

Accepted Manuscript

Challenging thermal management by incorporation of graphite into aluminium foams

L.P. Maiorano, J.M. Molina



PII: S0264-1275(18)30641-5
DOI: [doi:10.1016/j.matdes.2018.08.026](https://doi.org/10.1016/j.matdes.2018.08.026)
Reference: JMADE 7324
To appear in: *Materials & Design*
Received date: 24 May 2018
Revised date: 31 July 2018
Accepted date: 12 August 2018

Please cite this article as: L.P. Maiorano, J.M. Molina , Challenging thermal management by incorporation of graphite into aluminium foams. *Jmade* (2018), doi:[10.1016/j.matdes.2018.08.026](https://doi.org/10.1016/j.matdes.2018.08.026)

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 proof before it is published in its final 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.

Challenging thermal management by incorporation of graphite into aluminium foams

L.P. Maiorano^a, J.M. Molina^{a,b*}

^a Instituto Universitario de Materiales de Alicante, University of Alicante, Ap. 99, E-03080 Alicante, Spain

^b Departamento de Química Inorgánica de la Universidad de Alicante, University of Alicante, Ap 99, E-03080 Alicante, Spain

ABSTRACT

The recent progress made in active thermal management for electronics demands the development of new open-pore foam materials with excellent thermal performance that result from the combination of high thermal conductivity (≥ 70 W/mK) and the lowest possible fluid pressure drop. The foams considered to date in the literature do not meet these conditions. In this work, a new class of two-phase composite foam materials, which contain graphite flakes and aluminium, were fabricated by the gas pressure liquid metal infiltration method. These materials were fabricated in two main microstructures: i) aluminium foam with oriented graphite flakes in struts; ii) alternating layers of oriented graphite flakes and aluminium foam. The resulting materials exhibited thermal conductivities within the 60-290 W/mK range, and power dissipation capacities up to 325% higher than those for conventional aluminium foams, with pressure drops kept at convenient values for the most demanding active thermal management applications.

Keywords: metal foam, graphite flakes, infiltration, thermal conductivity, thermal management.

*corresponding author
e-mail: jmmj@ua.es; Tel: +34 965903400 (2055)

Download English Version:

<https://daneshyari.com/en/article/7216739>

Download Persian Version:

<https://daneshyari.com/article/7216739>

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