Effects of minor Scandium addition on the properties of Mg-Li-Al-Zn alloy

吳泓瑜,高禎蔚,林家宇,邱垂泓
Mechanical Engineering
Engineering
ncuwu@chu.edu.tw

Abstract

An Mg-Li based alloy containing Scandium (Sc) has been prepared by melting and
solidifying it in a carbon steel crucible, and by extruding at a billet preheating
temperature of 200C with an extrusion ratio of 28. Age heat treatments and
thermomechanical processing were performed to investigate the effect of minor addition
of Sc on the microstructures and mechanical properties. Hardness, optical microscopy,
scanning electron microscopy, electron probe microanalyzer, X-ray diffraction studies,
and tensile tests were carried out to explore the variations in microstructures and
mechanical behaviors during processing. The Mg-Li based alloy with Sc addition
presented age hardening effect at room temperature. The hardness decreased rapidly
with aging temperature at temperatures below 50C, indicating that the transformation
of the phase into the equilibrium phase AlLi should be shifted to a lower temperature.
Thermomechanical treatment could enhance the work-hardening effect to improve the
mechanical properties.

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