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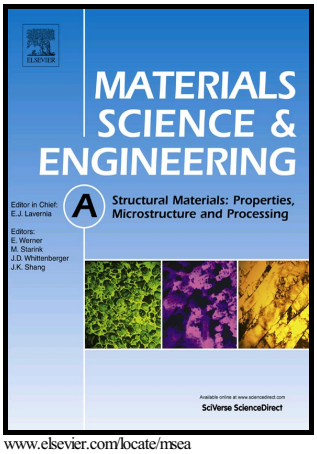

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Enhanced mechanical properties of ARB-processed aluminum alloy 6061 sheets by subsequent asymmetric cryorolling and ageing

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Abstract

Grain size and precipitations affect the strength and ductility of ultrafine-grained materials. In this study, aluminum alloy 6061 sheets were fabricated using the accumulative roll bonding (ARB) technique. The ARB-processed sheets were subsequently subjected to cryorolling and asymmetric cryorolling. The sheets were further aged at 100°C for 48 hours. Mechanical tests show that a combination of asymmetric cryorolling and ageing results in significant improvement in both the ductility and the strength of the ARB-processed sheets. The microstructures of the sheets at different stages of the process were also analyzed using optical microscopy, scanning electron microscopy, transmission electron microscopy and X-ray diffraction in order to correlate the mechanical properties with the microstructure.

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