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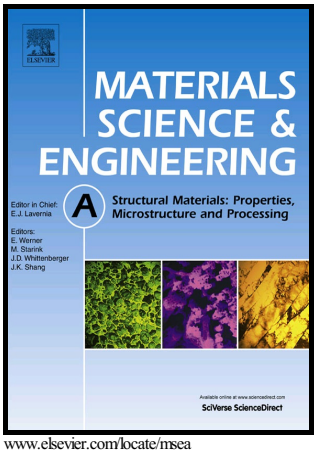

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Abstract

Investigation of the microstructural features and mechanical properties of the $Al_{86}Cu_7Si_7$ nanostructure-dendrite composite revealed that the high yield strength of 615 MPa and its reasonable plasticity of ~20% at room temperature mainly originate from the evolution of dislocations in the micron-scale dendrites together with the cooperative deformation action of shear band and interfacial sliding throughout the whole volume of the material. Especially, shear band-induced rotation of dendrites was found to be an important deformation mechanism. Here, we sequentially elucidate the deformation behavior using atomic force