

Microstructure and Mechanical Properties of Mg-Zn Alloys

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Abstract : Effect of Zn addition on the microstructure and mechanical properties of Mg-Zn alloys with Zn contents from 6 to 10 weight percent was investigated in this study. Through calculation of phase equilibria of Mg-Zn alloys, carried out by using FactSage[®] and FTlite database, solution treatment temperature was decided as temperatures from 300 to 400°C, where supersaturated solid solution can be obtained. Solid solution treatment of Mg-Zn alloys was successfully conducted at 380°C and supersaturated microstructure with all beta phase resolved into matrix was obtained. After solution treatment, hot rolling was successfully conducted by reduction of 60%. Compression and tension tests were carried out at room temperature on the samples as-cast, solution treated, hot-rolled and recrystallized after rolling. After solid solution treatment, each alloy was annealed at temperatures of 180 and 200°C for time intervals from 1 min to 48 hrs and hardness of each condition was measured by micro-Vickers method. Peak aging conditions were deduced as at the temperature of 200°C for 10 hrs. By addition of Zn by 10 weight percent, hardness and strength were enhanced.

Keywords : Mg-Zn alloy, heat treatment, microstructure, mechanical properties, hardness

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