

The Characterization of Microstructure of Hypoeutectic AlSi10Mg Sand Casting Alloy

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Extended Abstract

Aluminium alloys because of the low mass and good mechanical properties are one of the most popular groups of functional materials. AlSi10Mg is a typical casting alloy used for parts with thin walls and complex geometry. This kind of alloy is also used for parts subject to high loads and complicated in shapes. Due to the complicated shape and size, the elements are produced by sand casting.

This work concerns the specification and characterization of microstructure of AlSi10Mg alloy produced by sand casting. It is well known that to be able to improve the properties of the materials the good characterization of microstructure should be done.

Firstly, the optical metallographic structure was characterized. The microstructure was observed in two directions: transverse and longitudinal directions. To better characterization of elements of microstructure the scanning electron microscopy SEM (in secondary electron SE and back scattered electron BSE modes) was done. X-ray diffraction (XRD) investigations were also carried out using a Bruker D8 Advance diffractometer operating at 40 kV and 40 mA with Cu K α radiation. Measurements were obtained by step scanning 2θ from 10° to 120° with a step size of 0.05°. The TEM observation were done, also. The electronograms were made for different phases, indicating the area of their presence. The EDS analysis was done, also.

The goal of this work was to analyze the microstructure of AlSi10Mg alloy. As the results shown: the AlSi10Mg alloy is composed of Al matrix which is silicon - enriched, silicon eutectic, the multicomponent precipitates like α - AlFeMnSi, the magnesium enriched phase which can include the iron, silicon, aluminium and manganese and phases like Mg₂Si (Zovko Brodarar, 2017; Kores et al., 2012; Voncina et al. 2006)

References

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