

DSC and HRTEM study of precipitation in Al-Mg-Si-Cu alloys

非常勤研究員 Atif Mossad Ali

Abstract of this project

Aluminum alloys exhibit low density, high strength, high ductility and high corrosion resistance in the ambient environments. Consequently, they are considered promising candidates for vehicles industry. The resulting weight saving from using this light-weight alloys provides a great benefit of reducing the fuel consumption and exhaustion emission. The Al-Mg-Si-(Cu) alloys are currently being used in automobile's body sheets. The age hardening response of these alloys is very significant and hence, the control of the precipitation during heat treatment is very important for attaining optimum alloy performance. In this study, the non-isothermal DSC technique will be applied on Al - 0.68 mass% Mg - 0.37 mass% Si - 0.5 mass% Cu alloy. Eight reaction peaks have been evolved. Among these peaks, five are exothermic occurred due to the development of the precipitates. High resolution transmission electron microscopic (HRTEM) investigation was done also on these specimens heated during the corresponding DSC scans performed at a specific heating rate in order to characterize the precipitates formed these peaks.

Keywords: Al-Mg-Si alloy, Cu addition, DSC, HRTEM, precipitation