

ABSTRACT

Nanomaterials have gained great interest due to their importance in basic research and potential technological applications. The properties of nanostructured materials are determined by a set of physical parameters that include size, shape, composition, crystallinity, and microstructure. They can, in principle, be tailored and fine-tuned by controlling any one of these parameters. This thesis focuses a systematic investigation on morphology tuned synthesis and characterization on Mn(II), Ni(II) doped and undoped ZnS nanostructures by varying the reaction conditions.

We have organized the thesis into five chapters as follows:

Chapter 1 presents a comprehensive overview on the fundamental aspects of nanomaterials and II-VI group of semiconductors. It seeks to provide both theoretical and experimental framework for considering the formation of the nanostructures. It also reviews the properties and structural analysis of nano semiconductors, the crystal structure of zinc sulfide is discussed.

Chapter 2 details the objective of the present investigation.

Chapter 3 reports on the methodology involved in the present study.

Chapter 4 presents the results and discussion of the present investigation and is further divided into five sections. Section 4.1 explores the means to obtain different morphologically tuned ZnS nanostructures; Section 4.2 discusses the growth of 1D ZnS nanorods, their structural and photoluminescent properties. The effect of annealing temperature and time on the as-obtained ZnS nanostructures are presented in section 4.3. The role of dopants namely, Mn(II) and Ni(II) with varied molar concentration onto ZnS nanostructures are discussed in Sections 4.4 and 4.5, respectively. Their optical, photoluminescent and magnetic properties have been studied for their suitability for applications in optoelectronic devices.

Chapter 5 deals with the concluding remarks of the research work carried out.