



Abstract

Survey of Cambridge structural data base (CSD 2017), reveals 29 hits of Trimesic acid (TRIA) with Iron. The present work describes the synthesis of complexes derived from TRIA with Iron, coordination behavior of TRIA, and geometry of Iron under various conditions like reflux, hydrothermal and sono-chemical method. In Complex 1 $[\text{Fe}(\text{TRIA})_2]$, Iron is four coordinated by two oxygen atoms [O(14) and O(15)] of ligand (TRIA) and two oxygen atoms [O (24), and O(25)] of another TRIA to generate tetrahedral geometry. In $[\text{Fe}(\text{TRIA})\text{NO}_3]$ (4), Iron is four coordinated by two oxygen atoms [O(14) and O(15)] of ligand (TRIA) and two oxygen atoms [O (18), and O(19)] of nitrate to generate tetrahedral geometry. One of carboxylate of TRIA and nitrate utilized full such as η^2 bidentate mode. Physical analysis of fabricated complexes with 1,10-Phenanthroline led to orange red color formation which confirmed the presence of Iron. Effective photoluminescence analysis for illegal preservatives revealed that complex 4 have strong sensing ability against formaldehyde and Sodium nitrite in terms of quenching effect. Moreover, Complex 1 has also caused degradation of methylene blue dye to 71.8 % in presence of oxidant. Results of CHNS, FTIR, AAS, UV-VIS and Fluorescence Spectroscopy analysis have confirmed the binding of metal with ligand.