NANOTUN3D

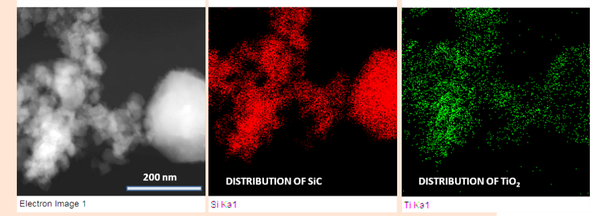
Development of the complete workflow for producing and using a novel nanomodified Ti-based alloy for additive manufacturing in special applications.

Metal AM Meets Nanotechnology

The NANOTUN3D workplan follows the main blocks towards the industrialisation of the nano-modified Ti alloy applications:

1 Development of core-shell nanoparticles

A “core-shell” concept and process (lab and industrial scale) for embedding ceramic nano-particles in the Ti6Al4V matrix.

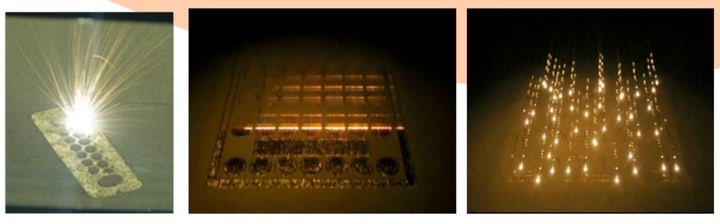


2 Powder for AM: SLM and EBM

The definition and scale up of two manufacturing routes for the NANOTUN3D material, based on the most popular powder production techniques: Gas atomization and EIGA.

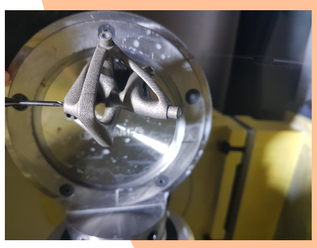
3 Development of AM process: SLM and EBM

The specification of the manufacturability requirements (process specification, design rules, reusability strategy, etc.) for processing the nanomodified Ti6Al4V by two AM technologies: Selective Laser (SLS) and Electron Beam (EBM).



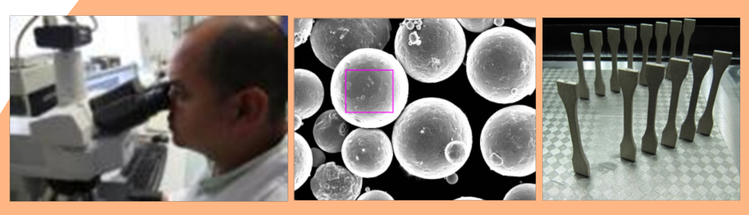
4 Development of AM post-process

The postprocesses needed by the AM NANOTUN3D part: machining, surface and heat treatments.



5 Material and process Qualification

A qualification approach of the developed material and transformation processes.

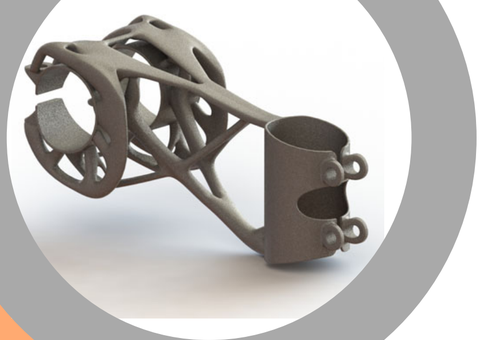


6 Health, Safety and Environment friendly

The development and Implementation of a Health and Safety Management System to ensure near 0 risks associated with the use on the NANOTUN3D technology from core-shell production to final part.

7 Lightweight Structural Metallic Parts

NANOTUN3D material will be an enhanced Ti6Al4V for AM with an improvement of the mechanical behaviour by 30% with no weight penalty in comparison with standard Ti6Al4V.
NANOTUN3D will be ready for developing new lightweight structural parts reducing the time for qualification by 40%.
NANOTUN3D will be ready for being used in a safe manner along its life cycle with near 0 risks.



Preliminary results:

Some results are achieved over the objectives foreseen. Five core-shell systems developed in lab and industrial scale. Two routes for manufacturing powder particles are defined (GA/EIGA). Decision made on early screening of the mixed/ consolidated samples on AM techniques (SLM/EBM). Qualification approach developed of material and process. Data on exposure and effects, together with available data from literature and physico-chemical characteristics is integrated to obtain a HSE management system.

More info at:

http://www.nanotun3d.eu/

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