

MATERIALS AND STRUCTURES SYMPOSIUM (C2)  
Advancements in Materials Applications and Rapid Prototyping (9)

Author: Mr. Liang Xiaokang  
Capital Aerospace Machinery Corporation(CAMC), China, kangkang-1985@163.com

Dr. Peng Dong  
China Aerospace Science and Technology Corporation (CASC), China, peng852@hotmail.com  
Dr. Wang Guoqing  
China, wanggq@calt.casc

MICROSTRUCTURE AND MECHANICAL PROPERTIES OF SELECTIVE LASER MELTING  
TI-6AL-4V ALLOY

**Abstract**

As a type of / two phases titanium alloy Ti-6Al-4V possesses comprehensive mechanical properties, with wide service temperature range from -196 to 400, thus it is widely applied in aeronautics, astronautics, shipbuilding industry and medical areas. Otherwise, titanium alloy are difficult to machine in traditional methods for its high melting-point, chemical activity and huge deformation resistance. As the aeronautics and astronautics products required much higher service performances, it has become one of the hot research topics to fabricate light-weight, heat-resistance titanium components with complex structures. Selective laser melting(SLM) is a type of numerical solid free form technology, possessing the scatter+accumulate characteristic of additive manufacturing, showing an advantage for manufacturing titanium and superalloy with complex three dimensional surface, cavity, thin-wall and integrated structures. Ti-6Al-4V titanium alloy samples were fabricated using SLM technology, the microstructure evolution characteristic were analyzed, the influence of annealing treatment on the microstructure and the mechanical properties of deposited samples were discussed. Moreover, the electron beam welding performance of SLM Ti-6Al-4V samples were investigated.