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Kodambakkam, Chennai - 600024, India

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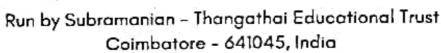
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Selective and sensitive Chelating Sensor for the detection of Cd²⁺. A greener approach

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Selective and sensitive Chelating Sensor for the detection of Cd2+ - A greener approach

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Abstract

A Novel chemosensor (L1) derived from 4 aminoantipyrine was synthesized by microwave irradiation in a greener approach. It was characterized by Ft-IR, H- NMR and HR-LCMS mass spectrum. The specific selectivity of the sensor towards the sensing of Cd²⁺ was effectively studied colorimetrically and by fluorescence technique. The synthesized sensor put on display strong "turn-on" fluorescence and promising selectivity towards sensing of Cd²⁺ ions in ethanol. The binding of Cd²⁺ with the synthesized sensor was confirmed by UV-Visible spectrum with an isobestic point at 430 nm. L1 forms 1:1 complex with Cd²⁺ which was further confirmed by HR-LCMS mass spectrum and Job's plot analysis. When Cd²⁺ binds with L1 PET process gets inhibited thereby enhancing the fluorescence intensity. CHEF takes place as a part of the sensing mechanism. The reversibility of L1 was analyzed by EDTA. The detection limit was found out to be 0.02 μM. Real sample analysis was performed for the practical applicability of L1 using various water samples. DFT study supports the four coordination of Cd²⁺ with L1. Fluorescence cell imaging of L1+Cd²⁺ complex was performed which also supports the fluorescent nature of L1+Cd²⁺ in L929 cells. Test strips study also confirms the fluorescent nature of L1+Cd²⁺.