

**SESSION 7: OTHERS, SALON F**

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## **Oxidation and mechanical properties of *in situ* hybrid (TiCp+TiBw)/Ti<sub>6</sub>Al<sub>4</sub>V composites with tailored network microstructure**

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### **ABSTRACT**

In order to obtain a combination of oxidation resistance and mechanical property, *in situ* hybrid TiC particles and TiB whiskers reinforced Ti<sub>6</sub>Al<sub>4</sub>V ((TiCp + TiBw)/Ti<sub>64</sub>) composites with a novel tailored network microstructure are successfully fabricated by two-step low energy milling and reaction hot pressing (RHP). TiCp and TiBw reinforcements with different volume ratios are *in situ* synthesized around the large Ti<sub>64</sub> matrix particles and subsequently formed into hybrid TiCp and TiBw network microstructure. Moreover, TiC particles self-assemble to compact TiCp wall in the network boundary, while TiB whiskers grow into matrix across TiCp wall-like dowel connectors, which can effectively link the adjacent Ti<sub>64</sub> matrix particles. The oxidation resistance of the novel composites increases, while the bending strength decreases with increasing volume fractions of TiCp. Moreover, the oxidation resistance of the composites can be effectively improved by tailoring network microstructure.

**KEYWORDS:** titanium matrix composites, oxidation, bending strength, hybrid, network microstructure