

### 论文摘要

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## Ti3Al合金激光焊接接头高温拉伸性能及显微组织

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**摘 要:** 研究Ti-24Al-17Nb合金激光焊接接头的室温及高温拉伸性能, 并分析接头显微组织和拉伸断口。研究表明, 室温下焊缝为单一 $\beta/B2$ 相柱状晶组织, 室温横向拉伸时接头强度与母材强度相当、塑性有所下降、但仍有25%左右的伸长率, 断裂大部分发生在母材部位、少部分断裂在焊缝; 高温拉伸时断裂均发生在焊缝部位。高温拉伸时, 接头组织发生变化,  $\alpha_2$ 相和 $B2$ 相向 $O$ 相转变; 焊缝 $\beta/B2$ 相向 $O$ 相转变的切变相变, 使原来柱状晶晶界应变集中、容易产生微裂纹, 使接头高温强度和塑性明显降低, 高温拉伸断口呈现沿晶断裂和解理断裂的脆性断裂形式。

**关键字:** Ti3Al合金; 激光焊接; 高温拉伸性能; 显微组织

## Microstructure and high-temperature tensile properties of Ti3Al alloys laser welding joint

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**Abstract:** Abstract: The high-temperature and room-temperature tensile properties of Ti-24Al-17Nb (mole fraction, %) alloys laser welding joints were investigated, and the microstructure and fracture of the joints were studied. The results indicate that the microstructures of the welds are consisted of  $\beta/B2$  with columnar crystals, the strength of the joints tensioned transversely at room-temperature is almost same as that of the base metal, and the ductility reaches 25%. Cracks occur in the base metal. During the high-temperature tension the cracks occur in the welds. After high-temperature tension, some of the phase  $\alpha_2$  and phase  $B2$  of the base metal and HAZ in joints turn to phase  $O$ , and phase  $B2$  of the welds turn to phase  $O$ . The phase changes bring about strain concentration, and induce fracture. The strength and ductility of the joints at high temperature descend significantly. The fracture types of high-temperature tension joints are intergranular fracture and cleavage fracture.

**Key words:** Ti3Al alloy; laser welding; high-temperature tensile property; joint microstructure

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