Influence of strain rate on the orientation dependence of microstructure in nickel single crystals

The deformation microstructures of nickel single crystals (99.945 wt.%) during dynamic plastic deformation and quasi-static compression to a true strain of 0.20 were comparatively investigated. The deformation microstructures are orientation dependent, forming cell structure, slip plane aligned or not slip plane aligned extended boundaries. It is found that the orientation spread decreases, remains unchanged and becomes enhanced when loading along ⟨001⟩, ⟨011⟩ and ⟨111⟩, respectively, as strain rate increases.

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