

Performance of New Aminothiazole Schiff Base Sensor for Cation Detection

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Abstract

The 2-hydroxybenzaldehyde-2-aminothiazole ligand was synthesized from benzaldehyde and 2-aminothiazole by direct condensation method using methanol as solvent. The formation of 2-hydroxybenzaldehyde-2-aminot hiazole compound was confirmed by FTIR, ¹³C NMR, ¹H NMR and mass spectrometry. The band at 1658.78 cm⁻¹ confirms the presence of C=N group. The total number of carbon atoms was confirmed by ¹³C NMR. The chemical shifts (100 MHz, DMSO:d₆, ppm) were noticed at (C₁-130.14), (C₂-122.72), (C₃-128.32), (C₄-117.70), (C₅-154.62), (C₆-128.53), (C₇-140.48), (C₈-139.36), (C₉-128.96) and (C₁₀-129.07). The total number of hydrogen atoms was confirmed by ¹H NMR. The chemical shifts of ¹H NMR (400 MHz, DMSO: d₆, ppm) were noticed at (1H-6.857), (2H-6.945), (3H-6.964), (4H-6.983), (5H-6.993), (6H-7.013), (7H-7.126), (8H-7.157) and (OH-9.237). The molecular mass of the compound was confirmed by mass spectrometry and found to be m/z=204.23 and the molecular formula of the compound was C₁₀H₈N₂SO. The synthesized compound was investigated for chemosensor application. The synthesized ligand was complexed with various metal ions like Na⁺, K⁺, Ba²⁺, Ca²⁺, Mg²⁺, Ag⁺, Cu²⁺, Co²⁺, Cd²⁺, Cr³⁺, Fe²⁺, Fe³⁺, Hg²⁺, Ni²⁺, Mn²⁺, Zr²⁺, Zn²⁺, Pb²⁺, Al³⁺ and Ce²⁺ and extent of complexation of the metals with the ligand was analysed using absorption and emission spectroscopy. The 2-hydroxybenzaldehyde-2-aminothiazole was analysed for high selectivity & sensitivity towards a particular metal ion. The compound was further studied for its performance on antibacterial, and antifungal activities.