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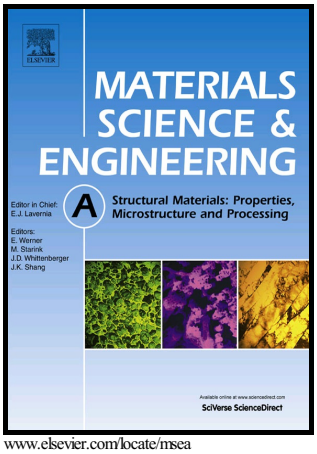

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Mechanical and microstructural properties of 2024-T351 Aluminium using a hat-shaped specimen at high strain rates

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Abstract

This paper investigates adiabatic shear bands (ASBs) in 2024-T351 aluminium and their effect on the mechanical properties and microstructure of this aluminium alloy. Using hat-shaped specimens in a split Hopkinson pressure bar (SHPB) and universal testing machine, resolved shear stress-nominal plastic shear strain curves were presented at shear strain rates between 1×10^{-4} to 15.4×10^{3} s^{-1}. A revised formula for shear stress in hat specimens is proposed. Microstructural observations were completed on deformed specimens, with hardness results, scanning electron microscopy (SEM) and energy dispersive X-ray spectroscopy (EDS) presented. A critical shear strain rate range for ASB initiation in