**【Electronic Supplementary Information】**

# A thin-layered chromatography plate prepared from BODIPY-based receptor immobilized $SiO_2$ nanoparticles as a portable chemosensor for $Pb^{2+}$

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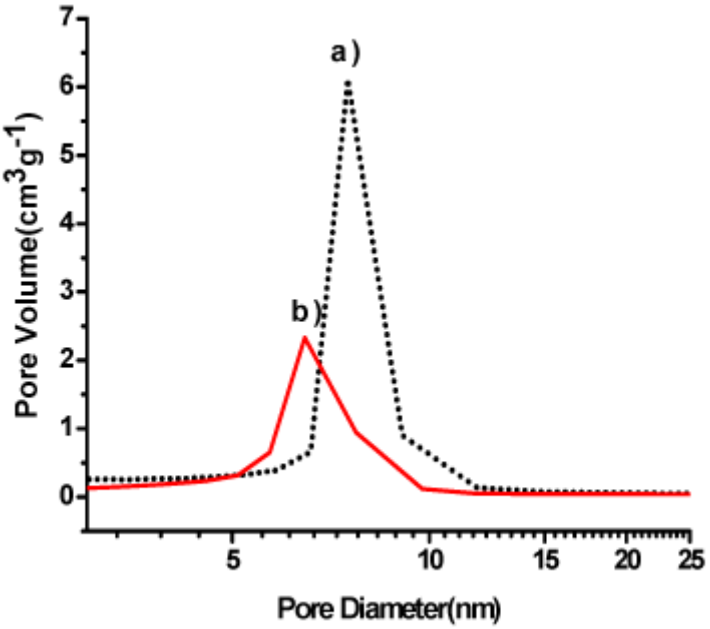


**Fig. S1** Barrett-Joyner-Halenda(BJH) pore diameters of (a) mesoporous silica and (b) BODIPY-$SiO_2$

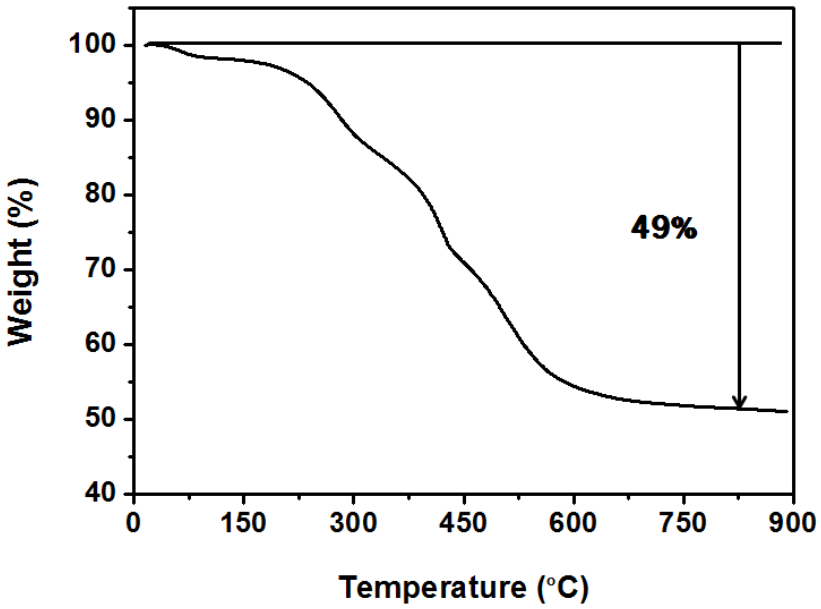


**Fig. S2** TGA data of **BODIPY-$SiO_2$**.

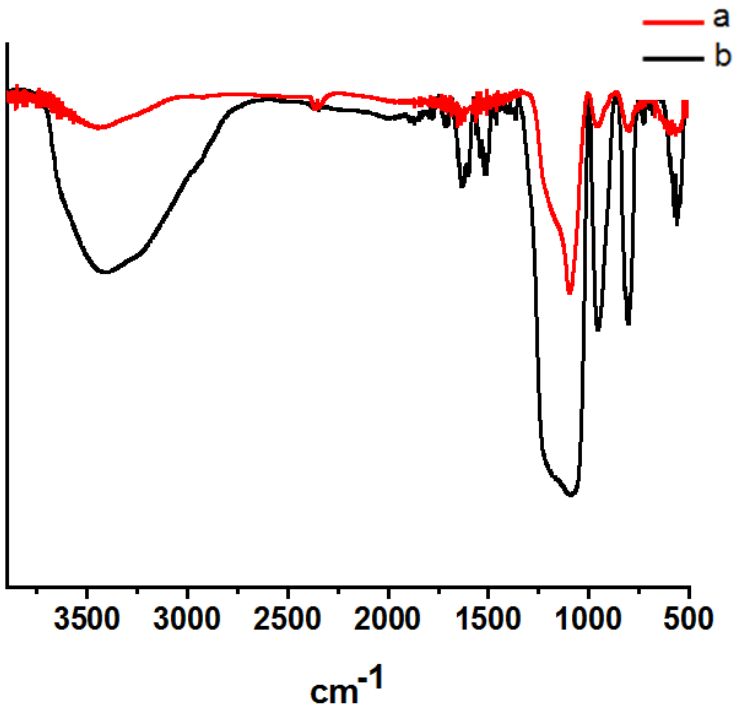


**Fig. S3** FT IR spectra of (a) mesoporous silica and (b) **BODIPY-$SiO_2$**.

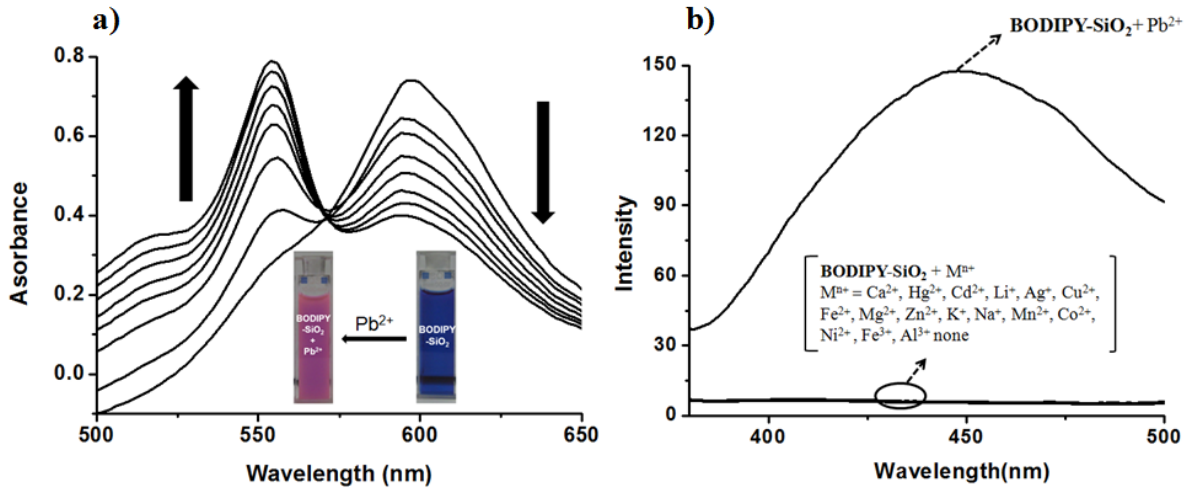


**Fig. S4** (a) Absorption spectra of **BODIPY-SiO$_2$** (10 μM with respect to the mesoporous silica concentration upon addition of increasing $Pb^{2+}$ concentrations (0, 5, 10, 15, 20, 25, 30, and 35 equiv) in 20 mM HEPES in pure aqueous solution at pH 7.4. (b) Fluorescence changes of 10 μM **BODIPY-SiO$_2$** upon addition of metal ions such as $Pb^{2+}$, $Ca^{2+}$, $Hg^{2+}$, $Cd^{2+}$, $Li^{+}$, $Ag^{+}$, $Cu^{2+}$, $Fe^{2+}$, $Mg^{2+}$, $Zn^{2+}$, $K^{+}$, $Na^{+}$, $Mn^{2+}$, $Co^{2+}$, $Fe^{3+}$, $Al^{3+}$ and $Ni^{2+}$ (250 equiv).

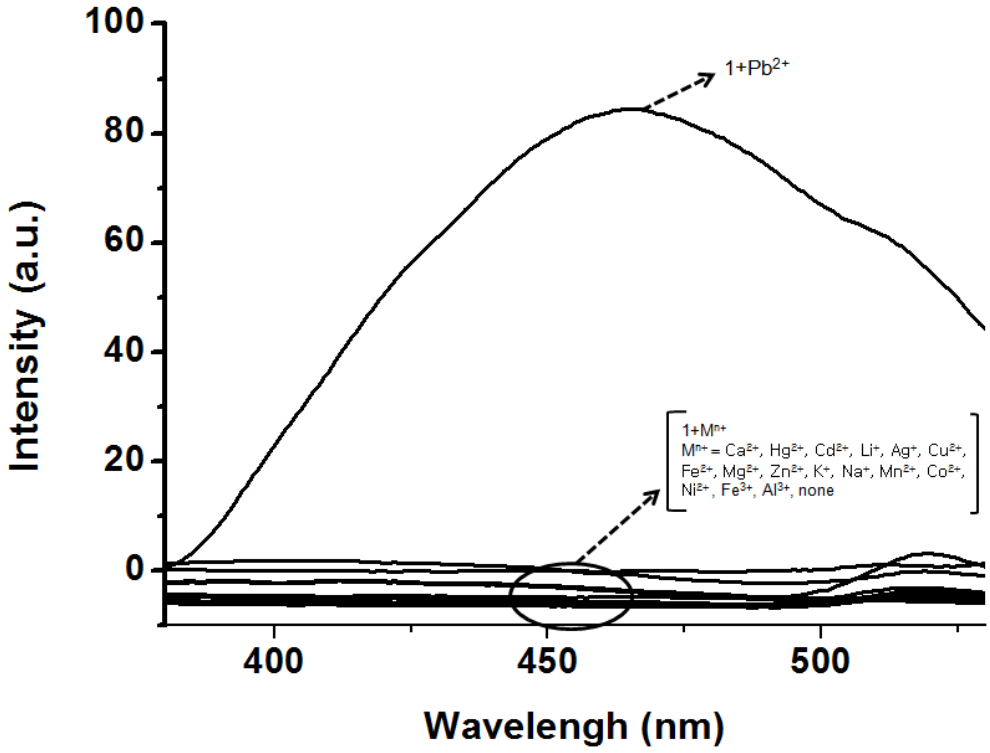


**Fig. S5** Fluorescence responses of **1** (10$\mu$M) upon addition of $Ca^{2+}$, $Hg^{2+}$, $Cd^{2+}$, $Li^{+}$, $Ag^{+}$, $Cu^{2+}$, $Fe^{2+}$, $Mg^{2+}$, $Zn^{2+}$, $K^{+}$, $Na^{+}$, $Mn^{2+}$, $Co^{2+}$,$Fe^{3+}$, $Al^{3+}$, or $Ni^{2+}$(250 equiv) in acetonitrile. Excitation was provided at 326 nm.

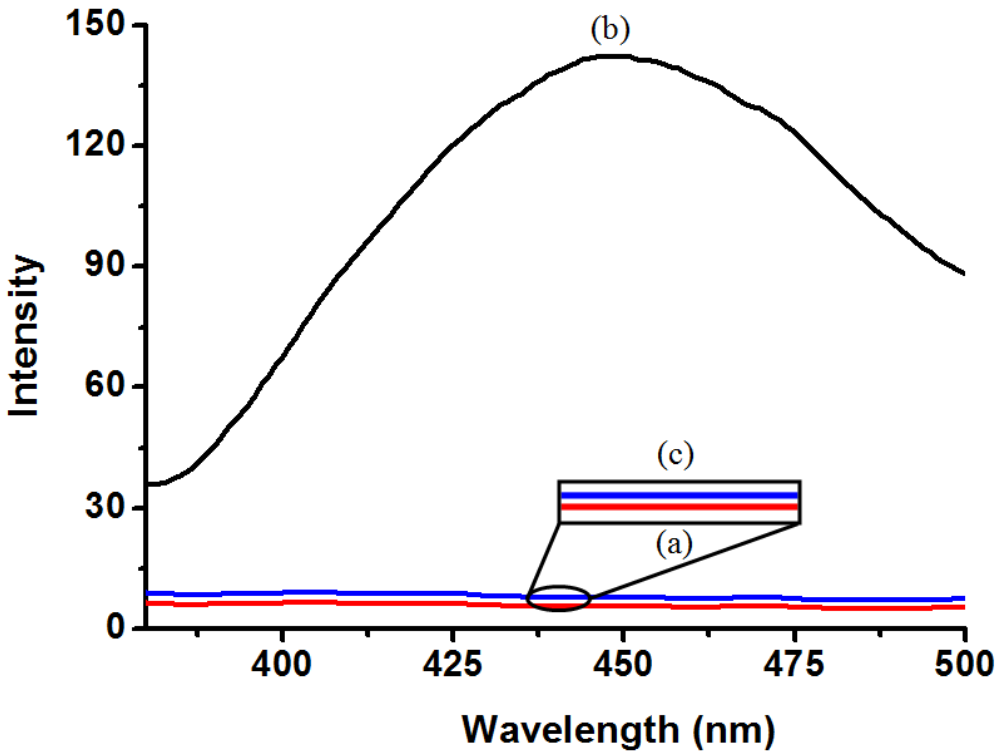


**Fig. S6** Fluorescence spectra of **BODIPY-$SiO_2$** (10 $\mu$M) (a) without and (b) with $Pb^{2+}$ ion (250 equiv), and (c) after treatment with EDTA (10 $\mu$M). The pH value was adjusted by using 20 mM HEPES, pH 7.4

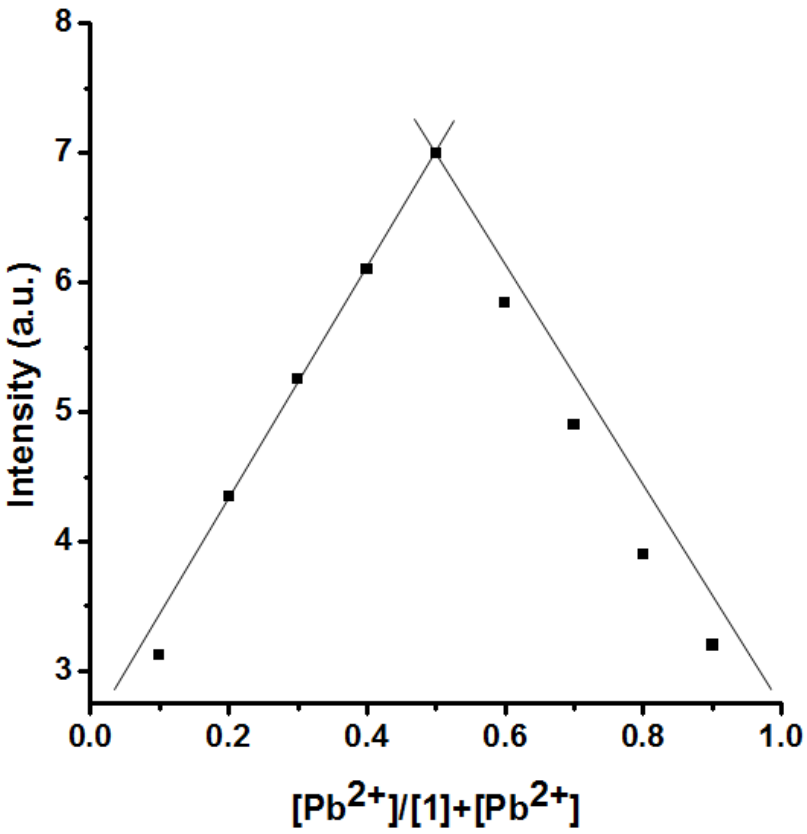


**Fig. S7** Job′s plot of 1:1 complex of **BODIPY-SiO$_2$** (10 $\mu$M) and $Pb^{2+}$. The pH value was adjusted by using 20 mM HEPES in pure aqueous solution at pH 7.4.

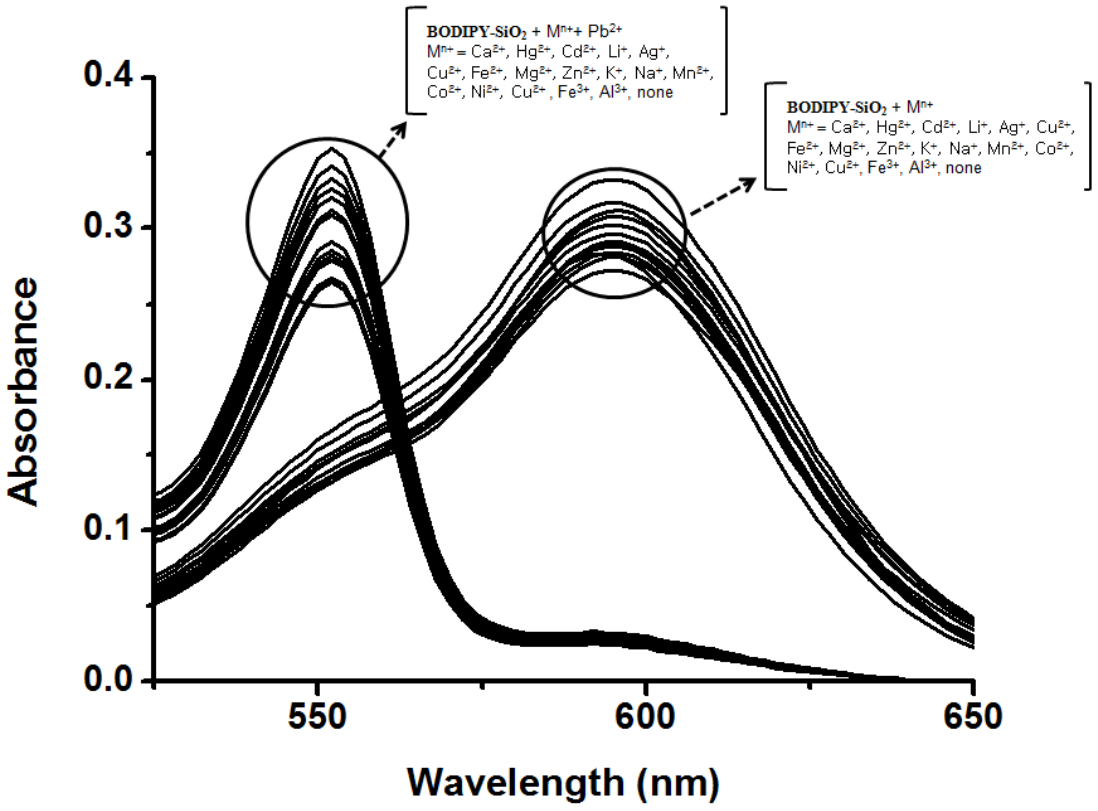


**Fig. S8** Absorption spectra of **BODIPY-SiO$_2$** (10$\mu$M) upon addition of $Ca^{2+}$, $Hg^{2+}$, $Cd^{2+}$, $Li^{+}$, $Ag^{+}$, $Cu^{2+}$, $Fe^{2+}$, $Mg^{2+}$, $Zn^{2+}$, $K^{+}$, $Na^{+}$, $Mn^{2+}$, $Co^{2+}$, $Ni^{2+}$, $Cu^{2+}$, $Fe^{3+}$, $Al^{3+}$(250 equiv), and subsequent addition of $Pb^{2+}$ (250 equiv) in aqueous solution. For all measurements, the pH value was adjusted by using 20 mM HEPES in aqueous solution at pH 7.4.

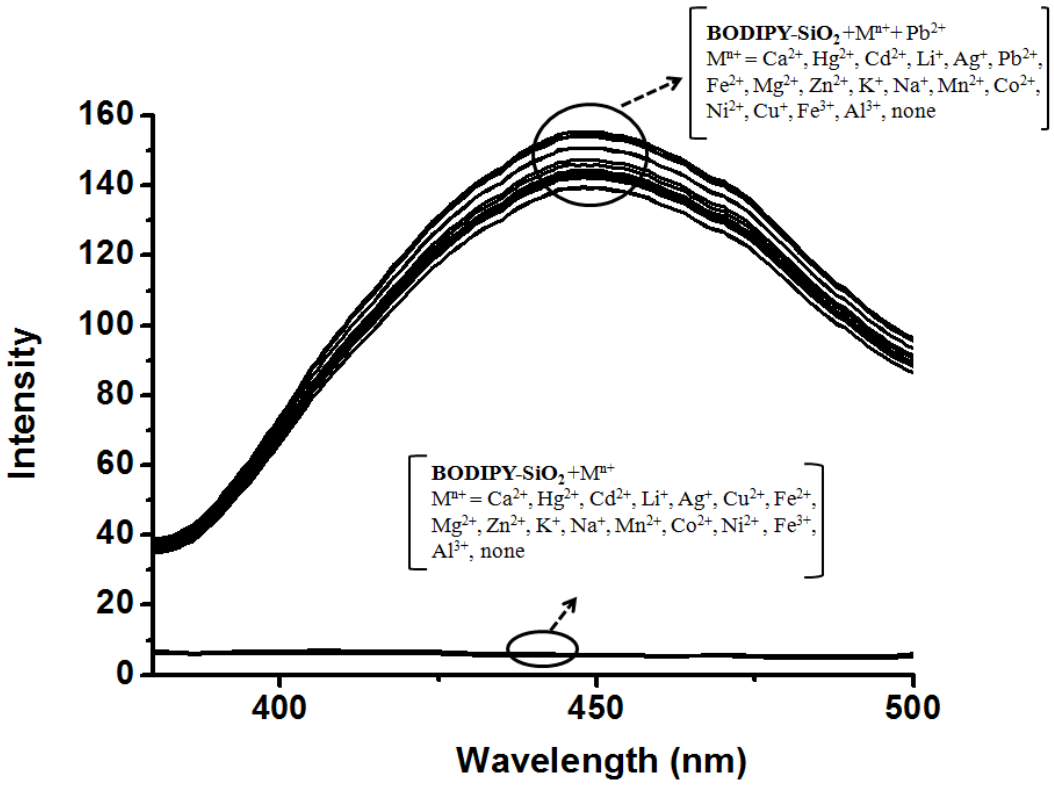


**Fig. S9** Fluorescence responses of **BODIPY-SiO$_2$** (10 $\mu$M) upon addition of $Ca^{2+}$, $Hg^{2+}$, $Cd^{2+}$, $Li^{+}$, $Ag^{+}$, $Pb^{2+}$, $Fe^{2+}$, $Mg^{2+}$, $Zn^{2+}$, $K^{+}$, $Na^{+}$, $Mn^{2+}$, $Co^{2+}$, $Ni^{2+}$,$Fe^{3+}$, $Al^{3+}$, and $Cu^{+}$ (250 equiv), and subsequent addition of $Pb^{2+}$ (250 equiv) in aqueous solution. For all measurements, the pH value was adjusted by using 20 mM HEPES at aqueous solution at pH 7.4. Excitation was provided at 326 nm, and the emission was monitored at 456 nm.

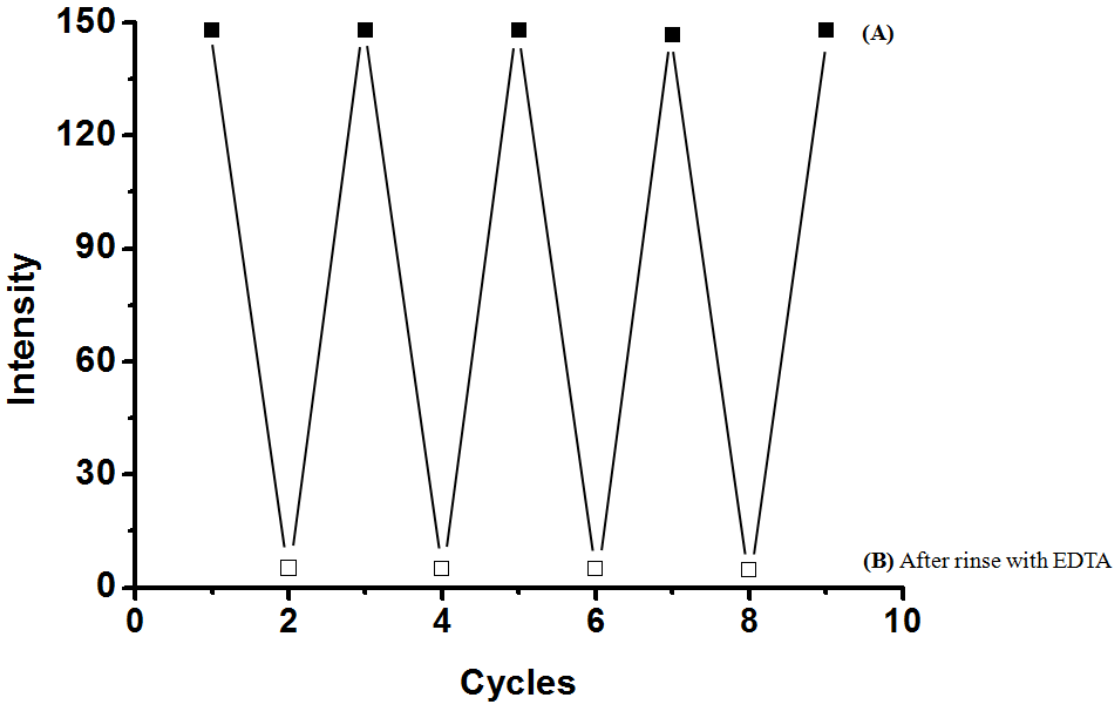


**Fig. S10** Plot for the fluorescent intensity of **BODIPY-$SiO_2$** by alternated dipping in (A) 10 $\mu$M $Pb^{2+}$ ion and (B) 10 $\mu$M EDTA solutions. The cyclic index is the number of alternating dipping / rinsing cycles with the vertical axis showing the fluorescent intensity for the **BODIPY-$SiO_2$** at 460nm.

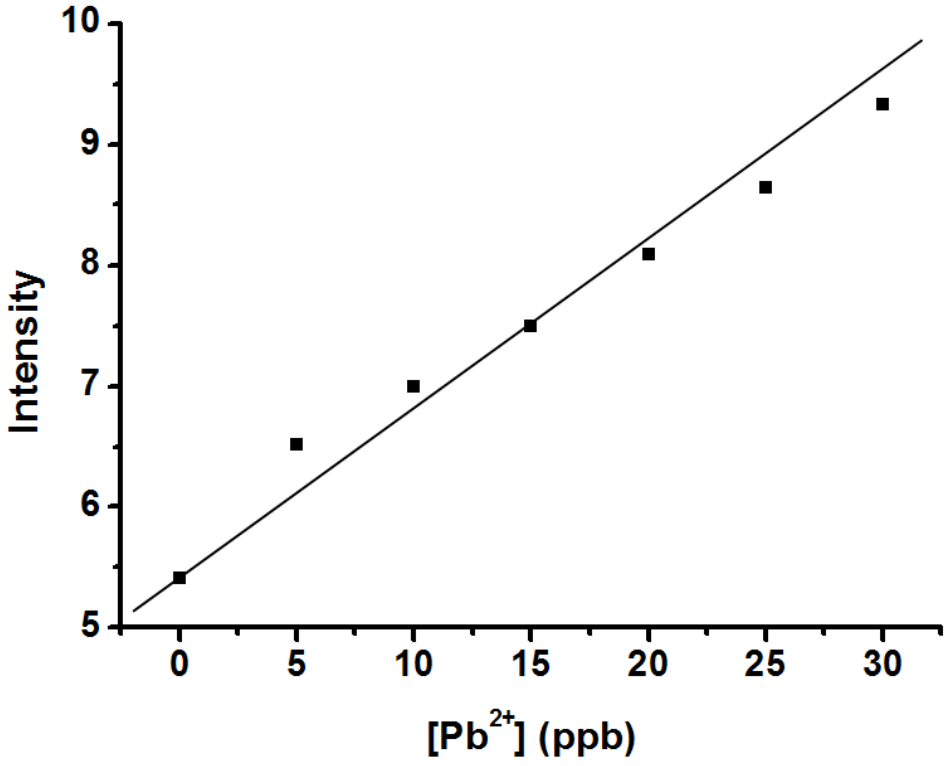


**Fig. S11** Calibration curve of concentration of $Pb^{2+}$ ion against fluorescence intensity of **BODIPY-$SiO_2$** films**.**

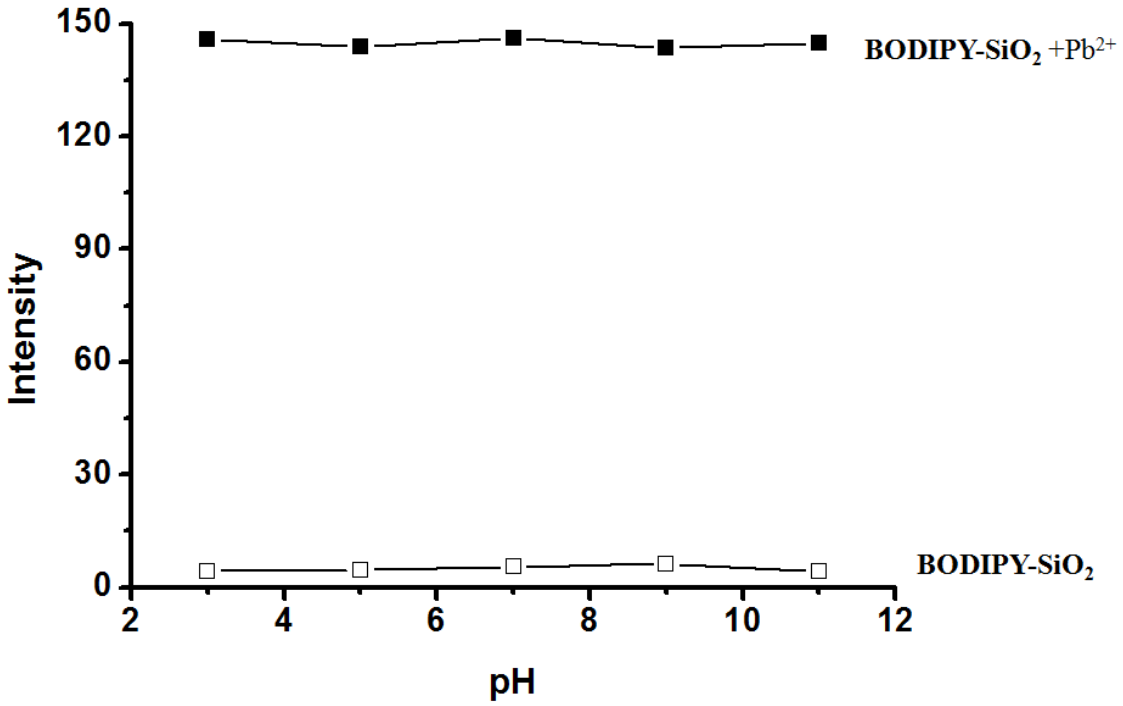


**Fig. S12** Plot of pH values against fluorescence intensity of **BODIPY-$SiO_2$** films without and with $Pb^{2+}$ (10 μM) in pure aqueous solution.