CREEP DEFORMATION AND DISLOCATION STRENGTHENING MECHANISMS IN A Nb-Al-Ti BASE ALLOY

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ABSTRACT

This paper presents the results of a study of the creep behavior of a multicomponent precipitation-hardened body-centered-cubic 44Nb-35Ti-6Al-5Cr-8V-1W-0.5Mo-0.5Hf-0.3C alloy (compositions quoted in atomic % unless stated otherwise). The alloy is shown to exhibit inverted creep in the primary creep regime, and an extended tertiary regime at 704°C. Furthermore, two-stage secondary creep behavior is also observed at 704°C. The dislocation substructures associated with creep deformation are evaluated by transmission electron microscopy. The observed dislocation/particle interactions are then discussed within the context of dislocation strengthening.