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# An amphiphilic pyrene-based probe for multiple channel sensing of mercury ions

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**Abstract:** An amphiphilic probe bearing a pyrene fluorophore and a hydrophobic cetyl chain has been synthesized by click reaction. The fluorescence recognition properties of the probe toward  $\text{Hg}^{2+}$  in DMF solution, in aqueous solution and in gel state were detailedly investigated. In DMF solution, the soluble probe shows a pyrene-based monomer emission, and binds with  $\text{Hg}^{2+}$  in a 1:1 stoichiometry with the fluorescence a turn-off response. The probe can self assemble nonoaggregates with showing both pyrene-based monomer and excimer emissions in aqueous solution. The formed nonoaggregates can be enhanced upon binding with  $\text{Hg}^{2+}$ , which leads the monomer emission largely quenching, but the excimer emission a little change. It also found that the probe in aqueous solution shows more sensitive toward  $\text{Hg}^{2+}$  than that in DMF solution. Furthermore, the probe can form fluorescent organic gels in some organic solvents, and the gels were collapsed with only addition of  $\text{Hg}^{2+}$ . For biological application, the probe was successfully used for fluorescence imaging of intracellular  $\text{Hg}^{2+}$ .

**Graphical abstract:**

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