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Aluminium–Polymer abs product

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ABSTRACT

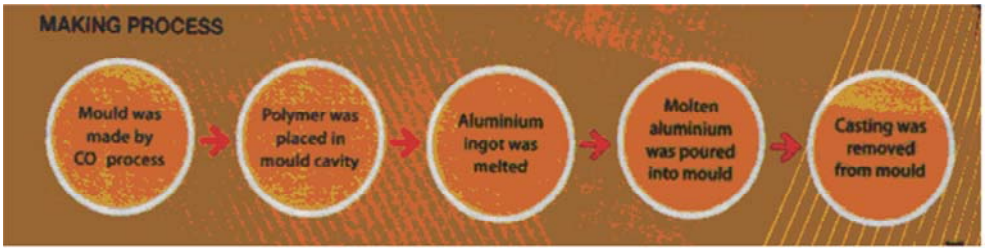
Material used for aluminium product usually made of aluminium scrap. Currently, the price of aluminium scrap is increased. It is necessary to minimize the cost of production by reducing the weight of the aluminium product at the same time remain the form or the shape of the product. Fabrication of aluminium matrix composite is one of the method to reduce the weight of aluminium but the modulus improved due the addition of ceramic materials as reinforcement. In this research, the idea of combining aluminium with polymers has been developed. Acrylonitrine Butadiene Styrene (ABS) was selected because of its low density and low melting temperature. The results indicated that homogenous microstructure and better strength can be obtained.

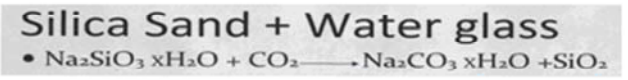
Keywords - *General Metallurgy, Polymer, Foundry Metallurgy.*

INTRODUCTION

The development of metal matrix composites was and is still considerably influenced by the reinforcement (fibres, particles or fillers), their properties and cost, and the problems of fibre-metal interaction, particularly the wetting or non-wetting behaviour of fibre-matrix systems. Mortensen and Jin (1992) have recently reviewed the factors of wetting and infiltration in solidification processing of metal matrix composites. Aluminium alloy based MMCs have been one of the important groups in the focus of the research and development programmes of MMCs and also commercial applications. The range of reinforcement materials is similarly large, although most application have been based on alumina, silicon carbide or carbon (graphite). Reinforcements are available in different forms such as fibres (either continuous or chopped), particulates or whiskers. The type and form of the reinforcement determines its cost, which in turn influences the cost of the MMCs component produced. The present work presents a study of fabrication and characterization of aluminium-polymer ABS. New approach of fabrication is prepared by in-situ mixing or addition of molten metal onto polymer granules. This technique is simple and never been attempted before due to the thermal instability

and degradation of polymer. Making process for aluminium-polymer ABS for fence flower product for example as follows:





RESULTS AND DISCUSSION

Microscopy

The examination of microstructure by optical microscopy is the primary method of evaluating alloys. It will show the effects of processing heat treatment, fabrication, and service conditions. The performance of metallic materials is predominantly determined by their microstructure.

Electron Microscopy

The aluminium-ABS alloy dendrite size is decreasing in the order of increasing in the amount of ABS polymer granules added.

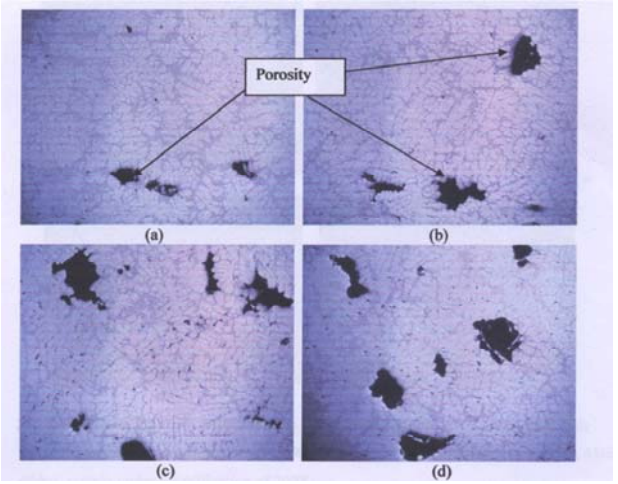


Figure 1: Microstructure at 50 x magnification

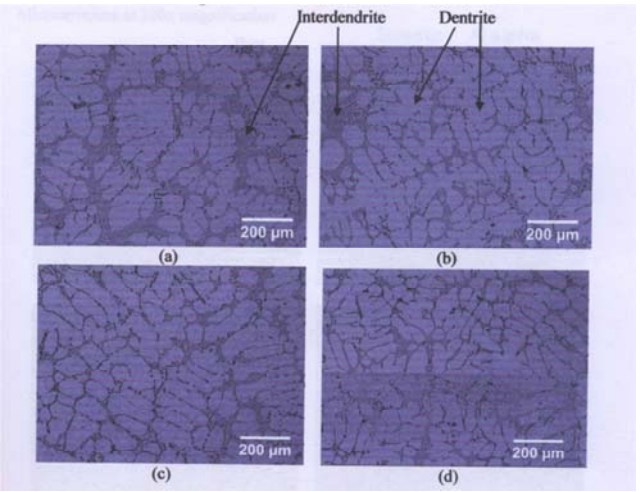


Figure 2: Microstructure at 50 x magnification

Hardness

Material	Aluminium	HV	Price
Al	400g	47.83	RM 24
Al + ABS	380g	72.83	RM 20

CONCLUSION

1. Density of aluminium-ABS decreasing compare to aluminium alloys.
2. From the aspect of microstructure the dendrite size is decreasing but its number is increasing.
3. The percentage of silicon in aluminium alloy is increasing with increasing in the amount of ABS.
4. This study was able to find out the effect of weight percent of ABS on the density, microstructure and also mechanical properties of aluminium-ABS alloys.
5. Minimize the cost of the production of the product by minimizing the weight of the product without changing the form or the shape of the product.

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