

Effect of Microstructure on the Mechanical Properties of Binary Magnesium Alloys Containing Ga, In and Sn

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In the present work Mg-Ga, Mg-Sn and Mg-In binary alloys with 1 and 3 wt.% Ga, Sn or In were studied in the as-cast state. Selected Mg-3Ga and Mg-3Sn binary alloys were subsequently extruded at 400 °C. Structures of investigated materials were studied using scanning electron microscopy and energy dispersive spectrometry. Mechanical properties were determined by Vickers hardness measurements and tensile and compressive testing. All materials were composed of primary magnesium dendrites and contained strong dendritic microsegregation. Both Ga and Sn have strengthening effect on magnesium; the effect of In is negligible. The extruded alloys were characterized by grain size in the range between 10-50 µm. Tensile yield strength and ultimate tensile strength of extruded alloys were clearly improved.

Keywords: Magnesium alloys, Casting, Thermomechanical processing, Electron microscopy, Mechanical characterization

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