

ABSTRACT

The present work describes the synthesis of complexes derived from 1,3,5-benzene tricarboxylic acid (TriA) with zinc, nickel and lead coordination behavior of TriA, geometry of these metals under various conditions like reflux etc. $[\text{Zn}(\text{TriA}) \cdot 4\text{H}_2\text{O}]$ (1) Zinc is six coordinated by two oxygen atoms [O(27) and O(12)] and from TriA, four coordinated water molecules [O(32), O(33), O(38) and O(42)] to generate ZnO_6 . In $[\text{Ni}_2(\text{TriA})_2 \cdot 3\text{H}_2\text{O}]$ (2), Nickel is six coordinated by three oxygen atoms [O(12), and O(11)] from one BTA ring in a conventional *O,O*-bidentate fashion and [O(33)] from another one TriA ring in a conventional *O*-monodentate fashion, three coordinated water molecules [O(36), O(39) and O(17)]. In $[\text{Pb}(\text{TriA})_2 \cdot 2\text{H}_2\text{O}]$ (3) Lead is Six coordinated by four oxygen atoms [O(32), O(33), O(20) and O(23)], from two TriA rings conventionally *O,O*-bidentate fashion from each ring of trimesic acid and coordinated with two water molecules [O(04) and O(01)]. Results of elemental analysis are in good agreement with the proposed structures, while FT-IR spectroscopic analysis also supports the binding of ligand with metal. Formation of metallogels were confirmed by atomic absorption spectrophotometer. About 97% of water contents was present in all these metallogels. Their sol-gel transition state was studied under different temperatures; these were not decomposed after 25 cycles showing good stability. Excellent photocatalytic degradation up to 89% was calculated against methylene blue. Effective photoluminescence quenching was observed for Tri-Nitro-Phenol (TNP) (explosive), while no significant change in emission was observed for *m*-Nitro-Toluene (*m*-NT) and Nitro-Benzene (NB). By quenching these metallogels show selective detection for TNP.