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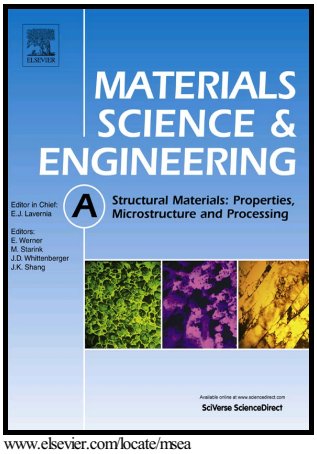

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PII: S0921-5093(17)30020-5
DOI: http://dx.doi.org/10.1016/j.msea.2017.01.024
Reference: MSA34586

To appear in: *Materials Science & Engineering A*

Received date: 30 September 2016
Revised date: 5 January 2017
Accepted date: 6 January 2017

Cite this article as: Seyed Masoud Ashrafizadeh, Ali Reza Eivani, Hamid Reza Jafarian and Jie Zhou, Improvement of mechanical properties of AA6063 aluminum alloy after equal channel angular pressing by applying a two-stage solution treatment, *Materials Science & Engineering A* http://dx.doi.org/10.1016/j.msea.2017.01.024

Improvement of mechanical properties of AA6063 aluminum alloy after equal channel angular pressing by applying a two-stage solution treatment

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Abstract

A two-stage solution treatment composed of soaking at 420 °C for 10 min and the second soaking at 500 °C for 10 min was applied to cold-worked AA6063 aluminum alloy samples after equal channel angular pressing (ECAP) for two and four passes. The microstructures and mechanical properties of the samples were compared with those of the samples after a routine one-stage solution heat treatment at 500 °C for 10 min. Abnormal grain growth (AGG) occurred to the samples during the one-stage solution treatment. However, no AGG was observed in the samples after the two-stage solution treatment. As a result of the prevention of AGG from occurring, the hardness, yield strength and ultimate tensile strength of the alloy after the two-stage solution treatment were significantly increased, while elongation to failure remained almost unchanged.

Keywords:

Aluminum; heat treatment; equal channel angular pressing; grain growth; mechanical property.