

论文

[011]多滑移取向铜单晶体的循环形变行为—I.循环应力-应变响应

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摘要: 本文在一个较宽的塑性应变幅范围 ($\gamma_p=1.1 \times 10^{-4}$ - 7.2×10^{-3}) 内研究了[011]多滑移取向铜单晶体的循环形变行为.结果表明,[011]晶体的循环形变行为明显不同于[011]和[111]多滑移取向的铜单晶体.[011]晶体具有较低的初始硬化速率,即使在较高的塑性应变幅下,初始硬化速率也无明显变化.[011]晶体的循环应力-应变曲线(CSSC)在所研究的塑性应变幅范围内呈现平台区.CSSC上是否存在平台区,主要由晶体本身的滑移特点和相应的位错反应所决定.疲劳滞后回线形状参数VH在某种程度上可用于确定[011]多滑移铜单晶体的PSB萌生应力

关键词: [011]多滑移取向铜单晶体 循环形变 滞后回线 CSSC平台区

CYCLIC DEFORMATION BEHAVIOR OF [011] MULTIPLE-SLIP-ORIENTED COPPER SINGLE CRYSTAL Cyclic Stress-Strain Response

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Abstract: Cyclic deformation behavior of [011] multiple-slip-oriented copper single crystals was investigated with the plastic resolved shear strain amplitudes (γ_p) in the range of 1.1×10^{-4} - 7.2×10^{-3} . It is shown that the cyclic deformation behavior of [011] copper single crystal is quite different from that of [001] and [111] multiple-slip-oriented crystals. [011] crystals exhibit rather low initial hardening rate, which does not increase notably even under higher plastic strain amplitudes. The cyclic stress-strain curve (CSSC) of [011] crystal shows a plateau region over the range of 1.1×10^{-4} - 7.2×10^{-3} . The occurrence of plateau region in CSSC is mainly determined by the slip characteristics and the corresponding dislocation reactions in the crystal. Moreover, the hysteresis loop shape parameter VH could be efficiently employed to determine the nucleation stress of PSBs in [011] multiple-slip-oriented copper single crystal.

Keywords: [011] multiple-slip-oriented copper single crystal cyclic deformation hysteresis loop plateau region in CSSC

收稿日期 1998-05-18 修回日期 1998-05-18 网络版发布日期

DOI:

基金项目:

国家自然科学基金!19392300-4和19402001

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