

论文

B2结构Fe₃Al单晶室温力学行为各向异性的研究

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摘要: 研究了B2结构Fe₃Al单晶室温下的力学行为, 结果发现, 依取向不同, 材料的屈服强度、延伸率、加工硬化率存在很大差异近[110]取向具有最高延伸率为42%, 而近[100]取向只获得了14.1%的延伸率近[110]取向具有的高加工硬化率是位错交互作用的结果, 二分位错分解为单根位错导致交滑移、进一步提高延伸率近[211]取向的低加工硬化率是单系滑移的结果, 在此取向向下直至断裂, 样品中仍为二分位错。

关键词: Fe₃Al 力学行为 各向异性

ROOM TEMPERATURE MECHANICAL BEHAVIOR OF B2-ORDERED Fe₃Al SINGLE CRYSTALS

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Abstract: A detailed study of room temperature mechanical behavior of B2-ordered Fe₃Al single crystals had been conducted. It was found that the yield strength, plastic elongation and work-hardening rate were changed with orientations. The highest ductility was measured from the specimen with the orientation near [110], where the plastic elongation is 42%. In contrast, at near [100] the plastic elongation is only 14.1%. The high work-hardening rate of the orientation near [110] was confirmed to be the results of superdislocation interaction, and the dissociation of two-fold superdislocations into single dislocations led to cross-slip, which resulted in further increase in elongation. The low work-hardening rate of near [211] was due to single active slip system and the superdislocations kept two-fold until the specimen was fractured.

Keywords: Fe₃Al mechanical behavior anisotropy

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