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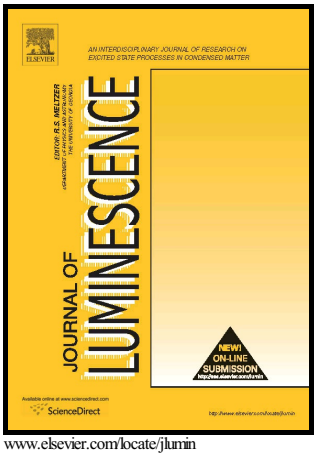

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An amphiphilic pyrene-based probe for multiple channel sensing of mercury ions

Li-Na Liu, [‡,a] Hui Tao, [‡,a] Guo Chen,[b] Yong Chen,[b] Qian-Yong Cao [a,*]

[a]Department of Chemistry, Nanchang University, Nanchang 330031, P. R. China

[b] Institute for Advanced Study, Nanchang University, Nanchang 330031, P. R. China

‡ These two authors contributed equally to this work

[*]Corresponding author. Fax: (+86)791-83969514; E-mail: cqyong@ncu.edu.cn;

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 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 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 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 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 Hg^{2+}. For biological application, the probe was successfully used for fluorescence imaging of intracellular Hg^{2+}.

Graphical abstract: