DSC AND TEM STUDY OF TRANSFORMATION KINETICS AND PRECIPITATION IN TWO Al-Mg-Si ALLOYS WITH AND WITHOUT Cu AND EXCESS Si

F.SERRADJ*, R.GUEMINI, A.BOUBERTAKH* and S.HAMAMDA***

** Thermodynamic and Materials Surface Treatments laboratory, Constantine 01 University, Algeria.*

*** Active Components and Materials laboratory, Larbi ben M'hidi-OEB University, Algeria.*

ABSTRACT. In this present research work, we have investigated the precipitation of two Al-Mg-Si alloys with and without Cu and excess Si by using the differential scanning calorimetry (DSC), transmission electron microscopic (TEM) and Vickers hardness measurement. The analysis of the DSC curves found that the excess Si accelerate the precipitation and the alloy contain the excess and small addition of copper has higher aging-hardness than that of free alloy (without excess Si and Cu) at the same heat treatment condition. TEM observation result shows there is smaller size and higher number density of precipitate in excess Si-bearing alloy than those of excess-free. Also, the activation energy for each peak of DSC curves (exothermic and endothermic reactions) was calculated. The alloys with an excess Si require larger activation energy for precipitation despite the acceleration of the precipitation by the excess Si.

KEYWORDS: *Al-Mg-Si alloys, transformation kinetics, precipitation, DSC, TEM, excess Si, activation energy.*