**Abstract**

Copper oxide nanomaterials have kindled the interest of researchers in view of their potential applications in electronic devices. In the present work, Copper oxide (CuO) nanoparticles were prepared through the simple hydrothermal method using two different concentrations (0.1 and 0.5 M) of the surfactant (CTAB) and their structural, optical, electrical and diode properties have been analyzed. From the XRD analysis, it was observed that the surfactant reduced the crystallite size of the CuO nanoparticles. It also caused an increase in the optical band gap and absorbance. The SEM analysis showed the strong influence of the surfactant on the structure of the nanoparticles. The presence of Cu and O elements was confirmed from the FT-IR spectrum. The study of the electrical properties revealed that the conductivity increased on using CTAB. The electrical parameters such as ideality factor (n), barrier height (ФB) and series resistance (Rs), and interface properties for the p-Si/CuO/Ag diodes have been analyzed by the I-V method.