

Mechanical Properties and Strain-hardening Behaviors of a few Mg-Li-Zn
Alloy Thin Sheets

吳泓瑜, 邱垂泓, 周耿中

Mechanical Engineering

Engineering

ncuwu@chu.edu.tw

Abstract

This work examined the effects of Li content on the mechanical properties and strain-hardening behaviors of three varieties of MgLiZn alloys containing approximately 6 wt%, 9 wt%, and 10 wt% of Li. Kocks - Mecking type plots were constructed to illustrate different stages of strain-hardening. The LZ61 alloy sheet was inferior to the other sheets in ductility but superior in strengths. The BCC β -phase was predominant in the LZ91 and LZ101 alloy sheets. Anisotropic behavior in mechanical properties was less noticeable in the LZ101 alloy sheet. The cold-rolled LZ61 alloy sheet showed stage II and stage III strain-hardening behaviors at room temperature. The specimens of LZ91 and LZ101 alloy sheets did not show stage II strain-hardening. Stage IV strain-hardening was observed in the LZ101 alloy sheet in specimens of all test directions. Higher initial strain-hardening rates were observed in the 90 direction for these alloys as a result of the cold-rolled fibrous structure affording stronger barriers to dislocation movements in this direction.

Keyword : Anisotropy, Magnesium-lithium alloy, Strain-hardening, Strain-hardening rate