MATERIAL

Powder metallurgy

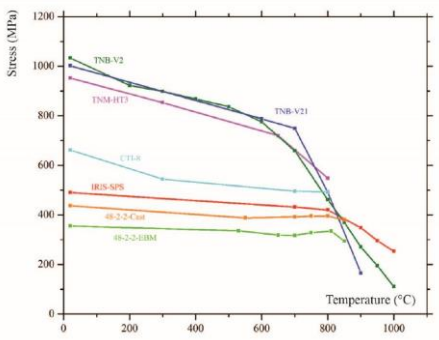
TOULOUSE TECH TRANSFER

Process for manufacturing high performance titanium aluminide part based on Spark Plasma Sintering

Titanium aluminide alloys (TiAl) combine high temperature resistance and low density. However, these alloys are brittle and have a limited creep resistance. Finally their manufacturing processes are complex and expensive.

DESCRIPTION*

- Manufacturing process by Spark Plasma Sintering (SPS) of high performance alloys:
  - Optimized conditions for SPS densification
  - Original powder composition including titanium aluminide
- Properties of the material obtained (IRIS-SPS):
  - Outstanding creep resistance at service high temperature
  - Good ductility at room temperature making assembly and maintenance easier
- Near net shape manufacturing
- No post heat treatment required



TiAl alloys yield strength

IRIS-SPS = Patented material

TECHNICAL SPECIFICATIONS

Secondary creep rate at 700°C/300MPa	3,5 10-9 s-1
Secondary creep rate at 750°C/200MPa	4,5 10-9 s-1
Plastic elongation at rupture at room temperature	1.6%
Nominal composition of the alloy	Ti: 49,90; Al: 48; W:2; B:0,08
Creep life at 700°C/300MPa	>4000 h

COMPETITIVE ADVANTAGES

- Unmatched compromise resistance/ductility at high temperature
- Homogeneity of microstructures
- Near net shape
- Reproducibility of material
- No heat treatment
- Rapidity of manufacturing
- Cost reduction

APPLICATIONS

- Turbine turbocharger
- Turbine blade
- Piston pin
- Valve

INTELLECTUAL PROPERTY

- Patent

DEVELOPMENT STAGE

- Technology validated at lab level

1	2	3	**4**	5	6	7	8	9

LABORATORY

CEMES

- Plasticity and Mechanical Properties

CONTACT

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