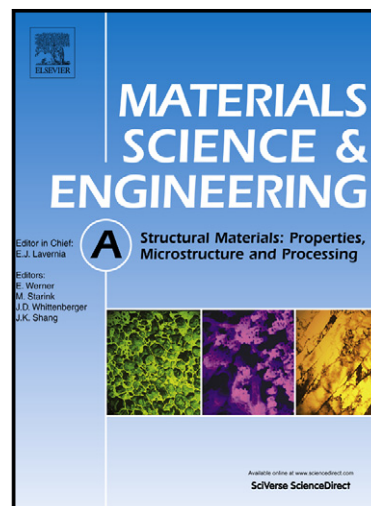


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Grain refinement and high strain rate superplasticity in aluminium 2024 alloy Processed by high-pressure torsion

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An Al-2024 alloy was processed by high-pressure torsion (HPT) to produce an ultrafine-grained structure with a grain size of ~240 nm. A maximum elongation of ~750% was attained with an initial strain rate of $1 \times 10^{-2} \text{ s}^{-1}$ at 673 K, demonstrating the advent of high strain rate superplasticity through grain refinement by the HPT processing. Evaluation of the strain-rate sensitivity and the activation energy for the deformation confirmed that grain boundary sliding through grain boundary diffusion is the rate-controlling process for the superplastic deformation of the HPT-processed Al-2024 alloy.

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