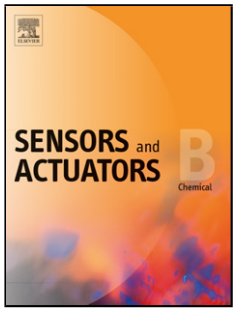

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Authors: Nirma Maurya, Ashok Kumar Singh

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Selective Naked Eye and "Turn-on" Fluorescence Chemodosimeter for CN^- by Activated Michael Acceptor Possessing Different Polar Substituents: Reduced ICT-Based Signal Transduction

Nirma Maurya, Ashok Kumar Singh*

Department of Chemistry, Indian Institute of Technology- Roorkee, Roorkee 247667, India

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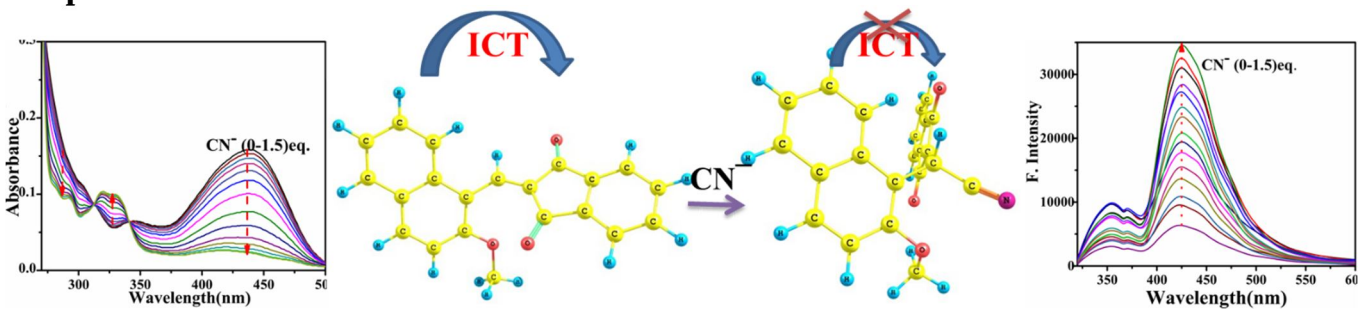
Graphical Abstract



Highlights

- Ligands shows colorimetric and fluorescence "turn on" sensor for CN^- in H_2O-DMF (9:1, v/v, HEPES buffer 7.4).
- The limit of detection for CN^- was 1.15/1.2 nM, which is the lowest ever reported.
- Liquid paper test strips and solid state allow naked-eye detection of CN^-.

ABSTRACT
Based on the specific nucleophilicity of CN^-, two doubly activated Michael type chemodosimeter were designed and synthesized with 2-methoxy 1-napthaldehyde donor moiety. The donor-acceptor molecular arrangement was interrupted by addition of CN^- on electron-deficient alkene bridge, which blocks intramolecular charge transfer. The colorimetric blue shift and florescence enhancement of ligands were observed by variations in absorption and emission spectra. The FTIR, NMR, mass spectroscopy and DFT (Density functional theory) further supported the suggested mechanism of interaction between ligands and CN.

Keywords:
Chemodosimeter;
Cyanide; NMR Titration
DFT; Cyclic voltammetry