

Experimental study and simulation of stable phase β (Mg_2Si) evolution during artificial aging of aluminum alloy AA6005

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Abstract : An AA6005 alloy that has been machined or cast can be strengthened using various aging and solution heat treatment techniques. This is called structural precipitation hardening which goes through three steps: a homogenization at lower temperature of melting temperature, which ensures alloy solution and then rapid cooling, and finally an aging treatment at a temperature between 180°C and 220°C for our alloys. In order to optimize the time and number of heat treatments, we perform simulations of various heat treatment ranges using MatCalc software to initiate precipitation reactions in the G zone. The β phase (Mg_2Si). Artificial aging is used to induce the formation of the hardening phases (Mg_2Si). The MatCalc software uses the mc Al.ddb thermodynamic database for aluminum alloys. The numerical results are in good agreement with the microhardness results, which demonstrate the existence of the stable β phase

Keywords : simulations, AA6005, artificial aging