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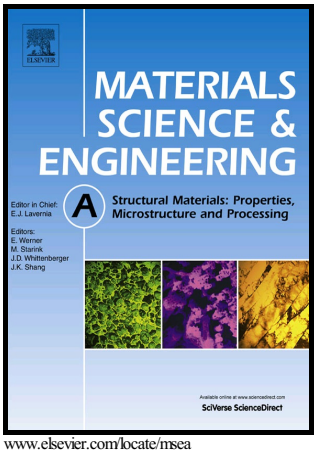

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Abstract

Nanostructured dual-phase equiaxial alloy (DPEA) possesses the unique mechanical properties of high strength and ductility. However, the characterization of mechanical behavior and its elastic-plastic response of DPEA remain to be solved. In this paper, in-situ consolidation dual-phase approximate equiaxial nanocrystalline (NC) AgCu alloys have been synthesized and relevant tensile and nanoindentation tests have been carried out. Experimental results indicates that dual-phase approximate equiaxial NC AgCu alloys have good strength, ductility and a certain creep resistance. Moreover, a theoretical model based on mechanics has been proposed to simulate the stress-strain relationship, strain hardening rate and creep strain rate of dual-phase equiaxial NC AgCu alloy. The plastic property of regular grain interior (GI) phase and amorphous grain boundary (GB) phase has been addressed by the strain gradient plasticity model.