CHAPTER – III

SCOPE AND OBJECTIVES

3.1 INTRODUCTION
Various Mg alloys and composites were developed by different methods, different alloying elements and different reinforcements which were discussed in the previous chapter. Developing of new Mg alloys with improved mechanical properties can be done by optimization process thus leads to the processing of Mg composites with superior mechanical properties. This chapter deals with the scope and objectives of the work of processing and characterization of Mg alloys and composites.

3.2 SCOPE
The scopes of this research work are listed as follows:
- Developing of magnesium alloy and composites using PM route followed by hot extrusion method.
- Developing of Mg-Zn-Cu-Mn alloy and Mg-Zn-Sn-Mn alloy by PM route.
- Developing of Mg composites by reinforcing SiC particles in optimized Mg-Zn-Cu-Mn and Mg-Zn-Sn-Mn alloys.
- Metallurgical studies of synthesized Mg composites are investigated.
- Mechanical characterization of developed Mg composites.

3.3 OBJECTIVES
The objectives of this research work are listed as follows:
- To get Mg alloys with improved mechanical properties by optimizing the weight fractions of alloying elements by using Taguchi based grey analysis method.
- Synthesizing of Mg alloy and composites by PM technique in which less number of studies were carried out.
- Characterization of newly developed Mg alloys and composites.
- To contribute for the development of new Mg alloy and composite.
3.4 WORK METHODOLOGY

Processing and Mechanical Characterization of Mg MMC

Part I
Synthesis of Mg-Zn-Cu-Mn Alloy

Part II
Synthesis of Mg-Zn-Sn-Mn Alloy

DOE
Level: 3
Parameters: 3

Optimization of compositions by Taguchi based grey analysis

Physical Properties at Optimal Composition
- Density and Porosity

Mechanical Properties at Optimal Composition
- Tensile strength for different strain rates
- Compression strength for different strain rates
- Vickers Hardness Number

Metallurgical Study at Optimal Composition
OM, XRD, SEM

Part III
Synthesis of Mg MMC (Mg-Zn-Cu-Mn alloy optimal composition) with SiC reinforcement
- 3wt.%, 6wt.%, 9wt.%, 12wt.%, and 15wt.% SiC

Part IV
Synthesis of Mg MMC (Mg-Zn-Sn-Mn alloy optimal composition) with SiC reinforcement
- 3wt.%, 6wt.%, 9wt.%, 12wt.%, and 15wt.% SiC

Metallurgical Study
OM, XRD, SEM

Mechanical Properties
- Tensile strength for different strain rates
- Compression strength for different strain rates
- Hardness (HV)

Results and Discussion

Conclusion

Figure 3.1: Work Methodology