



## ABSTRACT

The coordination polymers, MOFs, have attracted great interest as a promising candidate for the sustainable energy and environmental remediation. In the study, four coordination metal complexes have been synthesized by using precursor Neodymium Nitrate hexahydrate and 1,4-Benzenedicarboxylic acid. Another bimetallic complex was also synthesized using Cobalt nitrate and neodymium nitrate with terephthalic acid ligand. These metal complexes were prepared by using the solvothermal method at 180°C and autogenously increased pressure. The Neodymium metal complexes were synthesized by exploiting different reaction conditions such as pH, solvents and mole ratio. The synthesized complexes were characterized by Elemental analysis and FTIR spectroscopy. The post synthetic modification of the metal complexes was executed by calcination of the compounds at 600°C for 6 hours. These neodymium metal complexes served as the precursor of metal oxide nanoparticles and yielded pink colored nanoparticles of neodymium oxide. The band gap of Neodymium metal complexes were also calculated that falls under the range of semiconductors. Furthermore, the photocatalytic potential of these metal complexes of these metal complexes was also evaluated against Methylene blue dye. The results revealed an efficient degradation of methylene blue upto 93.4 %. The exciting results of photodegradation activity of the complexes and semiconductor's band gap values have made these complexes an ideal candidate for their potential applications in electronic devices and environment remediation