

ABSTRACT

Zinc oxide is a promising material for semiconductor device applications. It has a direct and wide band gap (3.37eV) in near UV spectral region and large free - excitation binding energy (60 meV) so that excitonic emission process can persist at or even above the room temperature. The prime objective of the present investigation deals with the synthesis, characterization, optical, magnetic, catalytic and antibacterial activities of ZnO, Ru doped ZnO and Ru-Mn codoped ZnO nanostructures. The following chapters are discussed in the thesis as follows.

Chapter 1 Introduction and an overview of metal oxide semiconductor was discussed. Importance of pure, doped and transition metal codoped ZnO nanomaterials towards the various applications such as optical, catalytic, magnetic and antimicrobial studies were also discussed.

Chapter 2 Scope of the present investigation are focused

Chapter 3 Detailed experimental procedure for the synthesis of ZnO, Ru doped ZnO and Ru-Mn codoped ZnO and photodegradation, heterogeneous catalytic activity and antimicrobial activity are presented. The synthesized nanomaterials are characterized using different characterization techniques and are briefly discussed.

Chapter 4 Deals with the results of the studies on the structural, optical and photodegradation of azo dyes using pure ZnO and Ru doped ZnO.

Chapter 5 Describes the study on heterogeneous catalytic oxidation of alcohols and antibacterial studies of ZnO and Ru-Mn codoped

ZnO nanostructures and their structural, optical and magnetic properties were discussed.

Chapter 6 Concludes the present investigation.