

Microstructure and Mechanical Properties of Boron-Containing AZ91D Mg Alloys

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Abstract : Effect of boron addition on the microstructure and mechanical properties of AZ91D Mg alloy was investigated in this study. Through calculation of phase equilibria, carried out by using FactSage® and FTLite database, solution treatment temperature was decided as 420 °C where supersaturated solid solution can be obtained. Solid solution treatment was conducted at 420 °C for 24 hrs followed by hot rolling at 420 °C and the total reduction was about 60%. Recrystallization heat treatment was followed at 420 °C for 6 hrs to obtain equiaxed microstructure. After recrystallization treatment, aging heat treatment was conducted at temperature of 200 °C for time intervals from 1 min to 200 hrs and hardness of each condition was measured by micro-Vickers method. Peak hardness was observed after 20 hrs. Tensile tests were also conducted on the specimens aged for various time intervals and the results were compared with hardness.

Keywords : AZ91D Mg alloy, boron, heat treatment, microstructure, mechanical properties, hardness

Conference Title : ICTCME 2016 : International Conference on Textile Composites, Materials and Engineering

Conference Location : Sydney, Australia

Conference Dates : December 15-16, 2016