

Strain-Hardening Behavior of Mg-Li-Zn Alloy Thin sheets under Tension

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Abstract

This work examined the effects of Li content on the strain-hardening behaviors of three varieties of MgLiZn alloys containing approximately 6 wt%, 9 wt%, and 10 wt% of Li. Tensile tests were carried out on specimens in the directions of 0, 45 and 90° to the rolling direction. Kocks - Mecking type plots were constructed to illustrate different stages of strain-hardening. The cold-rolled Mg6Li1Zn (designated as LZ61) alloy sheet showed stage II and stage III strain-hardening behaviors at room temperature. The specimens of Mg9Li1Zn (designated as LZ91) and Mg10Li1Zn (designated as LZ101) alloy sheets did not show stage II strain-hardening. 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 : Magnesium-lithium alloy, Anisotropy, Strain-hardening, Strain-hardening rate