

Author's Accepted Manuscript

The effect of slurry composition on microstructure and mechanical properties of open-cell Inconel foams manufactured by the slurry coating technique

Ninian Sing Kok Ho, Peifeng Li, Srinivasan Raghavan, Tao Li



PII: S0921-5093(17)30048-5
DOI: <http://dx.doi.org/10.1016/j.msea.2017.01.038>
Reference: MSA34600

To appear in: *Materials Science & Engineering A*

Received date: 27 July 2016
Revised date: 27 November 2016
Accepted date: 12 January 2017

Cite this article as: Ninian Sing Kok Ho, Peifeng Li, Srinivasan Raghavan and Tao Li, The effect of slurry composition on microstructure and mechanical properties of open-cell Inconel foams manufactured by the slurry coating technique, *Materials Science & Engineering A* <http://dx.doi.org/10.1016/j.msea.2017.01.038>

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.

P. Li

The effect of slurry composition on microstructure and mechanical properties of open-cell Inconel foams manufactured by the slurry coating technique

Ninian Sing Kok Ho ^a, Peifeng Li ^{a,*}, Srinivasan Raghavan ^b, Tao Li ^b

^a School of Mechanical and Aerospace Engineering, Nanyang Technological University,
Singapore

^b Singapore Institute of Manufacturing Technology, Singapore

* Corresponding author's email: peifeng.li@ntu.edu.sg (P. Li); Tel: +65 6790 4766

Abstract

Open-cell nickel-based alloy foams are attractive materials for applications such as sound damping and heat exchange, especially those involving exposure to high temperature environments. This study demonstrated the potential of a developed slurry coating technique for manufacturing open-cell Inconel alloy foams, and then investigated the effect of slurry composition on the microstructure and mechanical properties of the foams. It was found that the compressive properties of the foam can be quantitatively related to its relative density using the empirical equations. The deformation behaviour of the foam is bending-dominated; and unit cell struts undergo brittle fracture after the elastic region. Increasing the slurry solid loading leads to a higher average bulk foam density and more non-uniform crush bands in the foam under compression. Compared to other fabrication processes, this slurry coating technique is able to produce open-cell Inconel foams with relatively higher strength-to-weight ratios. This study also revealed that the sound absorption capability of the foam increases when its unit cell size is reduced.

Download English Version:

<https://daneshyari.com/en/article/5456247>

Download Persian Version:

<https://daneshyari.com/article/5456247>

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