**Abstract**

Over the past few decades, there has been an increasing demand for inexpensive, accurate, portable and reliable gas sensors which can be used to detect combustible, flammable and toxic gases, and oxygen depletion. Typically, gases of interest include CO, NO, NO2, NH3, SO2, CO2, CH4 and other hydrocarbons. These gases can be harmful to human health if present beyond a certain concentration. Among various metal oxide semiconductors, p-type Cobalt oxide semiconductors are excellent materials for fabricating highly sensitive and selective gas sensors of high-performance. In this study, a novel and low cost chemical route has been developed to synthesize Co3O4 nanostructures. The efficiency of Co3O4 nanomaterials is improved by means of introducing n-type dopants. The synthesized nanomaterials were characterized by different characterization techniques like UV, XRD, FTIR, SEM and EDAX analysis. The Cobalt oxide nanoparticles are observed to have a good response and sensitivity to ammonia gas at room temperature.