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Microstructure evolution and bonding mechanism of Ti2SnC-Ti6Al4V joint by using Cu pure foil interlayer

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Abstract

Ti_2SnC, as one of functional ceramics with self-healing ability, was studied to weld with Ti6Al4V (TC4) through Cu interlayer under an applied mechanical pressure 10MPa in Ar atmosphere. Electron probe microanalyses indicated that the outward diffusion of Sn from Ti_2SnC played a critical role in the chemical composition of the joining interface. After 60 min, the reaction layers consisted of five zones: an interleaved zone (V) of β-Cu(Sn) and α-Cu(Sn) , an enriched zone (IV) of Sn and intermetallic $CuTi_{0.5}Sn_{0.5}$ phase, the intermetallic zones (III) and (II) composed of $TiCu_4$ and Ti_3Cu_4 , a zone (I) consisting of β-Ti (Cu) phase. After shear tests, the corresponding fractographs indicated that the cracks mainly propagated in the Ti_2SnC matrix with an intergranular fracture mode.

Keywords: Dissimilar welding; Interfacial diffusion; Shear strength

Biography

Wenbo YU has completed his PhD at the age of 29 years from Universite de Poitiers and did postdoctoral studies in Tsinghua University. Right now, he was promoted as assisstant professor in Beijing Jiaotong University. He has published more than 11 papers in reputed

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