Mechanical properties of titanium matrix composites produced by Electro-Sinter Forging

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Abstract

A novel field assisted sintering process called Electro-sinter-forging (ESF), developed by EPoS Technologies SA, produces unique metal matrix composite structures. It is an ultrafast sintering process, combining a mechanical pulse and an electromagnetical pulse. This technology ensures a sintering at full density, in a sample obtained in a few seconds. We explore ESF process capabilities for the production of titanium matrix composites. This comprises the design and production of new materials, the in-depth study of their microstructural development, and their characterization for mechanical behaviour. General goals of the project are to design novel, high-performance titanium metal matrix composites for structural applications, and to contribute to our understanding of the links between composition and process parameters on one hand, and resulting microstructures and mechanical properties on the other hand, of metal matrix composite materials produced by the electro-sinter-forging process. This presentation will focus on in-situ Ti/TiC composites and their mechanical properties including their tensile behavior and elastic properties.

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