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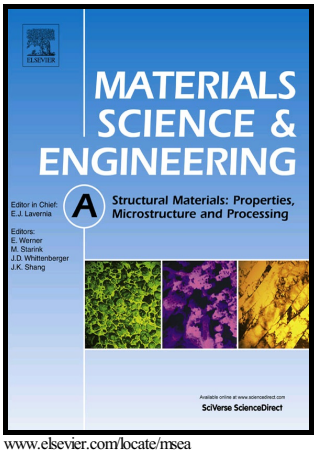

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Abstract

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 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.