

The continued industrialization and technological advancements have impacted our environment greatly. The world is facing several challenges regarding environmental pollution, especially given a fluctuating and undefined future environment, a fast-rising population that is driving enlarged community and financial growth, urbanization and globalization. Water pollution has become one of the major concerns globally. Water used for different processes is not completely utilized and is discharged as wastewater directly in water bodies. The need of hour is the synthesis of materials that can be used for treatment of water before its release in environment. Nanotechnology has played an essential role for providing different solutions for the existing scarcity of clean water. In this study, metal doped synthesis of iron oxide nanoparticles was carried out and its photocatalytic application for degradation of organic waste and dyes was evaluated. Different metals were used for doping of iron oxide nanoparticles with various combinations to assess their photocatalytic activities. The properties, efficiency and behaviour of these nanoparticles were studied under different conditions using UV-Visible spectroscopy. Moreover, the as-synthesized nanoparticles were also evaluated for their extended electrochemical applications. These nanoparticles exhibited promising photocatalytic and electrocatalytic activities and high efficacy towards wastewater treatment by degradation of organic waste.