



Archana Singh, Suban K. Sahoo, Darshak R. Trivedi

PII: S1386-1425(17)30610-8
 DOI: [doi: 10.1016/j.saa.2017.07.051](https://doi.org/10.1016/j.saa.2017.07.051)
 Reference: SAA 15338

To appear in: *Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy*

Received date: 6 June 2017
Revised date: 17 July 2017
Accepted date: 28 July 2017

Please cite this article as: Archana Singh, Suban K. Sahoo, Darshak R. Trivedi , Colorimetric anion sensors based on positional effect of nitro group for recognition of biologically relevant anions in organic and aqueous medium, insight real-life application and DFT studies, *Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy* (2017), doi: [10.1016/j.saa.2017.07.051](https://doi.org/10.1016/j.saa.2017.07.051)

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Colorimetric anion sensors based on positional effect of nitro group for recognition of biologically relevant anions in organic and aqueous medium, insight real -life application and DFT studies

Archana Singh^a, Suban K. Sahoo^b, Darshak R. Trivedi*

^aSupramolecular Chemistry Laboratory, Department of Chemistry, National Institute of Technology Karnataka (NITK) Surathkal, Srinivasnagar - 575 025, Karnataka, India

^bDepartment of Applied Chemistry, S.V. National Institute Technology Surat-395 007 Gujarat, India

*Email: darshak_rtrivedi@yahoo.co.in, Phone No: +91-824-2473205, fax: +91 824 2474033.

Abstract

A new six colorimetric receptors A1-A6 were designed and synthesized, characterized by typical common spectroscopic techniques like FT-IR, UV-Visible, ¹H NMR, ¹³C NMR and ESI-MS. The receptor A1 and A2 exhibit a significant naked-eye response towards F⁻ and AcO⁻ ions in DMSO. Due to presences of the NO₂ group at para and ortho position with extended π-conjugation of naphthyl group carrying -OH as a binding site. Compared to receptor A2, A1 is extremely capable of detecting F⁻ and AcO⁻ ions present in the form of sodium salts in an aqueous medium. This is owed to the occurrence of -NO₂ group at para position induced in increasing the acidity of -OH proton. Consequently, it easily gets deprotonated in aqueous media. The detection limit of receptor A1 was turned out to be 0.40 and 0.35 ppm for F⁻ and AcO⁻ ions which is beneath WHO permission level (1.0 ppm). Receptor A1 shows a solitary property of solvatochromism in different aprotic solvents in presence of AcO⁻ion. Receptor A1 depicts high selectivity towards AcO⁻ion in DMSO: HEPES buffer (9:1, v/v). Receptor A1 proved itself for real life application by detecting anion in solution and solid state. The binding mechanism of receptor A1 with AcO⁻and F⁻ ions was monitored from ¹HNMR titration and DFT study.

Keywords: Fluoride; Acetate; Sensor; Coloimetric; DFT calculation

Download English Version:

<https://daneshyari.com/en/article/5139477>

Download Persian Version:

<https://daneshyari.com/article/5139477>

[Daneshyari.com](https://daneshyari.com)