

In-situ melting assessment of AZ91D granules by thermal analysis

Abstract :

In this research, the response of AZ91D granules during In-Situ melting as a novel technique for investment casting of magnesium alloy was investigated. In order to assess the melting behaviour, the granules were heated at 700 °C for 30 min under three different protective environments, including covering flux, argon atmosphere and their combination. Thermal analysis experiments were carried out to disclose the heating profile of the granules and to detect any probable characteristic temperatures. Visual analysis was employed to characterize the products of the In-Situ melting process in each environment. The results showed that the granules underwent a severe oxidation when heated under the covering flux solely. However, the detected characteristic temperatures revealed that they experienced melting process during heating although they failed to produce a molten metal pool. Flowing argon gas not only prevented the granules from oxidation suffering, also assisted them to provide molten metal. It was further observed that using covering flux remarkably contributed to an increase in the feasibility of the granules melting in an argon atmosphere.