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Page 1 (Records 1 -- 1)
[1]

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Record 1 of 1

Title: The mechanical properties of expanded perlite-aluminium syntactic foam at elevated temperatures

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Abstract: Expanded perlite/A356 aluminium syntactic foams (P-MSF) were produced via a counter-gravity infiltration process. The quasi-static compressive properties of these foams were investigated at 25, 125, 250, 375, and 500 degrees C and compared with those of the matrix material, tested at the same conditions. Young's modulus, offset yield stress, plateau stress and energy absorption was evaluated for all samples. The improved ductility of the foams at higher temperatures results in more uniform deformation and smoother stress-strain curves. At the same time, the mechanical strength and the energy absorption of the foams and the matrix material decrease. The results indicate that the high temperature mechanical properties of the foams are controlled by two counter-acting mechanisms, i.e. the softening of the matrix material and the improved ductility of the foam. (C) 2017 Elsevier B.V. All rights reserved.

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Page 1 (Records 1 -- 1)
[1]

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