

## ABSTRACT

As our nation struggles with a growing water shortage, the goal of this research is to decrease the amount of pollution like dyes in the wastewater so that it may be used again. To degrade the dyes present in wastewater, many methods have been employed so far. Semiconductor photocatalysis has emerged as a feasible method for fully mineralizing organic pollutants as well as hazardous metal ions. ZnO is a very promising semiconductor photocatalyst because its band gap energy is equivalent to TiO<sub>2</sub>. To boost the photocatalytic activity of zinc oxide, dopants are introduced into its lattice. Copper and cobalt (transition metals) are used as dopants in this study, coupled with a non-metal doping agent (carbon). Pure ZnO nanoparticles and carbon-doped ZnO nanocomposite were also synthesized to compare their photocatalytic performance with the metal-doped ZnO/C composite. Samples were characterized using SEM and UV-vis spectrometer. Methyl blue and methyl green dyes were used as organic pollutants in water to test the influence of copper and cobalt doping on ZnO along with carbon. When the photocatalytic activity of copper and cobalt doped ZnO/C nanocomposite was compared to pure ZnO nanoparticles and ZnO/C nanocomposite, this metal doped nanocomposite demonstrated superior photocatalytic activity.