MATERIALS

Powder metallurgy

One step manufacturing process of complex parts by SPS sintering

Current methods for manufacturing complex parts are not fully satisfactory: loss of material, length of process, materials with imperfect performances... Spark Plasma Sintering (SPS) is a rapid densification technique which allows to get materials exhibiting higher performances. Combining this technology with a method for producing complex shapes is today possible.

DESCRIPTION*

- Manufacturing process of complex parts to nearest dimensions, so called « near net shape »:
  - Use of a sacrificial material (possibly of different and less expensive kind)
  - Creation of mobile interfaces
  - Evolution of the mobile interface during the densification: support the formation of the part to its final dimensions
- One step process
- Manufacture of several parts in a single matrix
- Fast production of high performances parts

TECHNICAL SPECIFICATIONS

Material for final part	- Unconstrained choice (metals and alloys, ceramics…)
Material for mobile interface	- Non-reactive to sintering under implementation conditions - Non-reactive to the material to be sintered
Sacrificial material	- Requires sintering parameters near those of the final material - Not limited formatting method (conventional sintering, additive fab, SPS…)
Final part geometry	

COMPETITIVE ADVANTAGES

- Complex geometry
- Homogeneity of Density & Microstructure
- Near net shape
- Reduced loss of material
- Reduced manufacturing cost
- Manufacturing simplification & speeding up
- Parts with high mechanical performances

APPLICATIONS

- Turbine turbocharger
- Turbine blade
- Piston pin
- Valve
- Bearing ball
- Watchcase
- Dental implant
- Biomedical prosthesis

INTELLECTUAL PROPERTY

- Patent

DEVELOPMENT STAGE

- Technology validated at lab level

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LABORATORY

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