Electronic Supplementary Material (ESI) for Nanoscale
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Supplementary Information

Highly photoluminescent silicon nanocrystals for rapid, label-free and recyclable detection of mercuric ions

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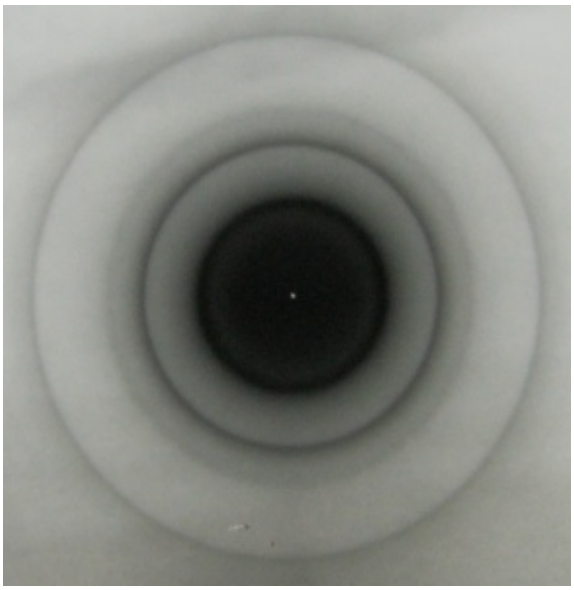

Fig. S1 The selected-area electron diffraction pattern of the SiNCs.

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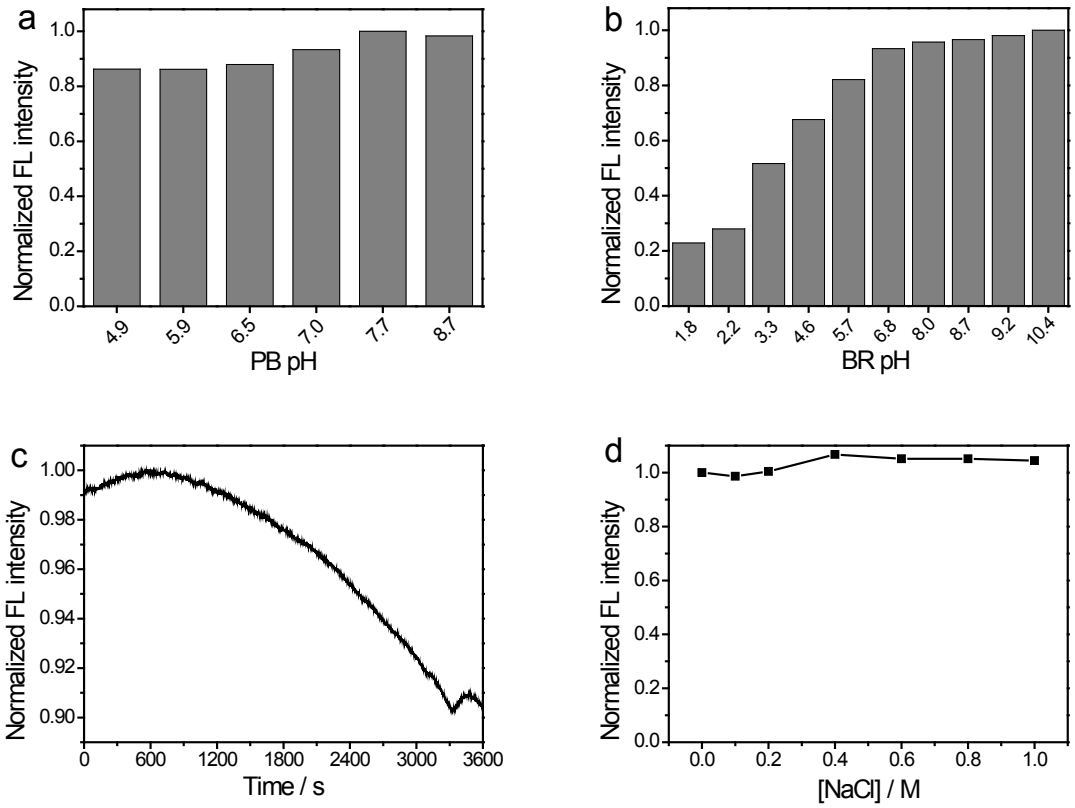

Fig. S2 pH-dependent FL intensity of the SiNCs solution with respect to (a) Britton-Robinson buffer and (b) phosphate buffer. (c) Stability investigation of the SiNCs solution under constant irradiation for 1 h. (d) The effect of salt concentration on the FL intensity of the SiNCs solution.

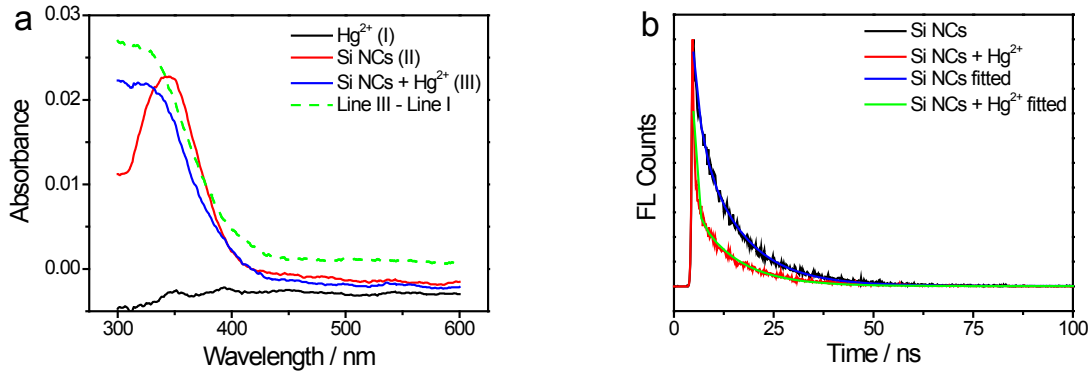

Fig. S3 (a) UV-Vis optical absorption spectra for the investigation of the interaction between SiNCs and Hg^{2+}. (b) The fluorescence decay curve of SiNCs in the absence and presence of Hg^{2+}.

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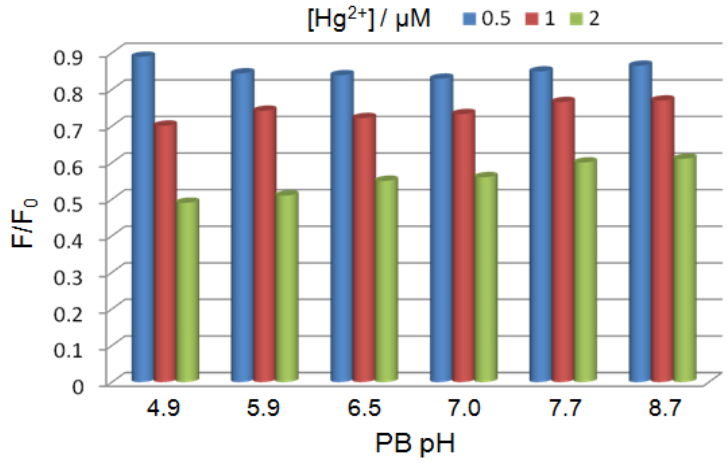

Fig. S4 The effect of phosphate buffer pH on the mercury detection for three concentrations. The data are based on the average of two repetitive measurements.

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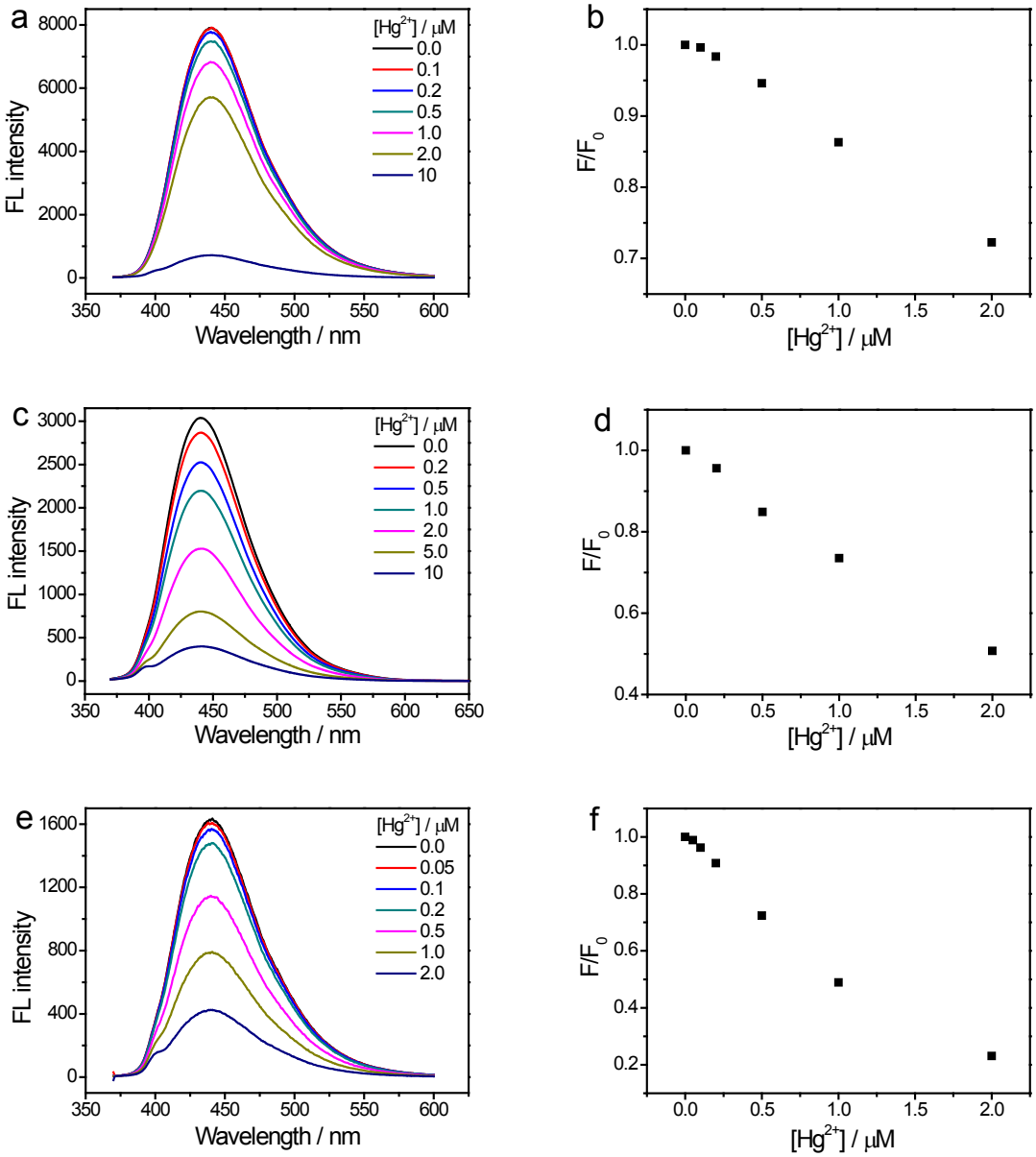

Fig. S5 Effect of SiNCs concentration on the mercury detection in phosphate buffer (20 mM, pH 5.9). The absorbance at 350 nm for the SiNCs was equal to 0.06 (a, b), 0.023 (c, d) and 0.013 (e, f), respectively, representing three SiNCs concentrations. The F/F_0 versus mercury concentration plot data are based on the average of two repetitive measurements.

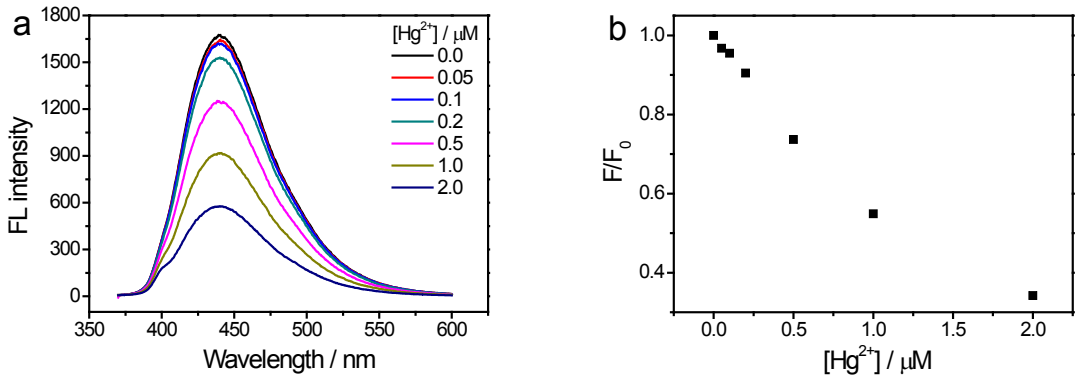

Fig. S6 Mercury detection by the SiNCs in citrate buffer (20 mM, pH 5.9). The absorbance at 350 nm for the SiNCs was equal to 0.013.

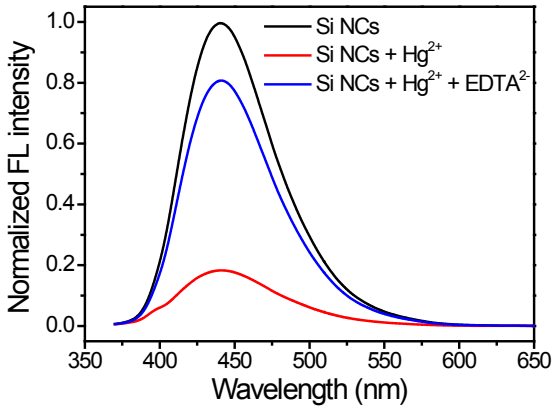

Fig. S7 FL recovery test of the SiNCs probe (A_{350nm} = 0.023) in phosphate buffer (20 mM, pH 5.9) in the presence of Hg^{2+} (5 μM) by the addition of Na_2EDTA (50 μM).

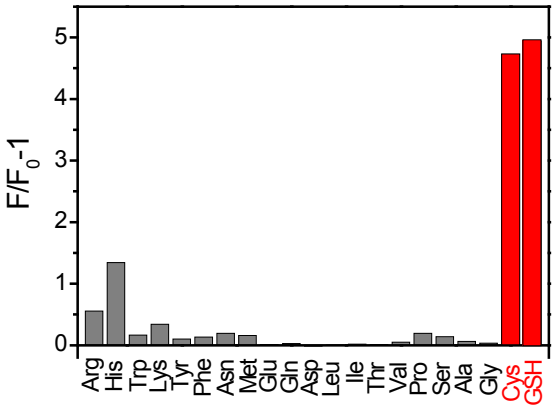

Fig. S8 FL recovery test of the SiNCs probe (A_{350nm} = 0.023) in phosphate buffer (20 mM, pH 5.9) in the presence of Hg^{2+} (5 μM) by the addition of amino acids and glutathione (all 10 μM).

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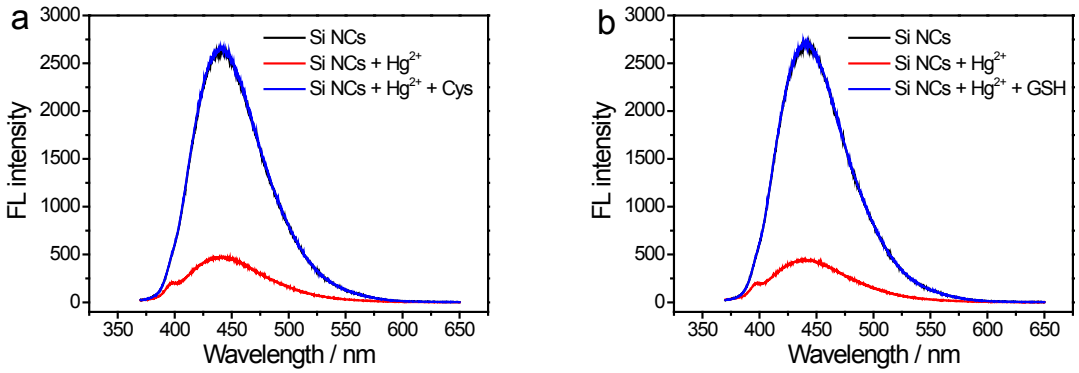

Fig. S9 Recyclable test of the SiNCs sensor in phosphate buffer (20 mM, pH 5.9) for the mercury assay by the addition of (a) cysteine (Cys) and (b) glutathione (GSH).

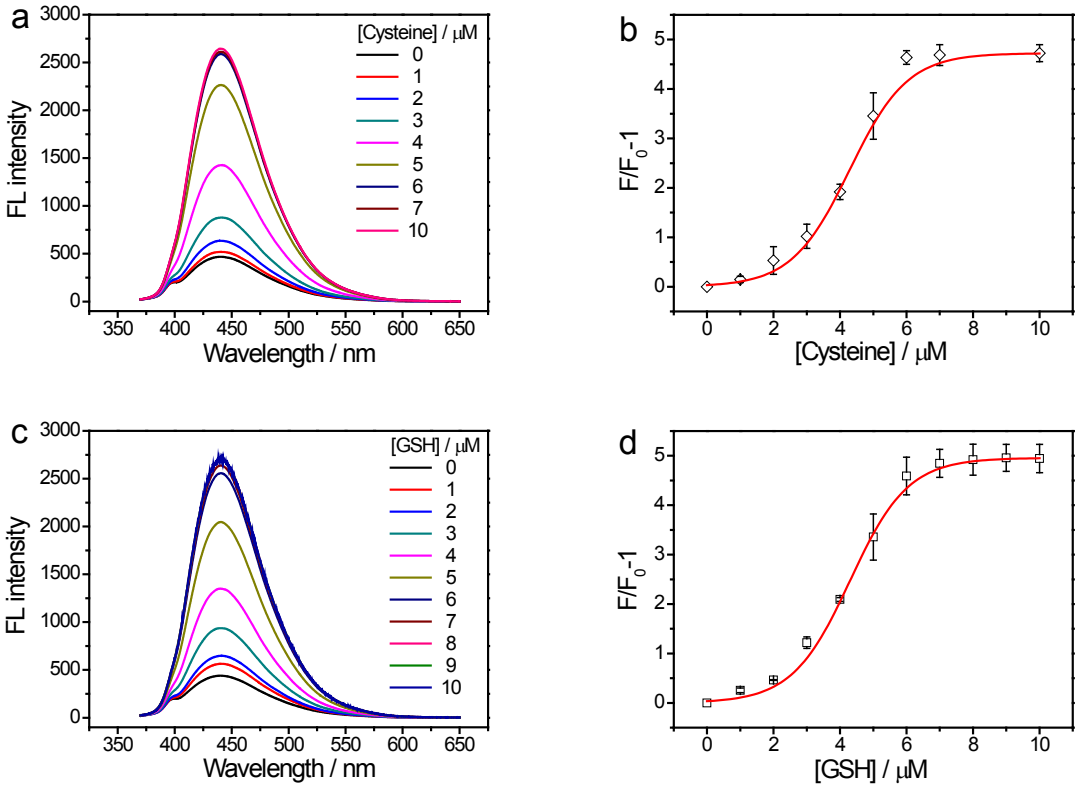

Fig. S10 FL recovery for the SiNCs solution in phosphate buffer (20 mM, pH 5.9) in the presence of Hg^{2+} (5 μM) by the addition of various concentrations of cysteine (a, b) and glutathione (c, d).

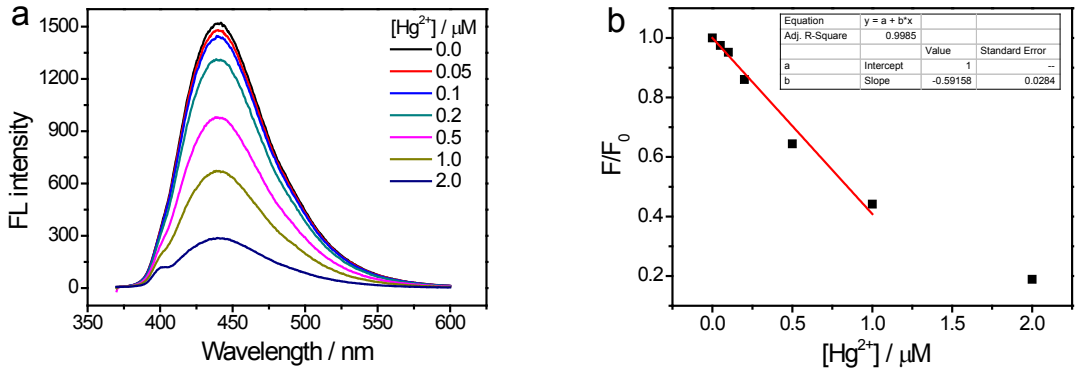

Fig. S11 Mercury detection by the SiNCs probe (A_{350nm} = 0.013) in acetate buffer (20 mM, pH 5.9), after five cyclable regeneration by the use of cysteine. The F/F_0 versus mercury concentration plot data are based on the average of two repetitive measurements.