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Benzidine based fluorescent probe for the sensitive detection of heavy metal ions via Chelation Enhanced Fluorescence mechanism—A multiplexed sensing platform

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Abstract

Herein, a novel benzidine based fluorescent chemosensor was developed to detect two important heavy metal ions viz. Sn^{2+} and Pb^{2+} in microheterogeneous medium (DMSO-water, 1:9 v/v). Benzidine based fluorescent coordination compound (BCc) was found to be an excellent receptor for the aforementioned ions via significant fluorescent enhancement which may be attributed to the inhibition of charge transfer process and an efficient chelation enhanced fluorescence (CHEF) effect. A good linear relationship between fluorescence intensity and concentrations of Sn^{2+} and Pb^{2+} ions was obtained in the range of 0 to 120 μM with the detection limit of 0.37 μM and 0.32 μM respectively. Interestingly, no interference was observed for 18 other tested metal ions making it highly selective probe for the detection of Sn^{2+} and Pb^{2+} ions. The multiplexed sensing ability coupled with prompt metal ion recognizing power, make this sensor specifically attractive for environmental toxicology and biomedical applications.

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