Synopsis

The work will be presented in the thesis with title **SYNTHESIS AND CHARACTERIZATION OF NEWER INORGANIC MATERIAL** has been described in to Three Chapters asunder.

Chapter 1 **General Introduction of Nanomaterial and Biodegradable Polymer PLA**

Chapter 2 **Synthesis and Characterization of Nanocomposite**

Section-A Synthesis and characterization of PLA/ZrO_2 nanocomposite

Section-B Synthesis and characterization of PLA/ZrO_2/ZnO Nanocomposite

Chapter 3 **Application of Nanocatalyst in organic synthesis**

Section-A Synthesis and characterization of Nanocatalyst

Section-B Synthesis and characterization of Benzimidazole derivatives using Nanocatalyst

Section-C Synthesis and characterization of Benzodiazepine derivatives using Nanocatalyst

Composites are materials made from two or more constituents, which remain separate and distinct at the macro or microscopic scale and have physical and chemical properties that are significantly different from the constituents. Now a days Nanocomposite have become very popular because they display unusual properties emerging from the combination of nanomaterial. In nanocomposites, at least one of the components is in the Nano size or in other words a composite made up with at least one Nano-sized material is known as nanocomposite.

Nanocomposites can provide many benefits such as enhancing mechanical properties, thermal stability, chemical resistance, etc. There are numerous promising applications of nanocomposite systems, comprising both the generation of new materials and the performance enhancement of known devices Although the use of nanocomposites in industry is not yet large, their massive switching from research to industry has already started and is expected to be extended in the next few years.

CHAPTER 1
GENERAL INTRODUCTION OF NANOMATERIAL AND BIODEGRADABLE POLYMER PLA

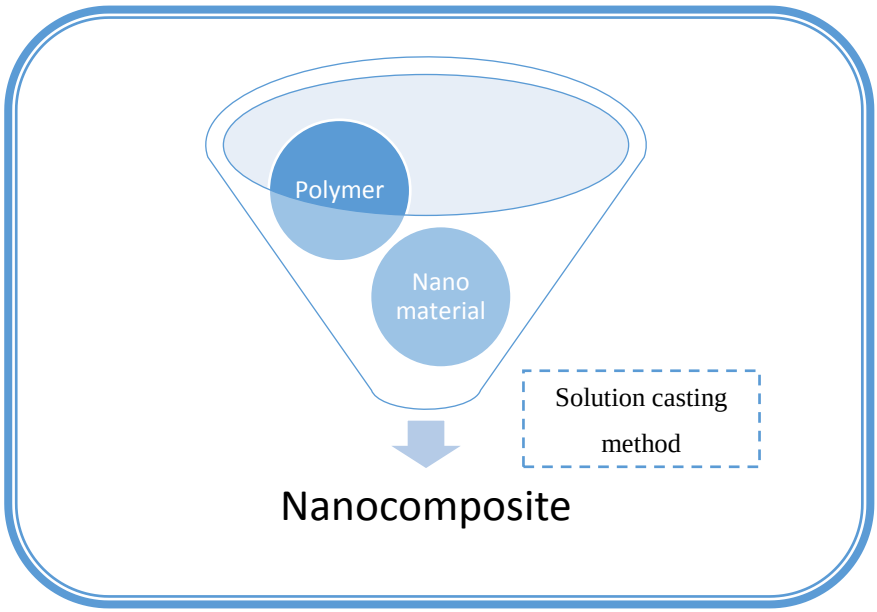
This chapter describes literature survey of synthesis, characterization and applications of Nanomaterials and Biodegradable Polymer Poly (lactic acid) [PLA].

CHAPTER 2
SYNTHESIS AND CHARACTERIZATION OF NANOCOMPOSITE

This chapter deals with synthesis and characterization of different Nanocomposites.

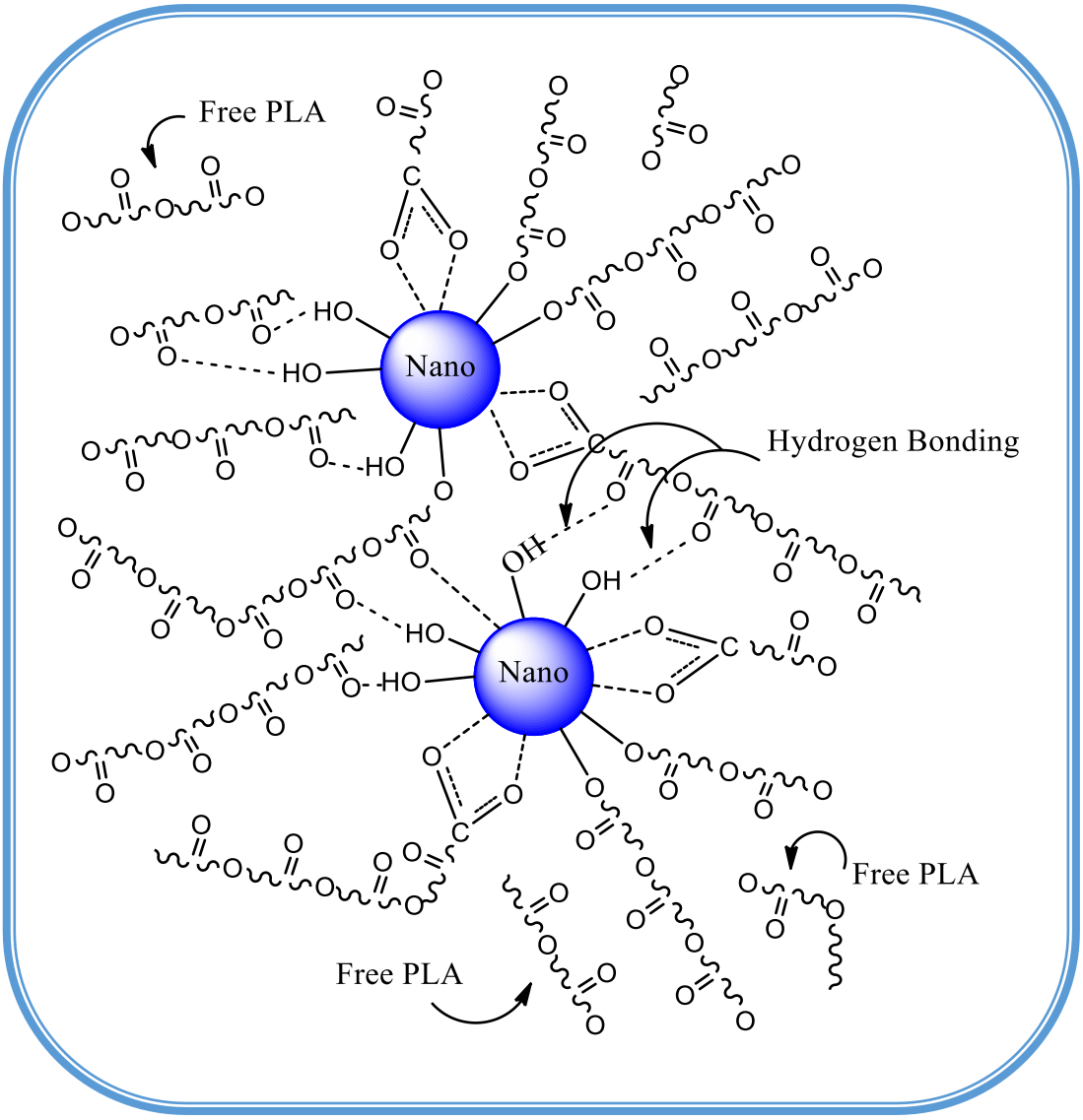
Section-A Synthesis and characterization of PLA/ZrO_2 Nanocomposite

In this section, synthesis of PLA/ZrO_2 nanocomposite with various loading of Nano ZrO_2 was synthesized via solution casting method. Synthesized PLA/ZrO_2 nanocomposite were characterized by powder XRD, FT-IR, TEM-EDX, TGA, DTA and DSC analysis.



Section-B Synthesis and characterization of PLA/ZrO_2/ZnO Nanocomposite

In this section, synthesis of PLA/ZrO_2/ZnO nanocomposite with various loading of Nano ZrO_2 and ZnO were synthesized via solution casting method. Synthesized PLA/ZrO_2/ZnO nanocomposites were characterized by powder XRD, FT-IR, TEM-EDX, TGA, DTA and DSC analysis.



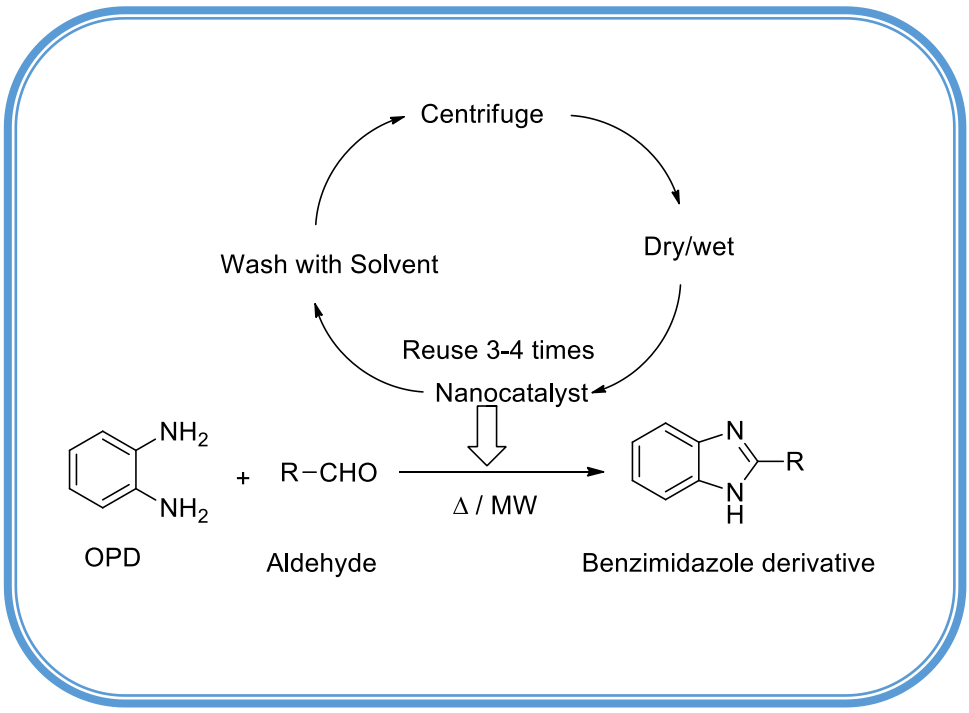
CHAPTER 3
APPLICATION OF NANOCATALYST IN ORGANIC SYNTHESIS

SECTION-A Synthesis and characterization of Nanocatalyst

In this section, two Nanocatalysts were synthesized via sol gel method, which were further characterized by DLS, powder XRD, FT-IR and SEM-EDX.

SECTION- B Synthesis and characterization of Benzimidazole derivatives using Nanocatalyst

All synthesized Nanocatalyst were used to synthesize various benzimidazole derivatives and characterized by MASS analysis, FT-IR spectroscopy and NMR spectroscopy. Significance of Nanocatalyst found is that they can be recoverable and reused several times.



SECTION- C Synthesis and characterization of Benzodiazepines derivatives using Nanocatalyst

Various Benzodiazepines were synthesized using synthesized Nanocatalyst and characterized by MASS analysis, FT-IR spectroscopy and NMR spectroscopy.