Jožef Stefan Institute
Ljubljana, Slovenia
K7 / Department for
Nanostructured Materials

SEMINAR

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Kolar's lecture hall

Dislocation plasticity in FeCoCrMnNi high-entropy alloy: Quantitative insights from in situ transmission electron microscopy deformation.

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ABSTRACT

The mechanical properties of high-entropy alloys (HEAs) are still not deeply understood. Detailed knowledge of the strengthening mechanism, especially, the atomistic origin of solid solution hardening and its interplay with dislocation plasticity is needed. In the present study, the dislocation glide behavior of a FeCoCrNiMn face-centered cubic single crystal 'Cantor alloy' was quantitatively analyzed by in situ deformation in a transmission electron microscope (TEM). Shear stress for dislocation glide in a thin foil is measured from dislocation curvature as exceeding 400 MPa. Interestingly, dislocations are prevented from straightening upon unloading by high frictional stresses. The underlying mechanisms are addressed by APT, STEM-EDS and electron diffraction.

Kindly invited.