



航空学报 » 2002, Vol. 23 » Issue (4) :307-311 DOI:

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热等静压处理对定向凝固NiAl/Cr(Mo,Hf)合金沉淀相和高温拉伸性能的影响

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EFFECT OF HIP ON PRECIPITATIONS AND TENSILE PROPERTIES OF DIRECTIONALLY SOLIDIFIED NiAl/Cr(Mo,Hf) ALLOY

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摘要

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摘要 研究了经热等静压处理后定向凝固 Ni Al/Cr(Mo,Hf)合金中的沉淀相和高温拉伸性能的变化。通过透射电镜和扫描电镜观察发现 :热等静压处理后,Ni Al和 Cr(Mo)相的形貌变化不大,聚集在 Ni Al/Cr(Mo)相界上的 Heusler减少并在 Ni Al,Cr(Mo)相中重新分布。从界面能的角度解释了 Heusler相主要沉淀在Ni Al/Cr(Mo)相界上的原因。热等静压处理后合金中不存在 G相。高温瞬时拉伸实验表明此合金具有优异的高温拉伸强度

关键词: 热等静压 Heusler(Ni₂AlHf)相 G(Ni₁₆Hf₆Si₇)相 力学行为

Abstract: The precipitations and high temperature tensile strength of DS NiAl/Cr(Mo,Hf) alloy after the HIP and aging treatment were studied. The experimental results showed that the NiAl and Cr(Mo) eutectic phases were stable, while the Heusler phase, which distributed at the NiAl/Cr(Mo) interface in the as-cast alloy, reduced greatly and redistributed in the NiAl and Cr(Mo) phase. It was also found that the Heusler particles mainly precipitated at the NiAl/Cr(Mo) interface and NiAl grain boundaries and the reason of which was interpreted from the viewpoint of interfacial energy. The G-phase also disappeared in the HIPed and aged specimen. The tensile experiments showed that the strength of the alloy is higher than that of most NiAl-based alloys.

Keywords: hot isostatic pressing heusler phase (Ni₂AlHf) G (Ni₁₆Hf₆Si₇) mechanical property

Received 2001-09-03; published 2002-08-25

引用本文:

郭建亭;崔传勇;齐义辉;陈玉喜;叶恒强. 热等静压处理对定向凝固NiAl/Cr(Mo,Hf)合金沉淀相和高温拉伸性能的影响[J]. 航空学报, 2002, 23(4): 307-311.

GUO Jian-ting; CUI Chuan-yong; QI Yi-hui; Chen Yu-xi; YE Heng-qiang. EFFECT OF HIP ON PRECIPITATIONS AND TENSILE PROPERTIES OF DIRECTIONALLY SOLIDIFIED NiAl/Cr(Mo,Hf) ALLOY[J]. Acta Aeronautica et Astronautica Sinica, 2002, 23(4): 307-311.

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