

"Synthesis, Characterization And Electrochemical Investigation of [16]-Membered Dioxadiazanaphthaldehyde Based Macrocyclic Ligand and its Complexes of Co(III), Ni(II), Cu(II) and Zn(II) Perchlorate IONS"

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Abstract: An hitherto new unreported [16]-membered dioxadiazanaphthaldehyde based macrocyclic ligand (L) 2,11-dioxa-23,30-diaza heptacyclo [30.4.0.0 4, 9.0 12, 21. 0 14, 19. 0 24, 29. 0 34, 39]-tetraconta-12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40-pentadecaene, has been synthesized by two different synthetic routes each involving two step. 2-Hydroxy-1-Napthaldehyde in the presence of potassium carbonate was treated with α,α' -dibromo-o-xylene to yield the dial derivative(I). The dial derivative (I) was further made to undergo Schiff base condensation with 1,2-diaminobenzene to yield the bright yellow macrocycle (L) in good yield. In the second method the Schiff base condensed product Napthaloph was synthesized and allowed to undergo Williamson's condensation with α,α' -dibromo-o-xylene to yield the ligand (L). The neutral sixteen membered tetradentatedioxadiaza ligand(L) readily complexes with Co(III), Ni(II), Cu(II) and Zn(II) perchlorate salts in 1:1 mole ratio to yield complexes of formulae $[\text{Co}(\text{L})\text{X}_2]\text{ClO}_4$, $[\text{Ni}(\text{L})\text{X}_2]$, $[\text{Cu}(\text{L})\text{X}]\text{ClO}_4$, (X = Cl^- , Br^- and NO_3^-). The complexes were also synthesized by the metal template method. The yield of the template procedure was found to be greater than the non-template method. The ligand and the complexes were characterized by elemental analysis, electronic spectroscopy, IR, Conductivity measurements, ¹HNMR, FAB-MS and Cyclic voltammetry studies. The [16]-membered tetradentatedioxadiazamacrocycle (L) was found to accommodate Co(III), Ni(II), Cu(II) and Zn(II) ions with ease due to the presence of flexible alkyl groups. Further studies with the inner-transition metal ions will be highly informative in understanding the coordinating capabilities of lanthanides and actinides.

Keywords : Schiff Base Ligand, Co(III), Ni(II) Cu(II) and Zn(II) complexes, 2-hydroxy-1-naphthaldehyde, α,α' -dibromo-o-xylene.