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Effects of sintering parameters on the microstructure and tensile properties of *in situ* (Ti₅Si₃ + TiBw)/Ti6Al4V composites with two-scale network architecture

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ABSTRACT

Titanium matrix composites reinforced with Ti₅Si₃ particles and TiB whiskers have been synthesized successfully using the reaction hot pressing. In this paper, we investigated the influence of sintering temperatures (1200 and 1300°C), and holding time (range of 1–2 h) on the microstructure and mechanical properties of (Ti₅Si₃+TiBw)/Ti6Al4V composites. The results clearly indicate that as compared to the sintering time, the sintering temperature plays a more dominant role in controlling the microstructure and mechanical properties of the composites. The volume fraction of Ti₅Si₃ precipitations in β-Ti increases significantly with an increase in temperature and time. The (Ti₅Si₃+TiBw)/Ti6Al4V composites with two-scale network architecture fabricated at 1300°C for 1.5 h exhibit excellent tensile properties.

KEYWORDS: titanium matrix composites, two-scale microstructure, sintering parameters, tensile property, reaction hot pressing