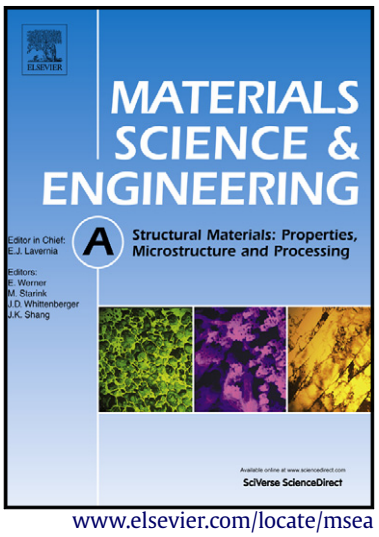


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PII: S0921-5093(14)00676-5
DOI: http://dx.doi.org/10.1016/j.msea.2014.05.064
Reference: MSA31170

To appear in: *Materials Science & Engineering A*

Received date: 28 April 2014
Revised date: 20 May 2014
Accepted date: 21 May 2014

Cite this article as: Yan Yang, Xiaodong Peng, Haiming Wen, Guobing Wei, Weidong Xie, Enrique J. Lavernia, Microstructure and mechanical behavior of Mg-10Li-3Al-2.5Sr alloy, *Materials Science & Engineering A*, http://dx.doi.org/10.1016/j.msea.2014.05.064

# Microstructure and mechanical behavior of Mg-10Li-3Al-2.5Sr alloy

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**Abstract**: As-cast Mg-10Li-3Al-2.5Sr alloy was prepared and extruded at 340 $^{o}$C using double change channel pressing (DCCAP) with an extrusion ratio of 4.5. The microstructure and mechanical response of the as-cast and the extruded alloy are reported and discussed. The present results show that Mg-10Li-3Al-2.5Sr alloy contains bcc β-Li, hcp α-Mg and $Al_4Sr$ phases, and that the matrix primarily consists of the β-Li phase. The microstructure in the as-cast alloy shows ultrafine primary regions and coarse eutectic structures with an average grain size of 450 nm, attributable to the solidification conditions. Dynamic recrystallization (DRX) is reported to occur during the DCCAP process and DRX lead to grain refinement in coarse eutectic regions and a concomitant increase of grain size in ultrafine primary regions. As a result of DRX, the microstructure in the extruded alloy, with an average grain size of 501 nm, is more homogeneous than that in the as-cast one. Moreover, the dislocation density in the DCCAP-processed alloy is lower than that in the as-cast alloy as a result of DRX. The tensile strength of the as-cast alloy (172±7 MPa) is slightly higher than that of the extruded one (165±6 MPa), whereas the ductility of the extruded alloy (42.2±3.0%) is significantly higher than that of the as-cast one (13.6±1.0%).

**Keywords**: Mg-Li alloy; extrusion; microstructure; mechanical properties;[1]

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