

SMARTi- Microstructure and mechanical properties of additive manufactured Ti-6Al-4V



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Titanium is used in aerospace due to superior strength to weight ratio. The most widely used Ti alloy is Ti-6Al-4V, which was invented in the 1950's and has since then, apart from in aerospace components, been used in medical devices and prostheses because of its biocompatibility and corrosion resistance.

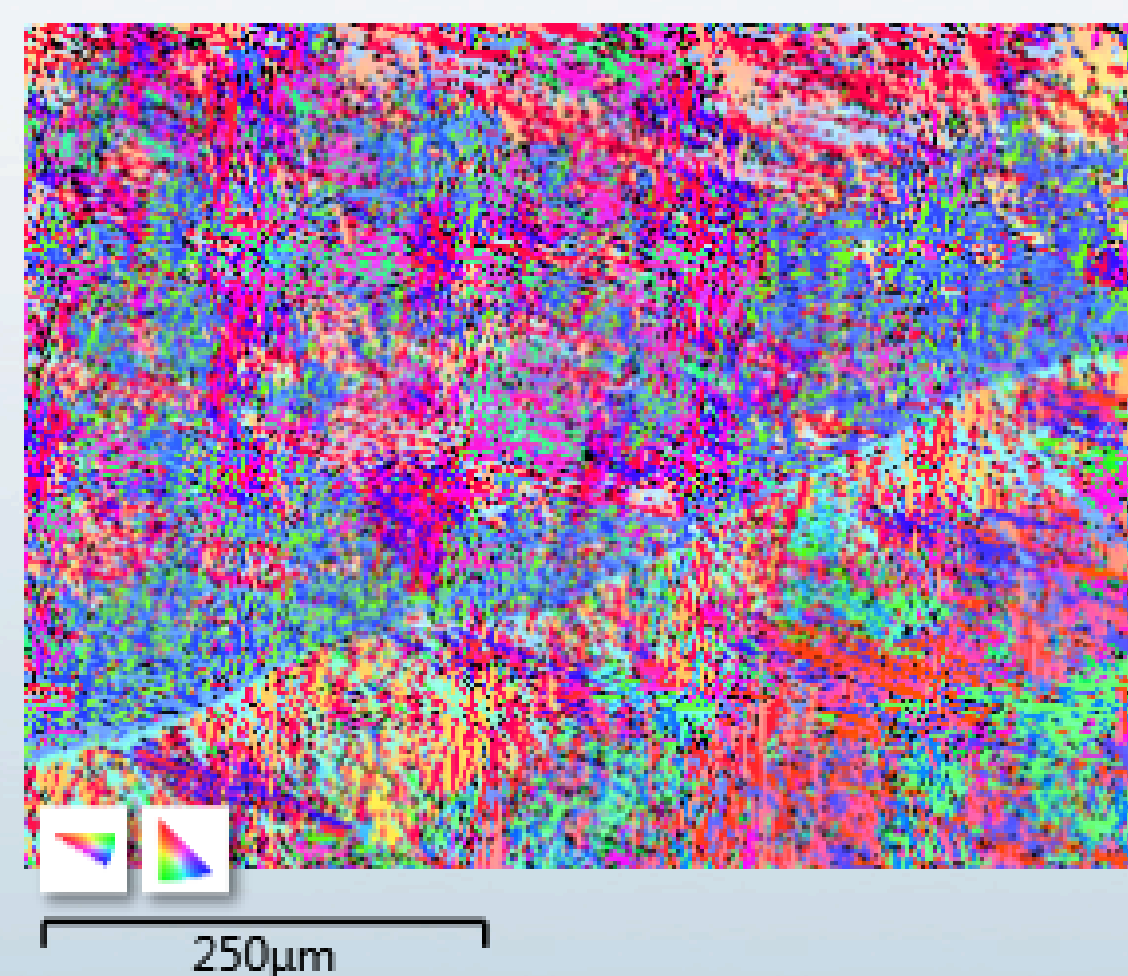
Additive manufacturing (AM) is a new manufacturing process where complex shapes are built in a layer by layer fashion. There are several types of AM processes, with different energy sources and material deposition techniques and it can be used for various aims:

- Reparation of components
- Surface coating
- Fabrication of high complexity parts in low volumes

This project will investigate the use of this promising method for producing the next generation Ti components for the Ariane 6 rocket. The scope is to characterize and to validate the material parameters of AM:ed Ti-6Al-4V. To achieve knowledge and understanding of the material behavior, the microstructure is being characterized and correlated to the mechanical properties. The influence of hydrogen is also being investigated.



Additive manufactured Ti-64 showing microstructure variations.



Electron Back Scatter Diffraction showing crystal orientations.

In collaboration with:



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(SMARTi stands for "Samband mellan additiv Metalldeponeringsprocess, mikrostruktur och mekaniska egenskaper för Ti-6Al-4V")