

## **Abstract**

In the present study, Manganese metal complexes were synthesized with 1,2,4,5-benzenetetracarboxylic acid ligand. The complexation reactions were carried out by sonication and reflux method under different reaction conditions. The characterization of metal complexes was carried out by using FT-IR spectroscopy, UV-Visible analysis, and Fluorescence spectroscopy. Photo-catalytic activity and luminescence analysis of the metal complexes was also carried out. The FT-IR analysis of ligand and metal complexes showed change in band positions of different functional group. The UV-Visible analysis revealed different  $\lambda_{\text{max}}$  of ligand and metal complexes giving insight into the metal complex formation and corresponding electronic transitions. The fluorescence analysis was performed using different solvents from polar to non-polar. The DMF solvent showed maximum luminescence intensity and was used for further analysis. In chemosensing studies, various analytes were used and quenching response was analyzed. Findings revealed that 4-Nitrophenol showed the maximum quenching efficiency of 88.59%. The photocatalytic property of Manganese complex was also explored and findings revealed the 50% degradation of methylene blue.