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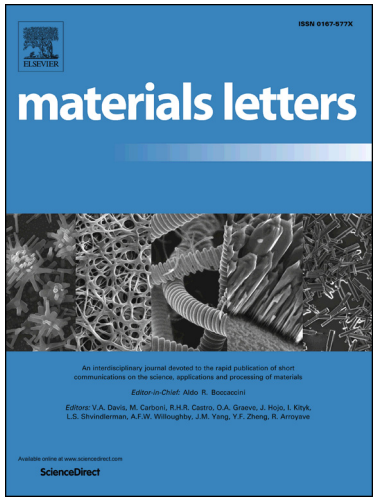

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On the comparison of interrupted and continuous creep behaviour of Nanocrystalline Copper: A Molecular Dynamics Approach

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Abstract

Molecular dynamics (MD) analysis of continuous creep (CC) and interrupted creep (IC) behaviour of nano crystalline (NC) Cu having grain size ~6 nm has been carried out employing Embedded atom potential. The creep deformation intensifies considerably during IC tests compared to CC process. Higher steady-state strain rates are also observed for IC tests as opposed to CC test. Partial strain recovery is also perceived during cooling and subsequent heating at the end of each cycle of IC test. Dislocation nucleation mechanism has a significant role on the accelerated creep behaviour in the IC tests of the NC Cu. Shockley partial dislocations play a crucial role for such enhanced creep deformation behaviour.

Keywords

Creep; Nanocrystalline Materials; Simulation and Modelling; Molecular Dynamics