

## **Abstract**

The synthesis of K10-MMT clay assisted magnetic materials (Ni, Co) doped ZnO nanoparticles were successfully synthesized by microwave irradiation method and CTAB as surfactant. The prepared nanoparticles were characterized by different analytical method like, structural, morphological, optical properties. Moreover, the samples was examined with electrochemical and photocatalytic application. From the FTIR analysis the functional groups of resulting nanomaterials were confirmed. The rod shaped morphology was observed from SEM micrograph the size of the rod thickness 200 nm and few micro meters length. The rod shaped K-10 clay intercalated pure ZnO and Ni<sup>2+</sup>, Co<sup>2+</sup> doped ZnO NPs was observed that, When doping magnetic metals (Ni<sup>2+</sup>, Co<sup>2+</sup>) with ZnO nanoparticles, the crystallites size decreases. The lattice is subjected to strain due to the substitution of dopant. It was observed that the band gap of pure ZnO decreases as Co<sup>2+</sup> and Ni<sup>2+</sup> dopant increases. The samples were examined with photocatalytic and electrochemical behaviors and the results are discussed.

The magnetic metals doped ZnO/montmorillonite nanocomposites are expected to be useful for various applications, for instance, as photo catalysts for hydrogen production from water.

**Key words:** K10-MMT clay, Clay@ZnO/Ni/Co, Microwave, Photocatalyst, Electrochemical studies.