

Microstructure and mechanical behavior of LZ91 Mg alloy processed by  
rolling and heat treatments

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Abstract

Mg-9%Li-1%Zn alloy was successfully cast into a 37 mm thick ingot, and then rolled to a thickness of 2 mm in this study. Effects of thermal and mechanical treatments on the microstructures and strengthening mechanisms were investigated. The experimental results indicated that the as-cast microstructure of the Mg-9%Li-1%Zn alloy had a dual phase structure with dispersed fine particles of ZnO and MgO oxides. After annealing heat treatment of the as-rolled specimen,  $\alpha$  phase was elongated and aligned in the rolling direction, and  $\beta$  phase showed a recrystallized grain structure. The variation in hardness during isothermal heat treatment was believed to correspond to an unstable phase or spinodal decomposition causing age hardening effect. Cold working presented moderate hardening effect, and the hardness of the cold-rolled specimen was almost proportional to the extent of cold working.

Keyword : Metals; Precipitation; X-ray diffraction; Transmission electron microscopy,

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