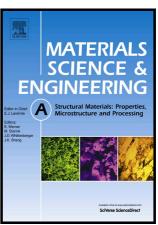
Author's Accepted Manuscript

Microstructure, mechanical and thermo-physical properties of Al–50Si–xMg alloys

Zhiyong Cai, Chun Zhang, Richu Wang, Chaoqun Peng, Xiang Wu, Haipu Li



www.elsevier.com/locate/msea

PII: S0921-5093(18)30765-2

DOI: https://doi.org/10.1016/j.msea.2018.05.098

Reference: MSA36536

To appear in: Materials Science & Engineering A

Received date: 11 May 2018 Revised date: 23 May 2018 Accepted date: 24 May 2018

Cite this article as: Zhiyong Cai, Chun Zhang, Richu Wang, Chaoqun Peng, Xiang Wu and Haipu Li, Microstructure, mechanical and thermo-physical properties of Al–50Si–xMg alloys, *Materials Science & Engineering A*, https://doi.org/10.1016/j.msea.2018.05.098

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.

ACCEPTED MANUSCRIPT

Microstructure, mechanical and thermo-physical properties of Al–50Si–xMg alloys

Zhiyong Cai^{a,b}, Chun Zhang^{b,*}, Richu Wang^{a, c}, Chaoqun Peng^a, Xiang Wu^a, Haipu Li^b

^a School of Materials Science and Engineering, Central South University, Changsha

410083, China

^b School of Chemistry and Chemical Engineering, Central South University,
Changsha 410083, China

^c Shenzhen Research Institute of Central South University, Shenzhen 518057, China

*Corresponding author. E-mail: zchun614@163.com (Chun Zhang)

Abstract: There is a growing demand to achieve better performance of electronic packaging materials owing to the development of modern electronics industry. In this work, the effects of elemental Mg addition on microstructural characteristics, mechanical properties, and thermo-physical properties of Al–50Si alloys were investigated. The tensile strength, bending strength, and hardness are improved significantly when the Mg content increases from 0% to 1%, but decreases as the content exceeds 1%. The enhanced strength is mainly attributed to the presence of small bar-like Mg₂Si phase located at the interface. However, the extensive growth of Si phase in the high Mg contained alloys reduce the mechanical properties. The thermal conductivity and thermal expansion coefficient decrease gradually with the increase in the Mg content. Compared with the addition of Cu, minor amount of Mg addition (0.5%) can effectively increase the strength of Al–50Si alloys without substantially sacrificing the thermal conductivity.

Download English Version:

https://daneshyari.com/en/article/7971736

Download Persian Version:

https://daneshyari.com/article/7971736

Daneshyari.com