

## ABSTRACT

Nanoscience is the study of phenomena and manipulation of materials at atomic, molecular and macromolecular scales, whose properties differ from bulk materials. Nanotechnology is the design, characterization and application of structures by controlling the shape and size at nanometer scale. The nanomaterials have gained great interest due to their importance in technological applications. This thesis deals with the synthesis and characterization of ZnO and Ni doped ZnO.

We have organized the thesis in to five chapters as follows:

**Chapter 1** presents the introduction of the nanomaterials. ZnO is an important II-VI semiconductor with wide band gap having applications in the field of optical, magnetic, catalytic and spintronic applications. It also discusses about the properties, crystal structure and doping characteristics of ZnO.

**Chapter 2** focuses the scope of the present investigation.

**Chapter 3** deals with the detailed explanation of the synthesis method used to synthesize ZnO and Ni doped ZnO.

**Chapter 4** includes the results of the present investigation and their discussions in this chapter. This is further sub divided in to eleven sections (4.1 to 4.11) in to the following factors as Overview of the present investigation, X-ray Diffraction analysis, High Resolution Scanning Electron Microscopy and Energy Dispersive Spectroscopy, Transmission Electron Microscopy, Thermal analysis of ZnO and Ni doped ZnO, Optical properties of ZnO and Ni doped ZnO, X ray photoelectron spectroscopy, Raman spectroscopy, Studies on Antibacterial activity, Magnetic studies and Electrical studies respectively.

**Chapter 5** finally concludes with the research work done.