

ABSTRACT

In this research work, two coordination complexes of cadmium metal with cyclopentanetetracarboxylic acid ligand were synthesized by using different synthetic strategies ranging from sonication, reflux and solvothermal methodologies. Effect of co-ligand, choice of solvent, pH and molar ratios of the metal and ligand was also studied to optimize the synthetic conditions of the complexes. The synthesized coordination products were characterized by UV-Visible spectroscopy, FT-IR spectroscopy and Photoluminescence spectroscopy. Photocatalytic behavior of these complexes was also studied by evaluating the degradation pattern of methylene blue dye. The photocatalytic activity of the complexes was assessed under sunlight and findings were compared in the presence and absence of external oxidant (hydrogen peroxide) and results showed that the photocatalytic property of the complexes was enhanced from 36.73% in absence of external oxidant to 63.1% in the presence of oxidant. The UV-Visible spectroscopic study was used to identify the possible electronic transitions of these complexes. The UV-Visible spectra obtained for the complexes and ligands were found to be different and exhibited different λ_{max} values. FTIR spectra showed the significant position shifts of peaks between free ligand and the synthesized metal complexes. The photoluminescence analysis showed the significant fluorescence of all the complexes. This fluorescent nature of compounds was further utilized to observe the chemo sensing behavior against nitro aromatics including Potassium dichromate, 2-nitroaniline, picric acid, 4-nitrophenol, 4-nitroaniline, Lead nitrate, Chromium nitrate, and 4-nitrotoulene.