

A unified creep life prediction method and fracture mechanism of high-temperature alloys under multiaxial stress state

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Abstract

This paper proposes a unified creep rupture life prediction method based on continuous damage mechanics under multiaxial stress state. Instead of the traditional method, this method can calculate the skeletal point location for different size of notches in a uniform way. We also conducted creep tests on Ni-based superalloy round bar specimens with different notch parameters, which verified the accuracy of the method. Meanwhile, we carried out creep rupture mechanism analysis for different notch sizes by combining finite element simulation with experiment, which analyzed the stress, damage, and explained the void growth based on triaxial stress.

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