

论文

含稀土低膨胀高温合金片状沉淀相研究

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摘要: 在Fe-Ni-Co基低膨胀高温合金中加入微量稀土元素Y,晶内和晶界的片状沉淀相增多,合金对应力加速晶界氧化脆性的抗力和合金的缺口持久性能也获得提高.运用常规透射电子显微术、会聚束电子显微术和高分辨透射电子显微术研究了该相的晶体结构及其与基体的取向关系。研究表明,片状相为CaCu5型六方结构,其空间群为P6/mmm,点阵常数为a=0.498nm和c=0.408nm,其化学当量为(Ni,Fe,CO,Ti)5(Nb,Si),并称之为H相.H相和基体有确定的晶体取向关系:(111)γ,(0001)H:[110]γ[110]H.高分辨像表明H相与基体的界面为半共格界面,H相内有层错存在。

关键词: Fe-Ni-Co 基高温合金 稀土 晶体结构

STUDY ON THE PLATELET PHASE IN AN YTTRIUM-CONTAINING LOW EXPANSION SUPERALLOY

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Abstract: The resistance to stress accelerated grain boundary oxygen embrittlement (SAGBO) and the notch-bar rupture life in Fe-Ni-Co low expansion superalloy have been improved with increasing platelet precipitates in the matrix and grain boundaries by trace yttrium element addition. The crystal structure of the platelet phase and its orientation relationship with the matrix have been determined using transmission electron microscopy, convergent beam electron microscopy, X-ray energy dispersive spectrum, X-ray diffraction analysis and high resolution transmission electron microscopy. It has a CaCu5 type crystal structure (space groupP6/mmm) with lattice parameters a=0.498 nm and c=0.408 nm. The crystallographic orientation relationship between the phase and the matrix is found to be (111)γ

Keywords: Fe-Ni-Co base superalloy rare earth element crystal structure

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