

Mechanical and anisotropic behaviors of Mg-Li-Zn alloy thin sheets

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Abstract

This study examined the mechanical property and formability of the cold-rolled Mg-Li-Zn alloy sheets with two different Li contents. Uniaxial tension and press-forming tests were carried out at room temperature. The tensile properties and formability parameters were correlated with the forming limit diagrams. The test results indicated that the Mg-Li-Zn alloy with a Li content of 6 wt% exhibited reasonable strength levels with moderate fracture elongation and that it did not show good stretchability and drawability at room temperature. The alloy with a Li content of 9 wt% presented excellent ductility even at room temperature and the strength levels were somewhat inferior. From the analysis, it was found that formability of the alloy with a higher Li content of 9 wt% was superior compared to that of the alloy with a Li content of 6wt%. Moreover, the fracture surfaces of the press-formed samples were considered and studied under a scanning electron microscope (SEM). The results showed that the partly ductile and partly brittle fracture pattern was observed in the tension-tension strain condition for both the alloys.

Keyword : Magnesium-lithium alloy; Anisotropy; Formability