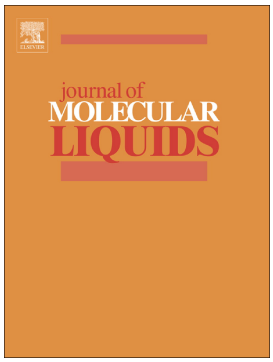

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Detection of Hg^{2+} ions in Aqueous Medium Using an Indole-Based Fluorescent Probe: Experimental and Theoretical Investigations

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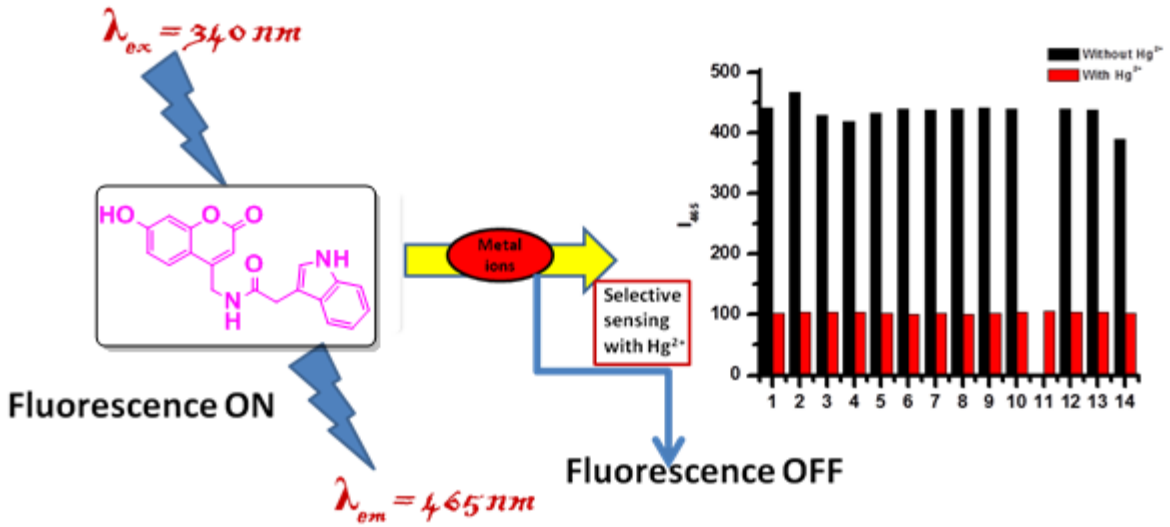
Abstract:

Mercury pollution is a widespread danger to human health and environment. Due to limitations associated with the existing Hg^{2+} chemosensors, development of new, efficient, selective chemosensors capable of sensing mercury ions in aqueous medium remains a demanding area of research. In this regard, an indole-based fluorescent probe has been synthesized and characterized by detailed spectroscopic analysis. The probe showed a high selectivity and sensitivity towards Hg^{2+} by giving significant fluorescence quenching over other tested cations in H_2O/DMF (7:3, v/v) medium. The association constant (K_a) was 6.4×10^3 M^{-1} between sensor and Hg^{2+}. The detection limit of sensor to Hg^{2+} is found to be 0.143 μM (143 nM). The experimental results have been verified with Density Functional Theory.



Keywords: Coumarin; Chemosensor, Fluorescence; Quenching; Mercury; DFT calculations

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