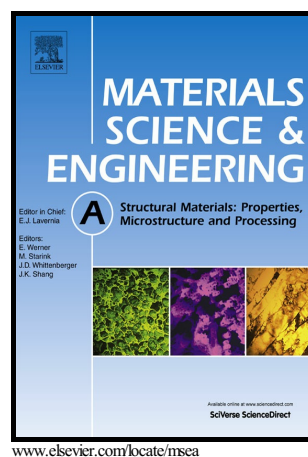


Titanium as an intermetallic phase stabilizer and its effect on the mechanical and thermal properties of Al-Si-Mg-Cu-Ti alloy

Se-Weon Choi, Hoon-Sung Cho, Shinji Kumai



PII: S0921-5093(16)31176-5
DOI: <http://dx.doi.org/10.1016/j.msea.2016.09.094>
Reference: MSA34179

To appear in: *Materials Science & Engineering A*

Received date: 26 May 2016
Revised date: 4 August 2016
Accepted date: 22 September 2016

Cite this article as: Se-Weon Choi, Hoon-Sung Cho and Shinji Kumai, Titanium as an intermetallic phase stabilizer and its effect on the mechanical and thermal properties of Al-Si-Mg-Cu-Ti alloy, *Materials Science & Engineering A* <http://dx.doi.org/10.1016/j.msea.2016.09.094>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Titanium as an intermetallic phase stabilizer and its effect on the mechanical and thermal properties of Al-Si-Mg-Cu-Ti alloy

Se-Weon Choi^{a*}, Hoon-Sung Cho^b, Shinji Kumai^c

^aKorea Institute of Industrial Technology, 6 Cheomdan-gwagiro 208 beon-gil, Buk-gu, Gwangju 500-480, Republic of Korea

^bSchool of Materials Science & Engineering, Chonnam National University, 77 Yongbong-ro, Buk-gu, Gwangju 500-757, Republic of Korea

^cDepartment of Metallurgy and Ceramics Science, Tokyo Institute of Technology, S8-10, 2-12-1 O-okayama, Meguro-ku, Tokyo 152-8552, Japan

Abstract

The effect of precipitation of intermetallics on the mechanical and thermal properties of Al-6.5Si-0.44Mg-0.9Cu-(Ti) alloys (in wt.%) during various artificial aging treatments was studied using a universal testing machine and a laser flash apparatus. The solution treatment of the alloy samples was conducted at 535 °C for 6 h, followed by quenching in warm water. The solution-treated samples were artificially aged for 5 h at different temperatures ranging from 170 °C to 220 °C. After the artificial aging treatment, the Al-6.5Si-0.44Mg-0.9Cu alloy (the Ti-free alloy) had a lower ultimate tensile strength (UTS) than the Al-6.5Si-0.44Mg-0.9Cu-0.2Ti alloy. The UTS response of the alloys was enhanced by the addition of Ti, with the maximum UTS showing an increase from 348 MPa for the Ti-free alloy to 363 MPa for that containing 0.2 wt.% Ti, aged at 180 °C. The Ti-free alloy had a higher thermal diffusivity than the Ti-containing alloy over all temperature ranges. Upon increasing the temperature from 180 °C to 220 °C, the room temperature thermal diffusivities increased because the

Download English Version:

<https://daneshyari.com/en/article/5456561>

Download Persian Version:

<https://daneshyari.com/article/5456561>

[Daneshyari.com](https://daneshyari.com)