

### 论文摘要

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## 原位合成TiB和TiC增强钛基复合材料热力学

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**摘要:** 根据热力学理论编程计算了钛与 $B_4C$ 反应的反应生成焓 $\Delta H$ 与Gibbs自由能 $\Delta G$ 以及反应式 $(x+5)Ti + B_4C = xTi + 4TiB + TiC$ 的绝热温度。计算结果表明: 钛与 $B_4C$ 反应释放出大量热, 反应能自发维持, 而过量钛与 $B_4C$ 反应更易生成TiB和TiC增强体。由于钛作为稀释剂吸收热量, 随着过剩钛含量的增加, 反应的绝热温度逐渐下降, 过剩钛完全熔解的初始温度逐渐升高

**关键字:** 生成焓 Gibbs自由能 钛基复合材料

## FORMATION OF TiB AND TiC REINFORCED TITANIUM MATRIX COMPOSITES

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**Abstract:** Reaction formation enthalpy  $\Delta H$ , Gibbs free energy  $\Delta G$  and adiabatic temperature of reaction between Ti and  $B_4C$  were calculated using thermodynamic theory. The results showed that the reaction between Ti and  $B_4C$  releases much heat, TiB and TiC reinforcer are favourable to synthesize by the reaction between excessive Ti and  $B_4C$ , adiabatic temperature will decrease and initial temperature which excessive titanium is absolutely melted will increase with excessive titanium increasing.

**Key words:** formation enthalpy Gibbs free energy titanium matrix composites

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