

A new processing route for achieving titanium architecture microstructure by coupling EBM and SPS

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A new route for elaborating architected microstructures with a controlled 3D arrangement is proposed. A combination of an additive manufacturing technique (Electron Beam Melting) and sintering (Spark Plasma Sintering) is used to generate a microstructural composite made of Ti-alloys. A lattice structure made of Ti6Al4V is first fabricated by Electron Beam Melting. The lattice structure is then filled with another Ti-alloy powder before spark plasma sintering. A bulk specimen is thus obtained with two different microstructures: one inherited from the EBM process in the lattice and the other one resulting from sintering in the matrix. This innovative technique will enable to achieve new types of metal composite with a controlled 3D architected designed for a specific application and presenting new type of mechanical properties.

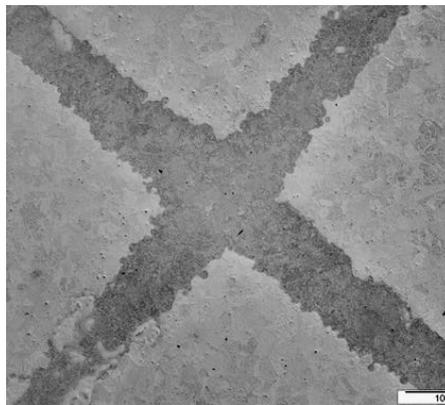


Figure 1: Macroscopic view of a Ti-Ti architected microstructure consisting of a lattice made with re-used Ti6Al4V powder and a matrix made of CP-Ti Grade 2 powder.