

## Abstract

Due to increased population, many industries are being developed to meet the basic needs of people. But these industries discharge their industrial wastes in lands and rivers without any pretreatment causing serious health hazards to human health as this discharge contains many organic pollutants i.e., heavy metals, phenolic compounds, petroleum hydrocarbons and dyes. It is necessary to mitigate these pollutants by using suitable methods as they have harmful or hazardous effects which are associated not only to human health but plants and water bodies as well. The main purpose of our research is to degrade dye by using most promising and common method e.g., photocatalysis. ZnO and Mn<sub>3</sub>O<sub>4</sub> NPs were successfully synthesized by using co-precipitation method. Whereas, the synthesis of graphene oxide was carried out using modified Hummer's method. For doping purpose, firstly ZnO was doped with GO using solvothermal method by placing the sample in Teflon hydrothermal and heated for 180°C for 24 hours. Mn<sub>3</sub>O<sub>4</sub> doping with GO/ZnO was done by sonication method. The synthesis of all these particles was confirmed by characterization techniques like UV spectrophotometer and FTIR. The characteristic peaks obtained in graphs were in accordance with literature value that confirmed the synthesis of desired particles. For application purposes, the individual catalysis of methylene blue using ZnO, Mn<sub>3</sub>O<sub>4</sub>, GO and doped GO particles was successfully carried out to degrade the complex industrial dye into less hazardous or environmentally friendly products.