

## ABSTRACT

The research study is focusing on the transition metal complexes with ligand dianilinomthane. The cobalt chloride hexahydrate salt was used to prepare the cobalt complexes. The complexes synthesized by using different solvents adopting various techniques and characterized by using characterization techniques. Two novel complexes of cobalt were prepared by adopting sonochemical method. The complex-I was **Co-DAM-PDA** that contained cobalt chloride salt, dianilinometthane ligand and pyrazine dicarboxylic acid as coligand synthesized in distilled water. The complex-II was **Co-DAM-PTA** that contained cobalt chloride salt, ligand dianilinomethane and pyridinetricarboxylic acid as coligand. These complexes were characterized by using UV-Visible spectroscopy, FTIR, Thermogravimetric analysis (TGA), and photoluminescence spectroscopy. In UV-Visible analysis, the ligand's lambda max appeared at 298nm, while complexes exhibited 274nm and 284nm lambda maximum respectively in complexes. FTIR also displayed significant shifts in the ligand and complexes spectra. The ligand gave a doublet peak at 3400-330cm<sup>-1</sup> for NH<sub>2</sub> while complexes gave peaks at 1350 cm<sup>-1</sup> -1250 cm<sup>-1</sup> that is an indication of C-N bond formation. Thermogravimetric analysis of complexes revealed the thermal stabilities of complexes. The complexes displayed luminescent properties and gave different emission intensities in different solvents and the solvents with best emission intensities were selected. To analyze the chemosensing of complexes, different nitroaromatics were used as quenchers. The picric acid depicted highest quenching in both complexes. This displayed the photoluminescence based chemosensing applications of cobalt complexes.