

Accepted Manuscript

Title: Selective Naked Eye and “Turn-on” Fluorescence Chemodosimeter for CN₃₀₄ by Activated Michael Acceptor Possessing Different Polar Substituents: Reduced ICT-Based Signal Transduction

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PII: S0925-4005(17)30128-4
DOI: <http://dx.doi.org/doi:10.1016/j.snb.2017.01.121>
Reference: SNB 21646

To appear in: *Sensors and Actuators B*

Received date: 29-10-2016
Revised date: 11-1-2017
Accepted date: 20-1-2017



Please cite this article as: Nirma Maurya, Ashok Kumar Singh, Selective Naked Eye and “Turn-on” Fluorescence Chemodosimeter for CN₃₀₄; by Activated Michael Acceptor Possessing Different Polar Substituents: Reduced ICT-Based Signal Transduction, *Sensors and Actuators B: Chemical* <http://dx.doi.org/10.1016/j.snb.2017.01.121>

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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

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ARTICLE INFO

Article history:

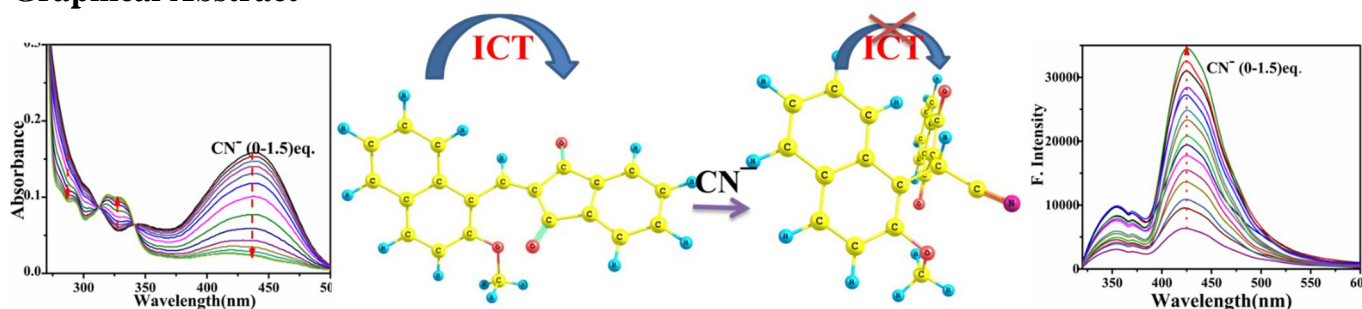
Received

Received in revised form

Accepted

Available online

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-naphthaldehyde 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 fluorescence 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^- .

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Keywords:

Chemodosimeter;
Cyanide; NMR Titration
DFT; Cyclic voltammetry

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