

Chapter 6

FUTURE SCOPE OF THE WORK

Following is the list of areas on which further research work can be possible to synthesis in-situ aluminium metal matrix composites (AMMCs). By doing this further analysis, a material can be developed with more novelty which is having extraordinary properties and compatible in different field of applications (a futuristic material).

1. Other matrix systems

Present study has been conducted using the commercially pure aluminium (LM 0 grade) as the matrix metal and MnO_2 as the reinforcement. To increase the scope of the research work, other grades of the aluminium can also be used.

2. Other wetting agents

Magnesium metal was used as the wetting agent in this work. The effect of other transition metals such as Li, Ca, Ti, Zr and P can be studied to evaluate its effect with the present matrix metal.

3. Other ceramics reinforcements

MnO_2 ceramic reinforcement particles have been used to synthesis in-situ AMMCs in this study. Many researchers have used various other reinforcements such as Al_2O_3 , SiO_2 , FeO , TiO_2 , SiC , etc. to strengthen the matrix. Using present commercially pure aluminium as matrix, these reinforcements can be used. Alteration of the addition sequence can also be studied to evaluate best approach of the processing in-situ AMMCs.

4. Variation in the stirrer parameters

In this research work, the stirrer parameters have been fixed which include its design (number and angle of the blades), rotational speed (in rpm), position and angle in liquid bath, etc in all experiments. The variation in above parameters may give different results.

5. Tribological properties

In this study, mechanical properties such as density, ductility, hardness and ultimate tensile strength have been evaluated. The metallurgical characterizations such as element analysis by Energy Dispersive Spectroscopy (EDS), phase analysis by X-Ray Diffraction (XRD) and spectroscopy have been performed. Microstructure evaluation was carried out using optical microscope and Scanning Electron Microscope (SEM). All these testing have been performed to optimise the in-situ composite system. The study of tribological analysis can help to understand wear, friction and lubrication effect on the AMMCs.

6. Processing and characterization of nano composite

In this study, 44 to 75 micron sized MnO_2 reinforcement particles were used. In addition of that, the nano sized reinforcement particles can also be studied to manufacture nano AMMCs with high end applications. Study of hybrid composite is also possible with same matrix material.