

## 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



Photos: CIRIMAT/TTT

### TECHNICAL SPECIFICATIONS

Material for final part	Unconstrained choice (metals and alloys, ceramics...)
Material for mobile interface	<ul style="list-style-type: none"> <li>- Non-reactive to sintering under implementation conditions</li> <li>- Non-reactive to the material to be sintered</li> </ul>
Sacrificial material	<ul style="list-style-type: none"> <li>- Requires sintering parameters near those of the final material</li> <li>- Not limited formatting method (conventional sintering, additive fab, SPS...)</li> </ul>

\*Technology requiring license rights.

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### 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 pending

### DEVELOPMENT STAGE

- Technology validated at lab level



### LABORATORY

- Team Nanocomposites and Carbon Nanotubes



### CONTACT

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