# Highly selective and sensitive simultaneous nanomolar detection of Cs(I) and Al(III) ions by tripodal organic nanoparticles in aqueous medium: The effect of urea backbone on chemosensing

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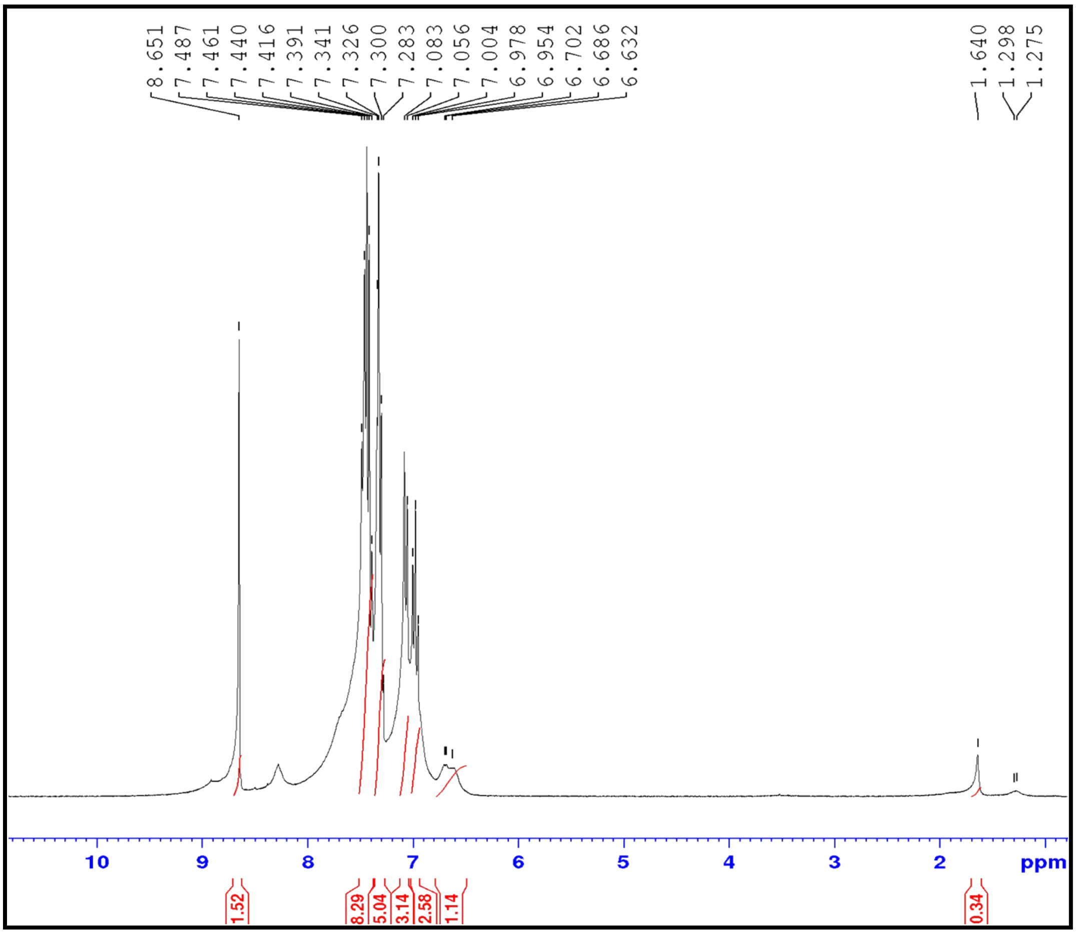


Figure 1S. [1]H NMR spectrum of Schiff base

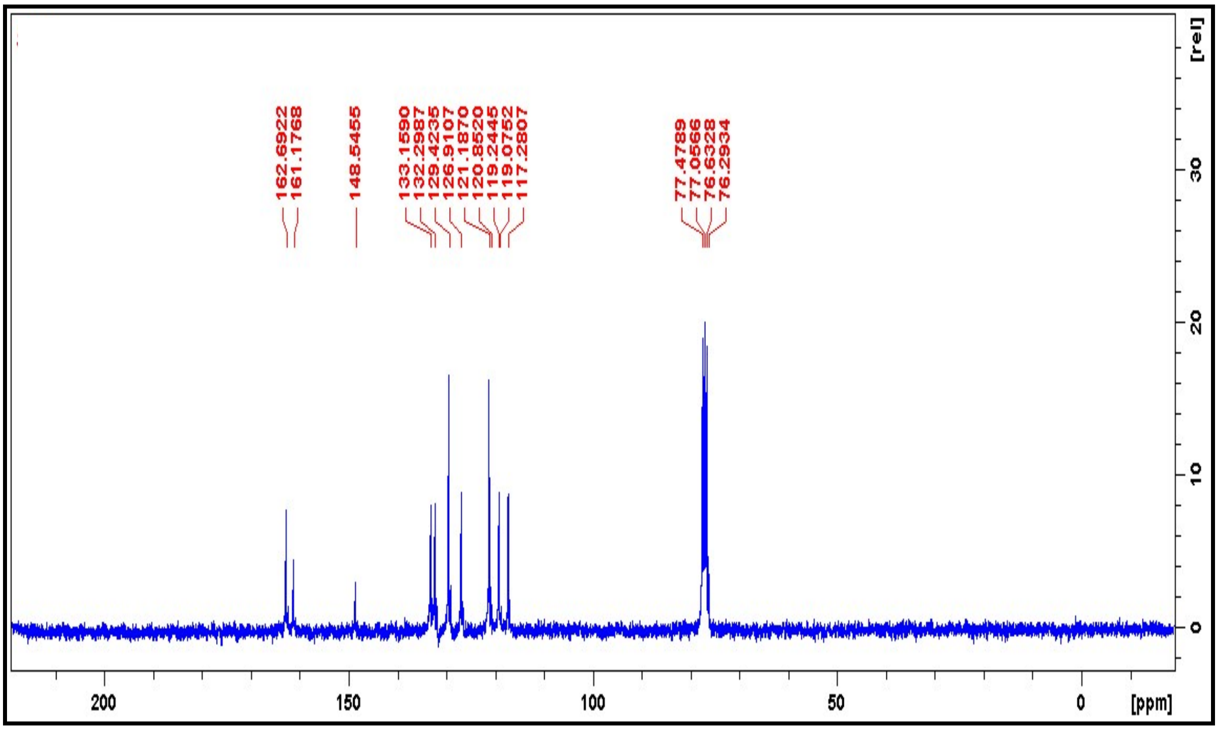


Figure 2S. $^{13}C$ NMR spectrum of Schiff base

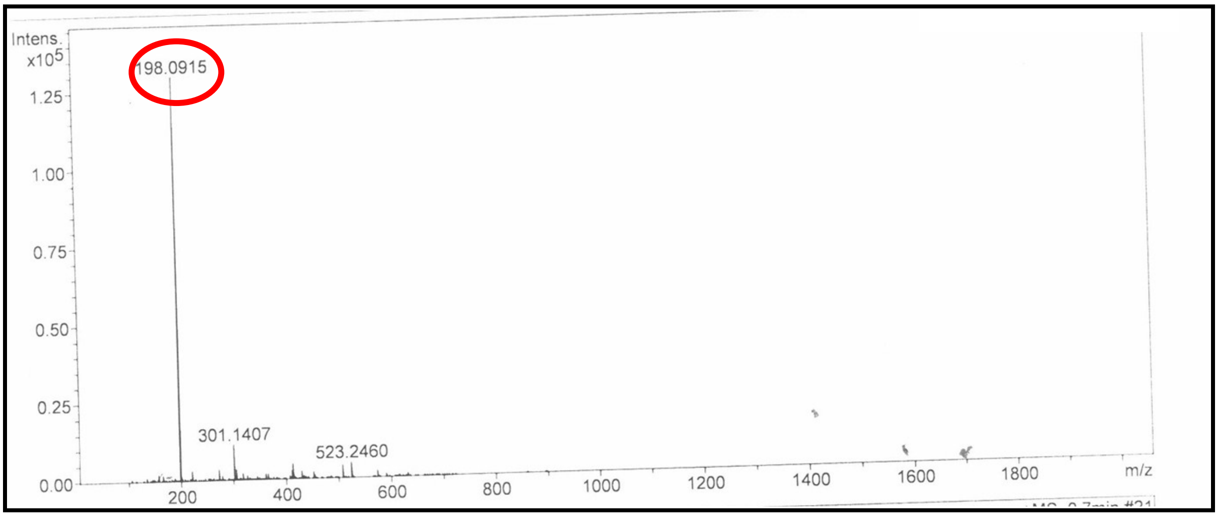


Figure 3S. Mass spectrum of Schiff base

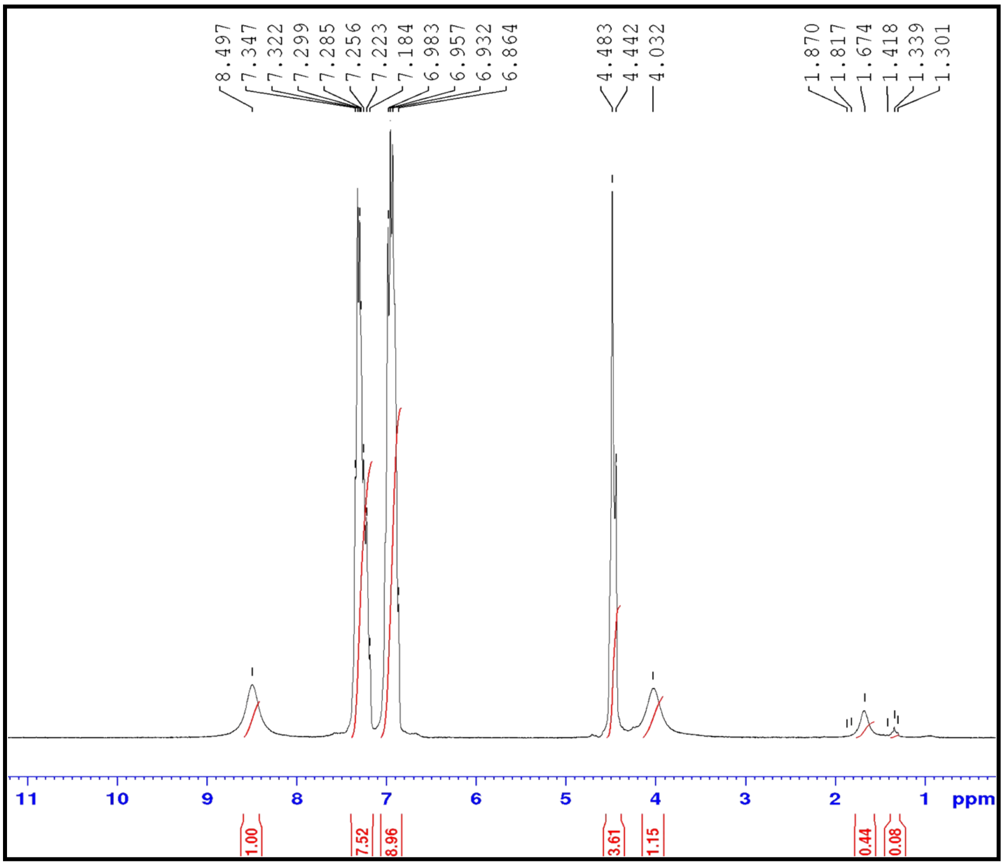


Figure 4S. [1]H NMR spectrum of reduced product of Schiff base

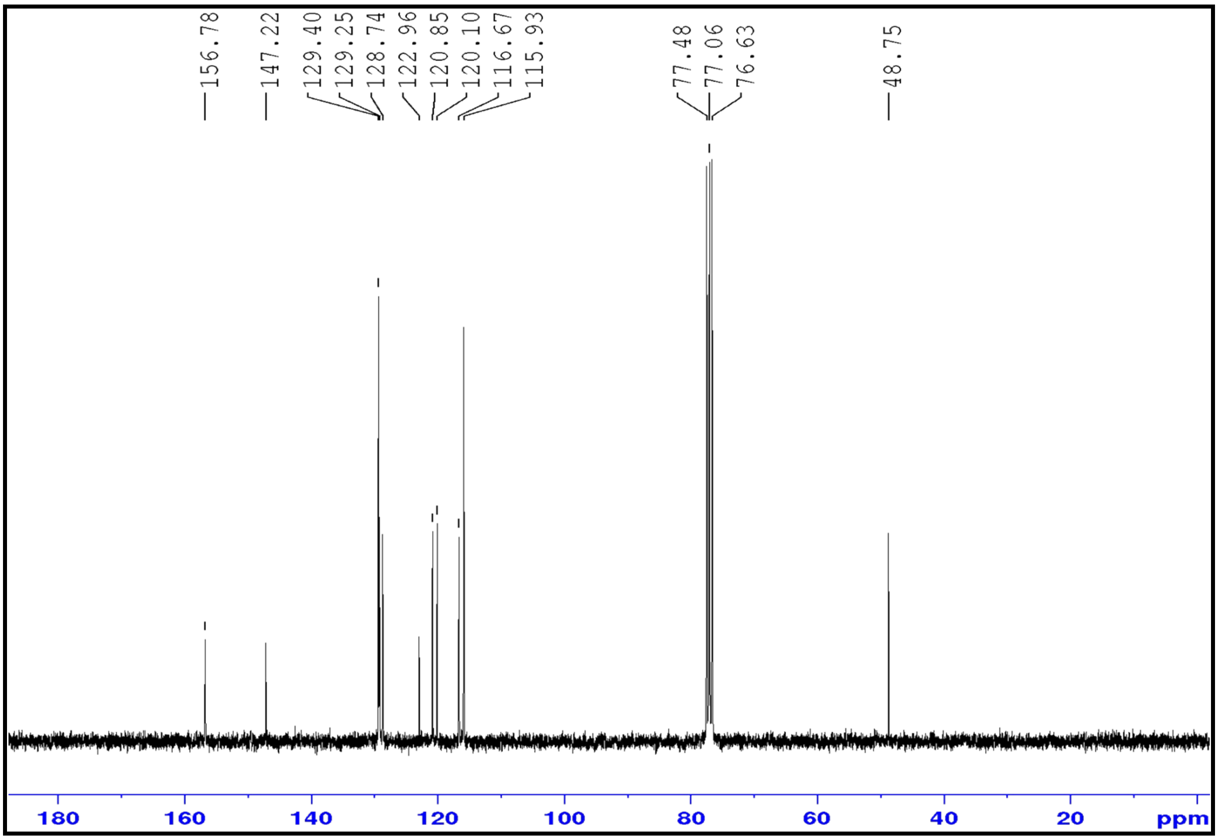


Figure 5S. $^{13}C$ NMR spectrum of reduced product of Schiff base

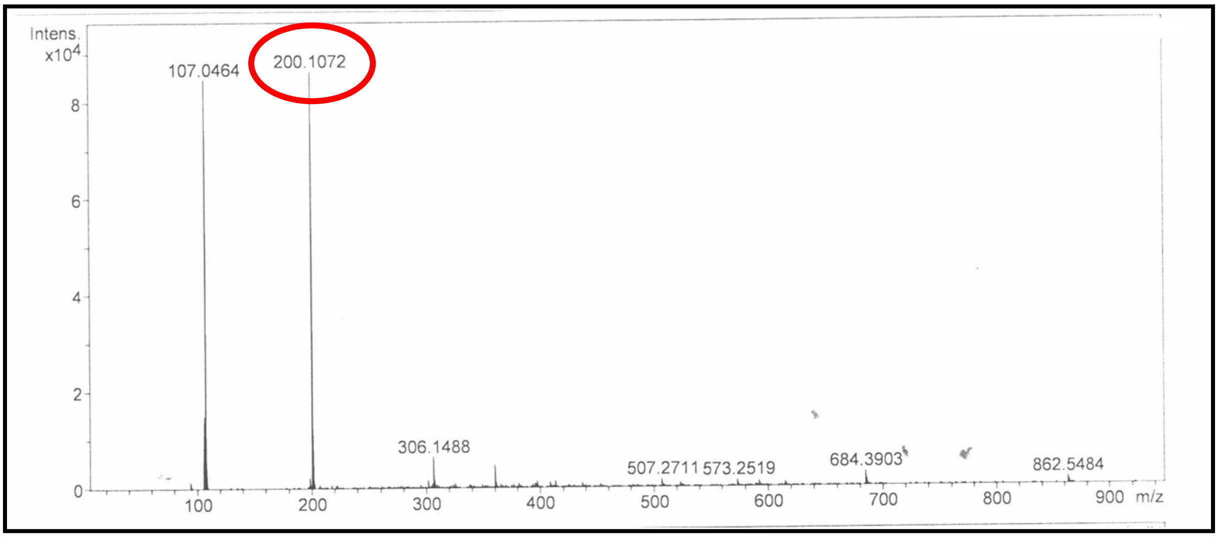


Figure 6S. Mass spectrum of reduced product of Schiff base

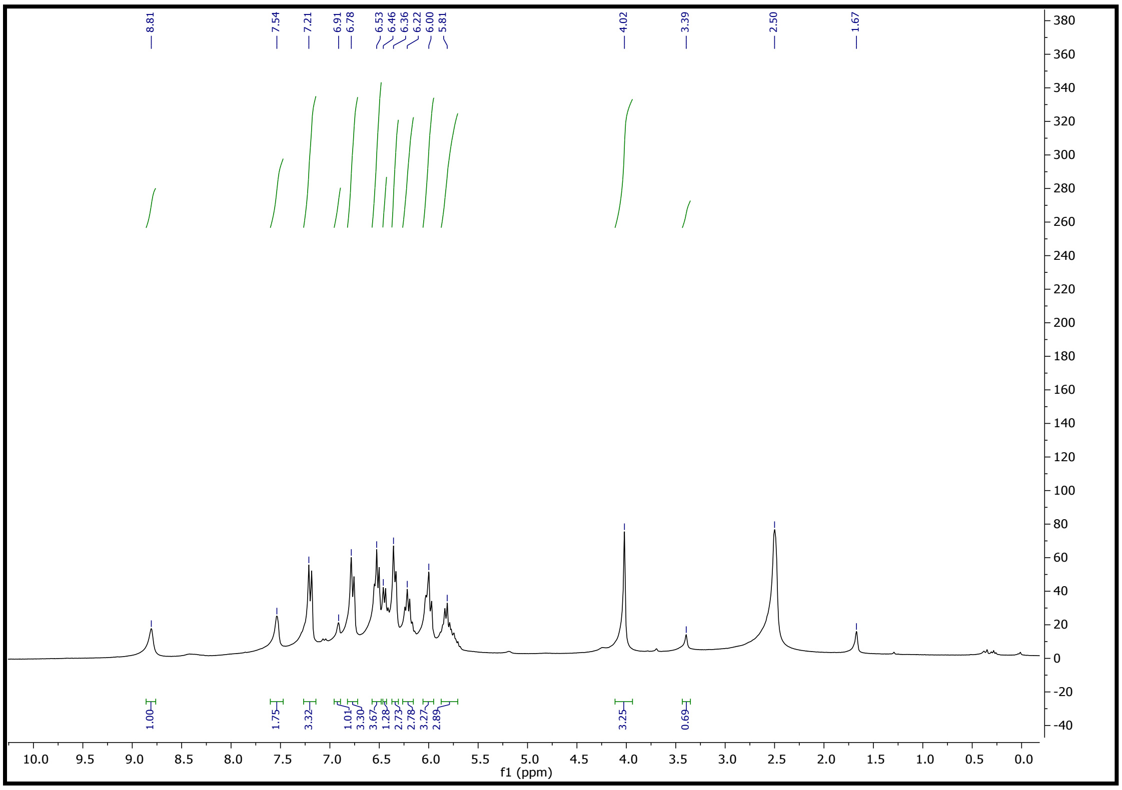


Figure 7S. $^{1}H$ NMR spectrum of ligand 1

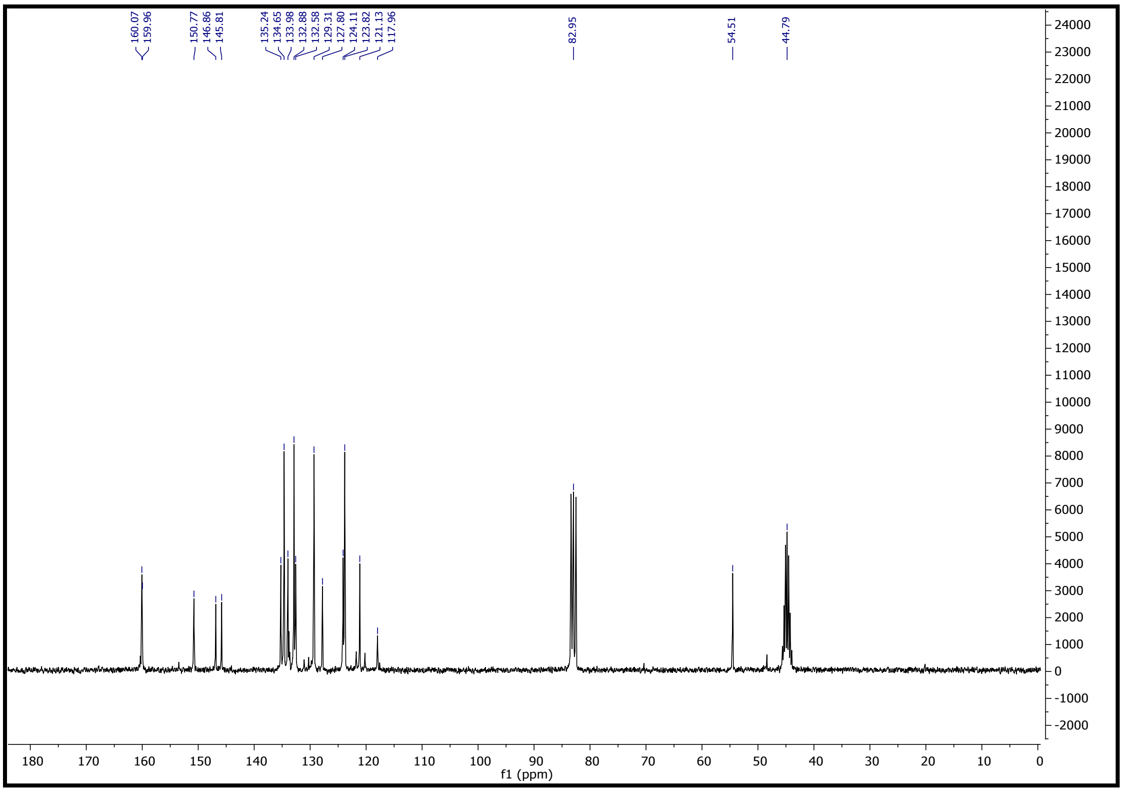


Figure 8S. $^{13}C$ NMR spectrum of ligand 1

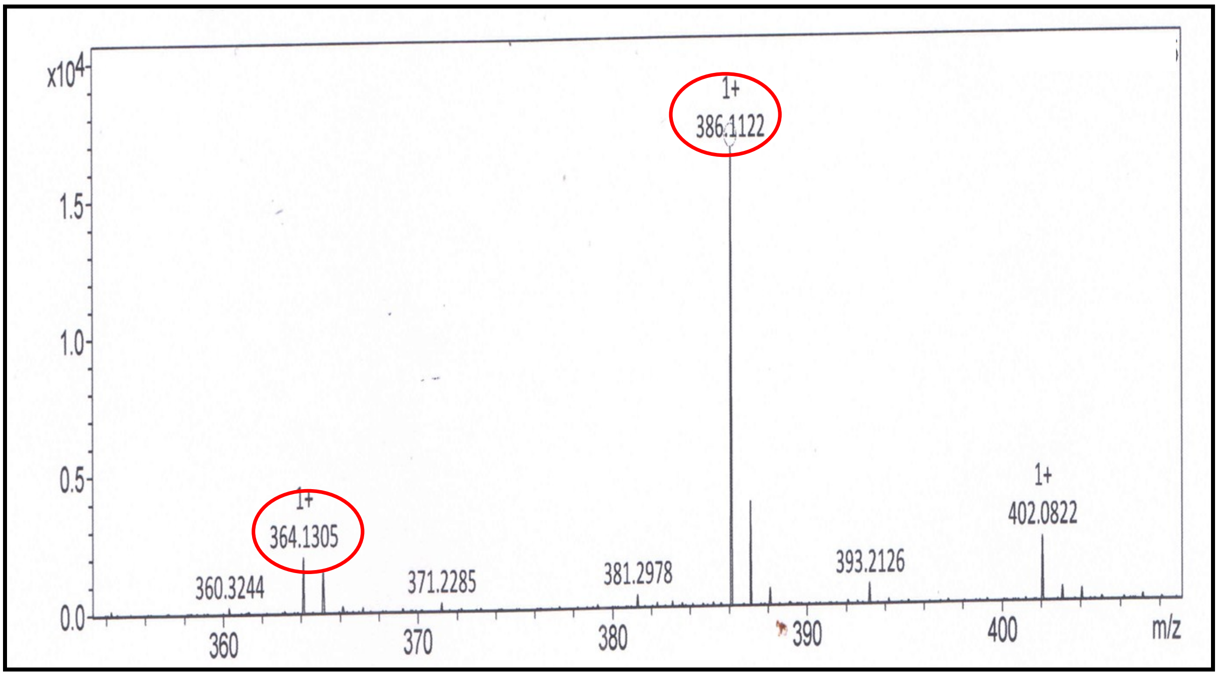


Figure 9S. Mass spectrum of ligand 1

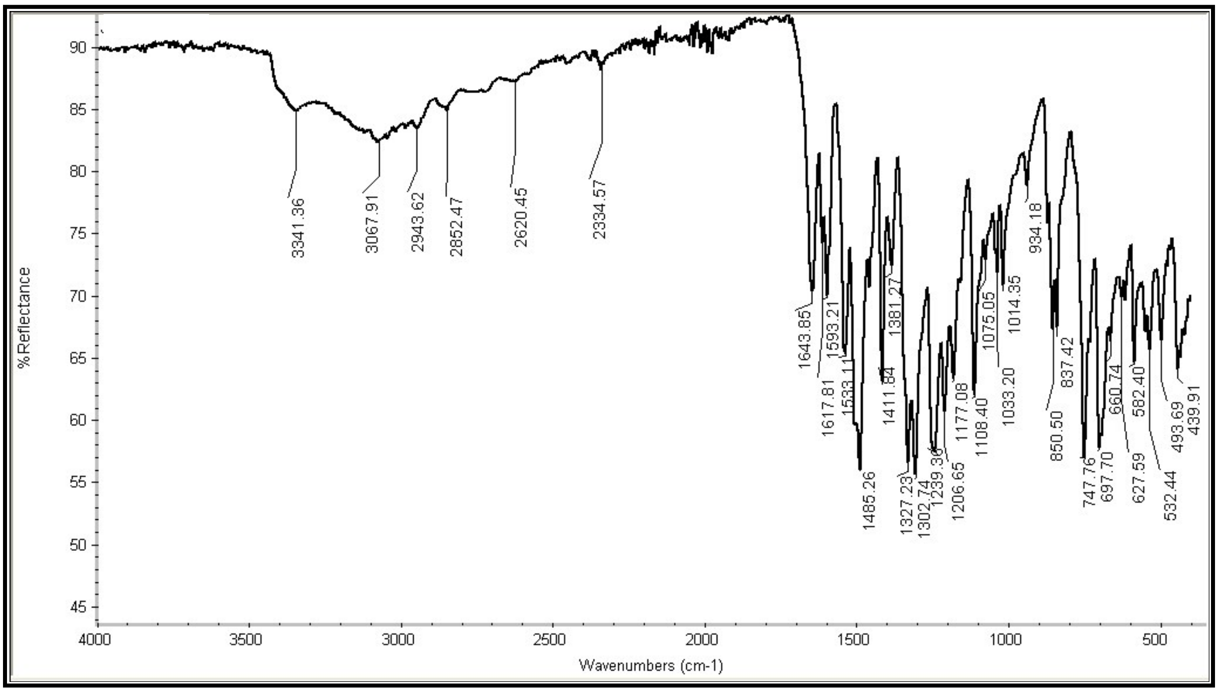


Figure 10S. IR spectrum of ligand 1

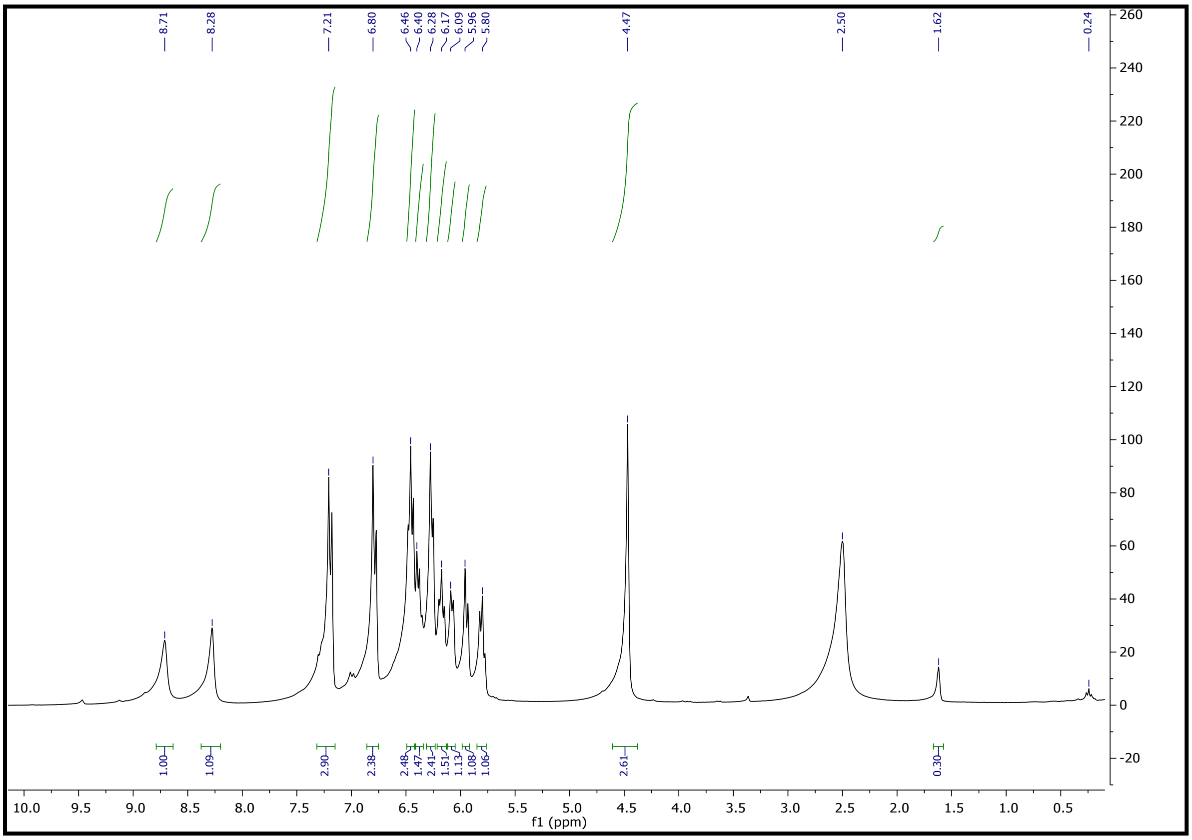


Figure 11S. $^{1}H$ NMR spectrum of ligand 2

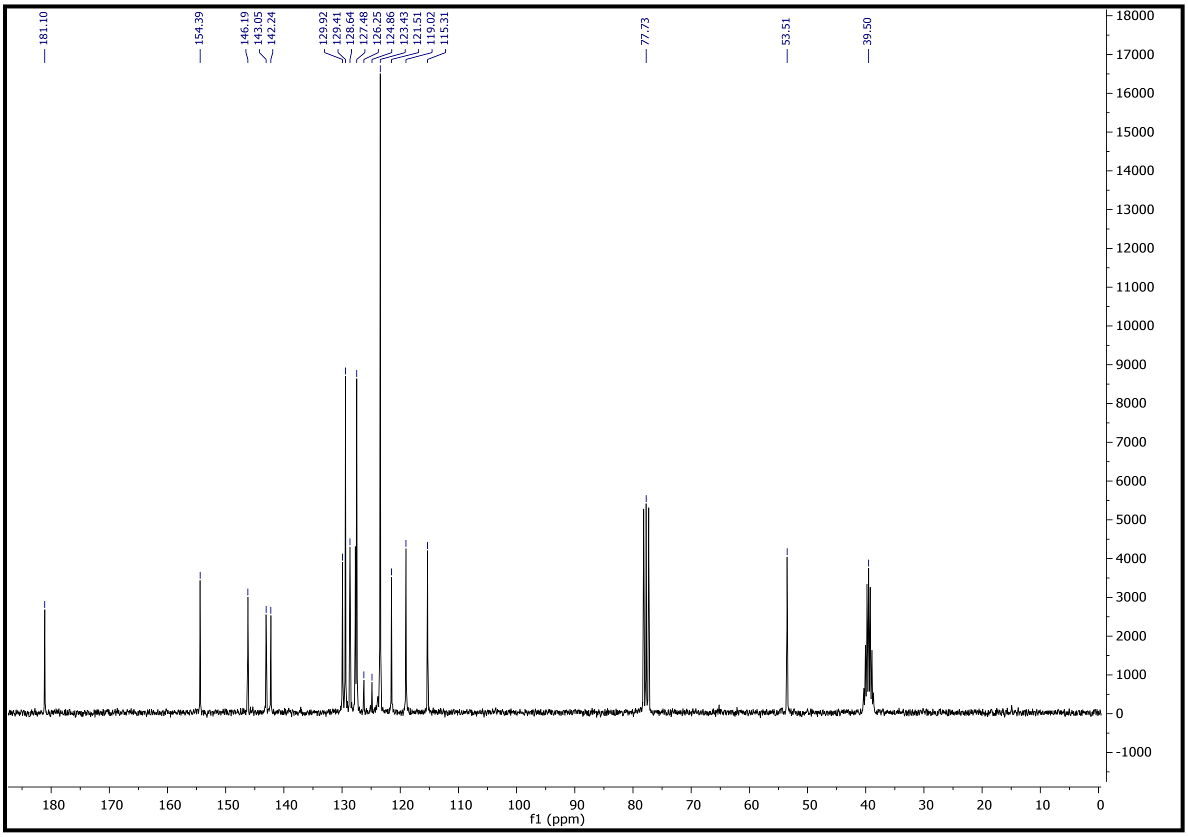


Figure 12S: $^{13}C$ NMR spectrum of ligand 2

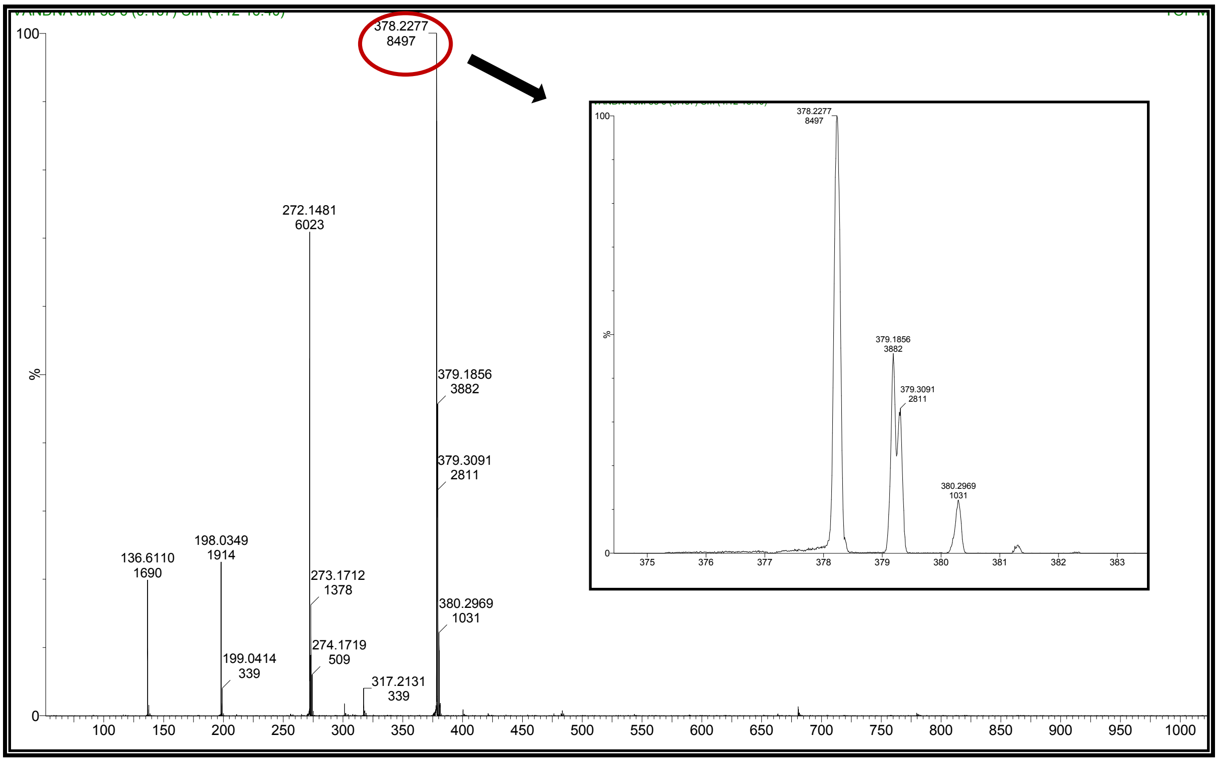


Figure 13S: Mass spectrum of ligand 2

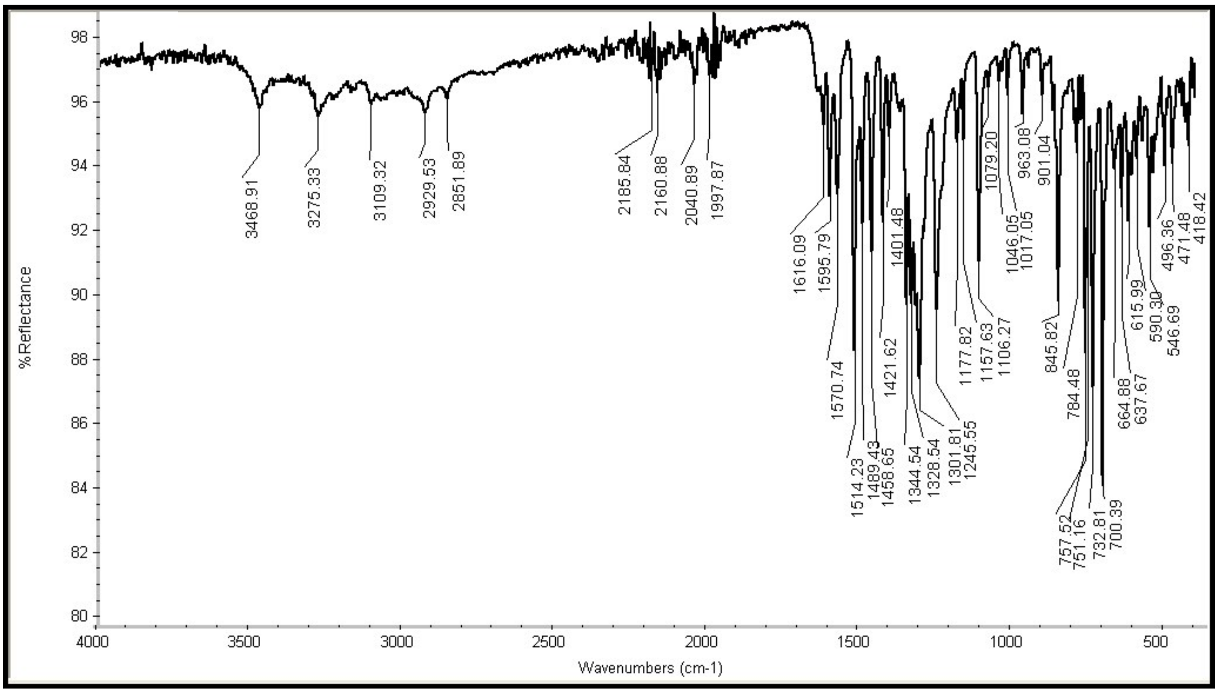


Figure 14S: IR spectrum of ligand 2

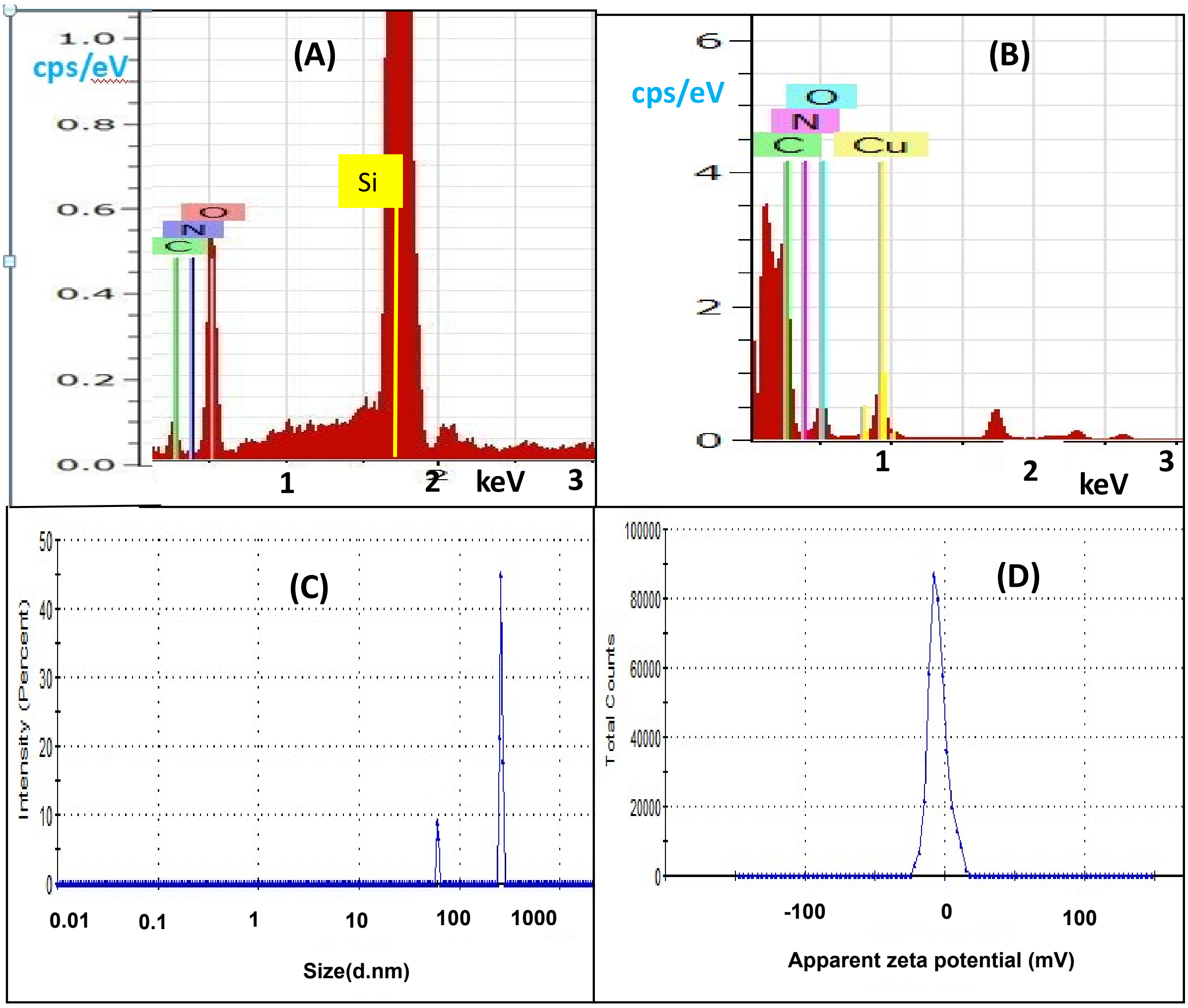


Figure 15S: (A) SEM-EDX spectrum analysis; (B) TEM-EDX spectrum analysis; (C) Size distribution and (D) Zeta potential profile of 1-ONP

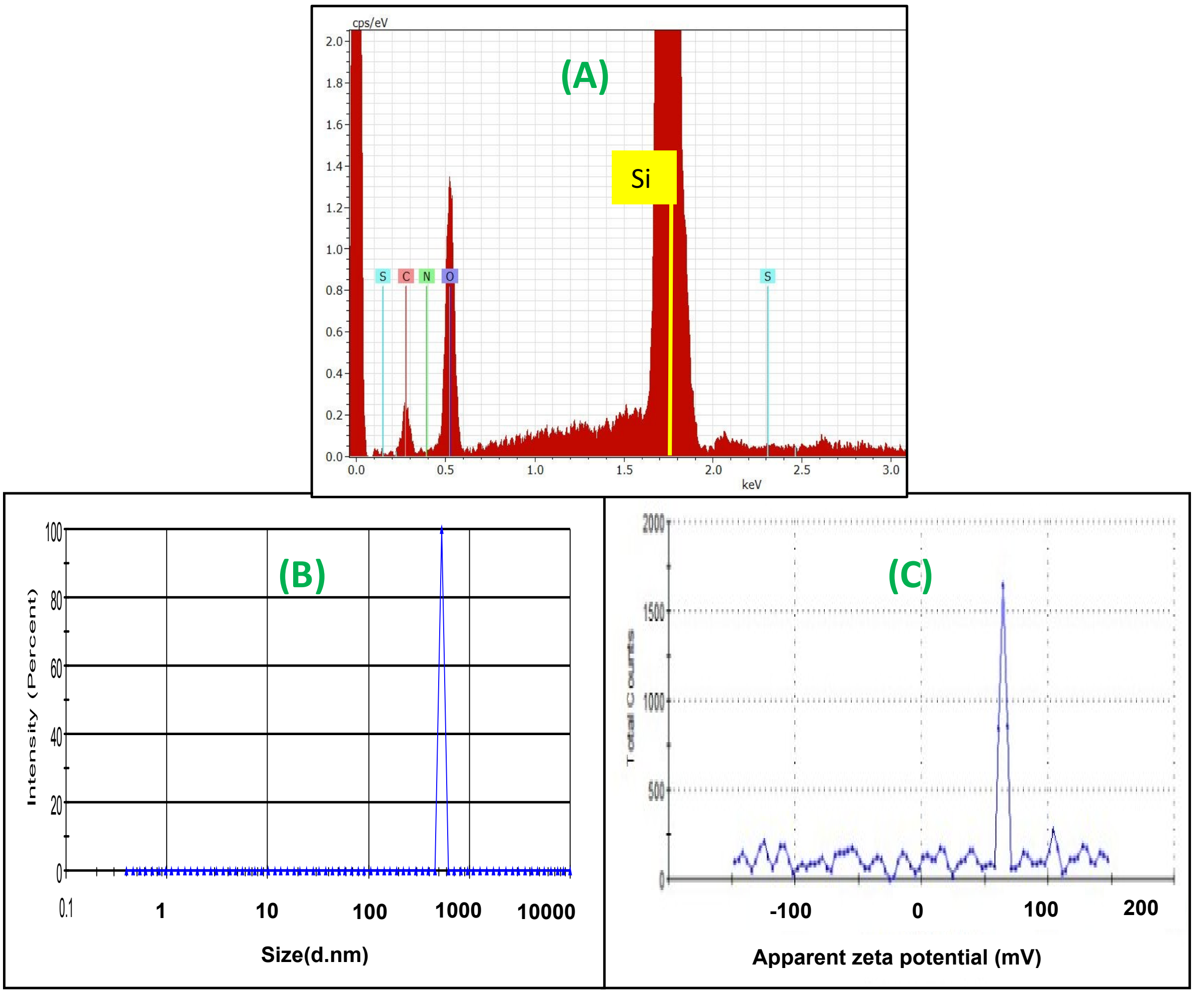


Figure 16S: (A) SEM-EDX spectrum analysis; (B) Size distribution and (C) Zeta potential profile of 2-ONP

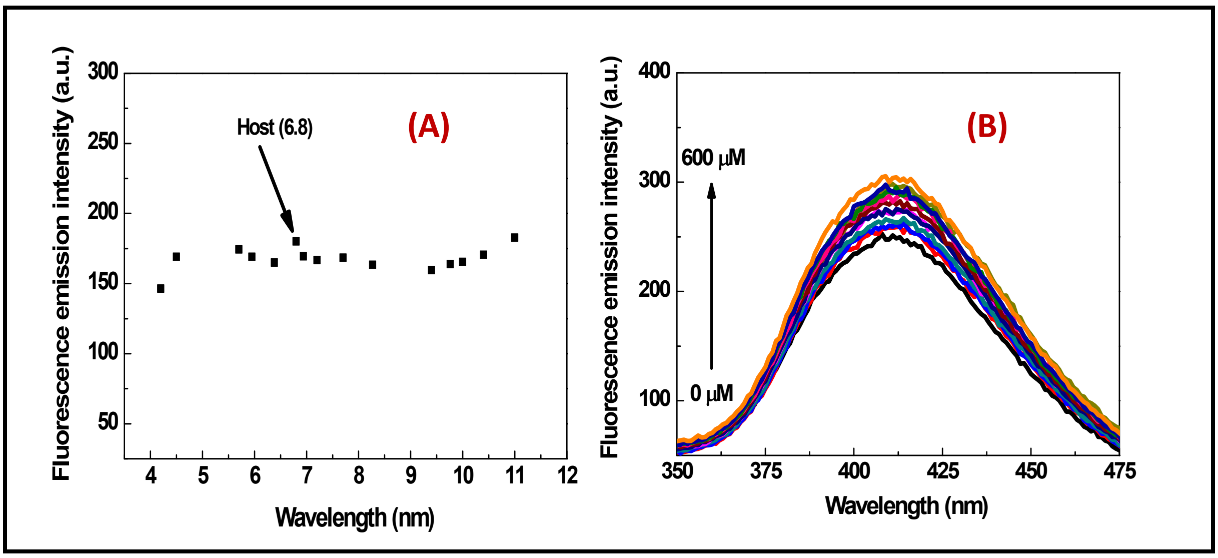


Figure 17S. (A) Effect of pH on fluorescence emission profile of 1-ONP; (B) Effect of a heavy salt i.e. tetrabutylammoniumperchlorate on 1-ONP

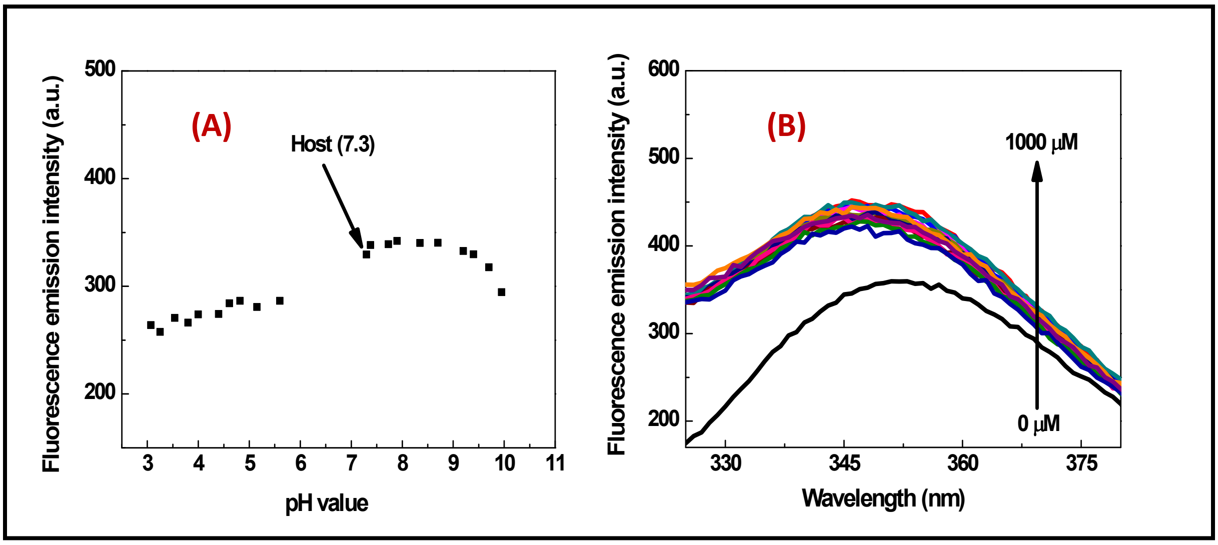


Figure 18S. (A) Effect of pH on 2-ONP fluorescence emission profile; (B) Effect of a heavy salt i.e. tetrabutylammoniumperchlorate on 2-ONP

**Table:**

| S. N. | Journal name | Receptor | Analyte | Limit of detection |
|---|---|---|---|---|
| **1.** | Shamsipur *et al.* [29] | PVC membrane electrode based on 1,5-diaza-2,3,4-naphthyl-8,11,14 trioxacyclohexadecane- 6,16-dione (16-membered macrocyclic diamide) | Cs(I) | 4.7 µM |
| **2.** | Talanova *et al* [30] | Calix[4]arenebis(crown-6 ether) containing one pendent dansyl group | Cs(I) | 4 x $10^{-7}$ M |
| **3.** | Levine *et al.* [31] | 2,4-bis[4-(N,N-dihydroxyethylamino)-phenyl] squaraine | Cs(I) | 0.096 µM |
| **4.** | Leray and Valeur *et al.*[32] | Calix[4]arene-bis(crown-6-ether) based receptor | Cs(I) | 3.7 mM |
| **5.** | Arvand *et al.* [35] | Zeolite KY modified sol-gel matrix as an electrochemical sensor for potentiometric determination of cesium ions in water samples | Cs(I) | 7.3 µM |
| **6.** | Jiang *et al.*[36] | Schiff base directed 8-hydroxyquinoline-5-carbaldehyde in | Al(III) | $10^{-7}$ M |

| | | | | |
|---|---|---|---|---|
| | | weak acid aqueous medium. | | |
| **7.** | Bera *et al.* [37] | A neutral imidazol carrier i.e. 2-(4,5-dihydro-1,3-imidazol-2-yl)phenol based liquid membrane electrode in a poly(vinyl chloride) (PVC) matrix for potentiometric sensing | Al(III) | $7x10^{-7}$ M |
| **8.** | Maity and Govindaraju[38] | Conformationally constrained (coumarin-pyrrolidinyl-triazolyl-bipyridyl) fluoroionophore conjugate in $CH_3CN$ | Al(III) | $1.0 \times 10^{-7}$ M |
| **9.** | Mashhadizadeh and Talemi[39] | Carbon paste electrode modified with silica sol–gel and mercaptosuccinic acid (MSA) in presence of gold nano-particles | Al(III) | $1.6 \times 10^{-7}$ M |
| **10.** | Gholivand *et al.* [40] | PVC membrane and a Schiff base i.e. N,N'-bis(salicylidene)-1,2-phenylenediamine (salophen) oriented electrochemical sensor | Al(III) | $6.0 \times 10^{-7}$ M |

Table 1: The comparative account of various chemosensors towards chemosensing of Cs(I) and Al(III)