Abstract

In this dissertation, conditions were optimized to synthesize novel magnesium complexes derived from 5-Carboxyisophthalic acid in the presence of different coordination behavior of ligand, geometry of metal under various conditions like sonication, reflux. Temperature, time, pH, molar ratio alternations were studied. FT-IR spectroscopy supports the binding of ligand with metal in complexes. Atomic absorption spectroscopy measures the concentration of magnesium metal in complexes. Effective photoluminescence of all complexes were studied. Effective photoluminescence quenching was observed for 2-Nitro-Aniline (2-NA), 4-Nitro-Aniline (4-NA), 4-Nitro-toluene (4-NT), Lead Nitrate, 4-Nitro-Phenol (4-NP), Picric Acid in Ethyl Acetate and Methanol. On quenching of complex 3 with these quenchers, it was investigated that the complex has showed strong quenching affinity upto 98.98% for the detection of 2NA compound in aqueous solution. This excellent performance of complex 3 makes it a promising candidate for the detection of 2NA real time practical application. On the basis of magnesium percentage calculated by AAS, proposed ligand to metal ratio has been found as 2:2 with eight coordinated water molecules. In $[Mg(TRIA)_2 .8H_2O]$ (complex 1), magnesium (16) is six coordinated by two oxygen atoms [O (14) and O (15)] of ligand (TRIA) and four oxygen atoms [O (17), O (18), O (19) and O (24)] from water molecules while other magnesium (29) is also six coordinated by two oxygen atoms [O(8) and O(9)] of ligand (TRIA) and four oxygen atoms [O(30), O(31), O(32) and O(33)] from water molecules (Fig.4. 25) to generate octahedral geometry. On the basis of magnesium percentage calculated by AAS, proposed ligand to metal ratio has been found as 1:1 with four coordinated water molecules. In $[Mg(TRIA) .4H_2O]$ (Complex 3), magnesium is six coordinated by two oxygen atoms [O(14) and O(15)] of ligand (TRIA) and four oxygen atoms [O(17), O(18), O (19) and O(24)] from water molecules (Fig. 4.27) to generate octahedral geometry.