MECHANISM OF MATRIX CONSOLIDATION IN 1D-TI/SIC/C COMPOSITES PRODUCED BY CONTINUOUS BINDER-POWDER COATING

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Summary. Matrix consolidation mechanism has been investigated in 1D-Ti/SiC/C composites produced by CBPC - Continuous Binder-Powder Coating, a new fabrication route which can be used in aeronautic and aerospace industries. Titanium metal matrix composites reinforced with continuous SiC/C filaments were analysed in different densification conditions. The results showed that during processing, densification occurs by several mechanisms including a complex elasto-viscoplastic flow and diffusion bonding. The matrix consolidation depends on many processing conditions such as pressure and temperature, mainly. Using correct conditions of pressure and temperature, the titanium matrix composites produced by this process present a good matrix consolidation without porosity and a weak interaction between matrix and fiber. These good agreements between matrix consolidation and weak chemical interaction between matrix and fibre are obtained when pressures up to 150 MPa and temperatures below β-transus are applied. In these conditions, supplementary heat treatments can be performed either in alpha or beta domains.