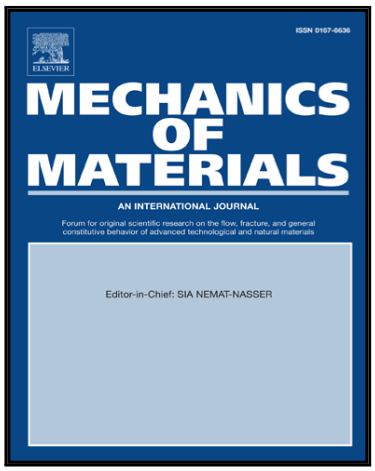

Mechanistic insight into the role of severe plastic deformation and post-deformation annealing in fracture behavior of Al-Mn-Si alloy

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Highlights

- Dual-strained Al-Mn-Si samples by CGP and cold rolling were annealed at 150, 250 and 350 °C.
- DCR was more impressive rather than CCR path on grain refinement and strength enhancement. Post-deformation treatment of DCRed sample at 350 °C recovered its ductility to more than 1000%.
- Contributions of UD and PUD in tensile tests were acquired while fracture-angles demonstrated inverse correlations with PUD.
- By calculating the fractions of emerged morphologies, total area covered by fibrous, slip and shear morphologies considered as ductile fracture since rupture area deduced as brittle failure.
- Particles fragmentation, nucleation and enrichment in alloying elements are studied by SEM.