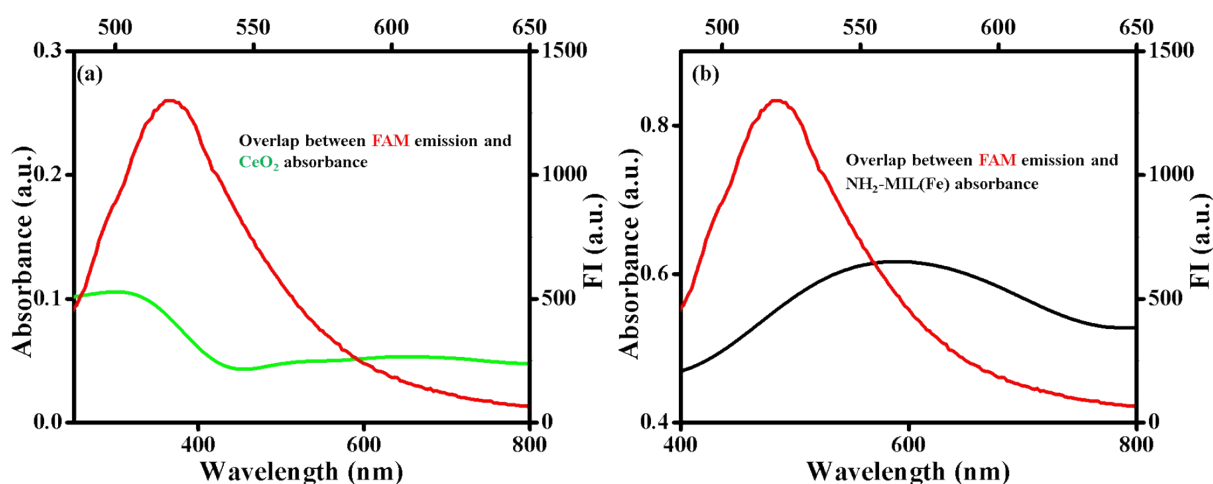


## Dual Fluorometric Biosensor Based on Nanoceria Encapsulated Metal Organic Framework and Signal Amplification Strategy of Hybridization Chain Reaction for the Detection of Melamine and Pb<sup>2+</sup> ions in Food Samples

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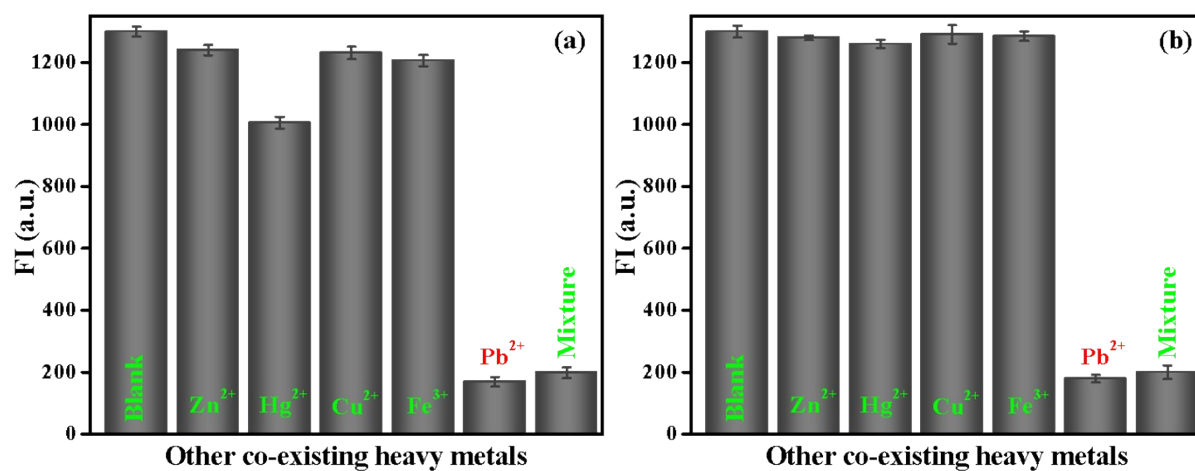
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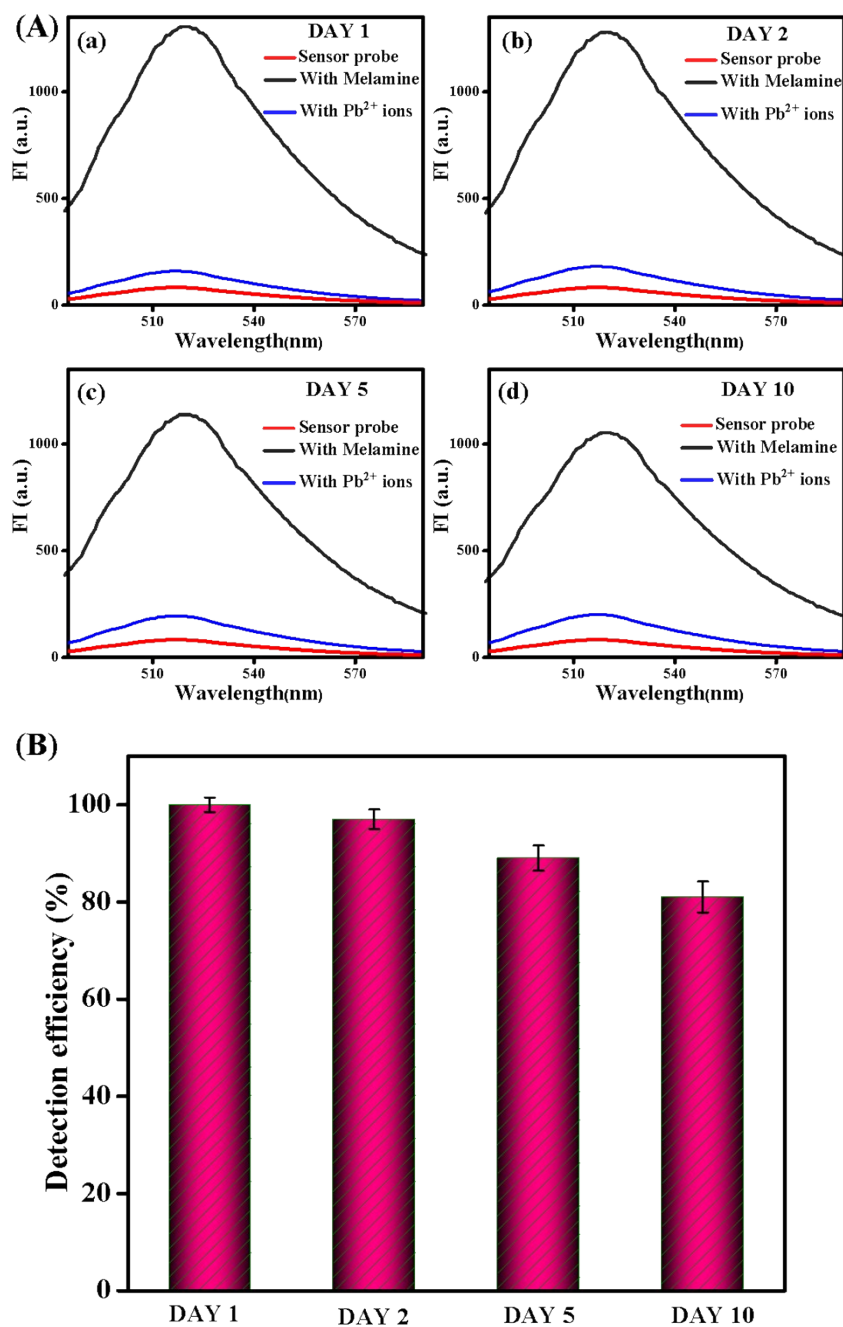
**Figure S1.** (a) UV-Vis absorption spectra for CeO<sub>2</sub> (green) (b) NH<sub>2</sub>-MIL(Fe) (black) and FAM emission spectra (red).

The selectivity of the proposed Pb<sup>2+</sup> sensor was studied with some other heavy metal ions. The effect of Zn<sup>2+</sup>, Hg<sup>2+</sup>, Cu<sup>2+</sup>, and Fe<sup>3+</sup> ions were investigated by the FAM fluorescence emission. As shown in **Figure. S2a**, the FAM emission of the reaction solution having each of the selected metal ions was constant except the Hg<sup>2+</sup> ions shows a slight decreases in the FAM emission. The reason for the interference of Hg<sup>2+</sup> ions might be that Hg<sup>2+</sup> ions could bind to melamine. Since the real milk samples does not contains significant amount of Hg<sup>2+</sup> ions [1], the interference of Hg<sup>2+</sup> ions can be avoided in a fluorometric assay for Pb<sup>2+</sup> ions used in milk samples. Furthermore, herein, we were able to avoid Hg<sup>2+</sup> ion interference by using PDCA reagent also. PDCA was added to the detection solution prior to analysis to mask the Hg<sup>2+</sup> ions significantly in order to achieve the unique detection. PDCA forms considerably more stable complexes with Hg<sup>2+</sup> ions ( $\log \beta_2 = 20.28$ ). As shown in **Figure. S2b**, the FAM signal showed

a dramatic decrease with increasing  $\text{Pb}^{2+}$  ions concentrations in presence of PDCA while the introduction of  $\text{Hg}^{2+}$  and other ions had no influence on the FAM emission [2, 3].



**Figure S2.** (a) Selectivity study for  $\text{Pb}^{2+}$  with coexisting other heavy metals (b) selectivity study for  $\text{Pb}^{2+}$  with coexisting other heavy metals and masking agent PDCA.



**Figure S3.** (A) a-d FAM fluorescence response for melamine and Pb<sup>2+</sup> sensor (B) sensor detection efficiency at different days.

## REFERENCE

- (1) H. Hu, J. Zhang, Y. Ding, X. Zhang, K. Xu, X. Hou, P. Wu, *Analytical chemistry* 2017, 89(9), 5101-6.
- (2) E. Norkus, I. Stalnionienė, DC. Crans, *Heteroatom Chemistry* 2003, 14(7), 625-32.
- (3) NY. Hsu, YW. Lin, *New Journal of Chemistry* 2016, 40(2), 1155-61.

