

ABSTRACT

ZA3 is a zinc-based alloy with aluminium as its main alloying element. Producing ZA3 product by semisolid metal processing (SSM) offer significant advantages such as the reduction of macrosegregations, porosity and low forming efforts. The thermal and microstructure analysis of ZA3 alloy were studied using differential scanning calorimeter (DSC) and scanning electron microscopy (SEM). The solidus and liquidus of the alloy can be determined by DSC analysis. The changes to the microstructures in response to two different isothermal treatments were investigated. They are heating at 100oC for 3-6 hours and at 280oC for 0.5-5 hours respectively. The initial as-cast ZA3 alloy consisted of dendritic microstructure typical of a cast ingot. The major effort in the semi-solid technologies is the generation of small and spherical morphologies. The results indicated that when the ZA3 alloy was subjected to the respective heat treatments of 100oC for 4.5 hours and 280oC for 3 hours, the dendritic arms coalesced and coarsened into fine solid grains of less than 50µm.

Keywords: solidus; liquidus; dendritic; spherical morphologies