

论文

**γ-TiAl基双相合金等温分解初生片层组织的相成分与相变应力**

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**摘要:** 应用X射线衍射测定了过饱和α<sub>2</sub>单相的Ti—45%Al合金在950℃等温分解过程中,初生片层形成时的γ相转变分数及α<sub>2</sub>和γ相晶格参数的变化.结果表明,初生片层中α<sub>2</sub>相是亚稳相,其成分可以由自由能成分曲线的亚稳态α<sub>2</sub>相与γ相自由能成分曲线公切线的切点确定,该成分的确定对定量计算合金自由能及发生不连续粗化的转变驱动力有十分重要的作用;等温分解过程中原α晶粒内部将产生相变应力,在垂直于初生片层的方向上可以产生约50MPa的压应力,该应力将对合金的组织形态有显著的影响

**关键词:** Ti—Al合金 初生片层 相成分 相变应力

**PHASE COMPOSITION AND TRANSFORMATION STRESS OF PRIMARY LAMELLAR STRUCTURE IN γ-TiAl-BASED DUPLEX ALLOY DURING ISOTHERMAL DECOMPOSITION**

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**Abstract:** During isothermal decomposition of the supersaturated α<sub>2</sub> phase in Ti-45%Al alloy at 950℃, the volume fractions of the decomposed γ phase and the lattice parameters of both α<sub>2</sub> and γ phases have been investigated by X-ray diffraction. The results show that α<sub>2</sub> phase in the primary lamellar microstructure (PLMS) is a metastable phase, and its composition should be identified by the tangency point on the common tangent of metastable α<sub>2</sub> and γ phase free-energy curves. This composition is very important in calculation of free energy of the alloy and the driving force of discontinuous coarsening (DC). There exists transformation stress inside the original α grains at the direction perpendicular to PLMS which is a compress stress of about 50 MPa and will greatly affect the microstructure of the alloy.

**Keywords:** Ti-Al alloy primary lamellar structure phase composition phase transformation stress

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