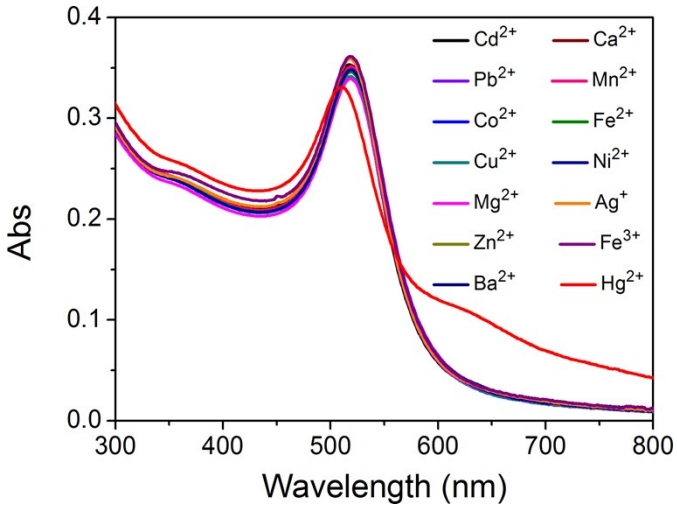

Fig. S9 Changes in UV-vis absorption spectra of the Au NPs with the addition of $NaBH_4$ and different metal ions. Final concentrations: phosphate buffer 20 mM (pH 7.0), Au NPs 1.3 nM, $NaBH_4$ 100 μM, Hg^{2+} and the other ions: 2.0 μM each.