

FABRICATION OF LARGE COMPONENTS BY SPARK PLASMA SINTERING

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THE WORLD'S LARGEST HYBRID SPS FACILITY

SPS is an innovative sintering process that is emerging as a key enabling technology in the processing of numerous advanced materials however up to now the industrial upscale of the technology was limited due to the reduced size of the samples attainable and the material properties heterogeneities in large samples.

The main advantages of Spark Plasma Sintering (SPS) over conventional hot pressing and sintering are:

- Use of low temperature and mould

pressure

- Reduction of cycle times to just few minutes
- No need for sintering additives
- Fabrication of fully dense sintered components retaining nano- and ultrafine microstructures
- Sintering of composites with components that are solid state incompatible (metastable microstructures)
- Diffusion bonding of dissimilar materials

CINN's SPS is a **customized unit** equipped with a radial, inductive heating system to prevent radial temperature gradients in large-sized components or to facilitate the inductive heating of materials that are otherwise inadequately conductive at room temperature.

This facility is particularly suitable for industrial demonstration activities allowing the production of prototypes with dimensions up to **400 mm in diameter**.

SPECIFICATIONS

- Dimensions: 15 m x 6 m x 5 m
- 400 tons pressing force
- Maximum capacity of 1200 kW
- Voltage: 1-20 V
- Current: 40 kA
- Maximum Temperature: 2800°C
- Maximum sample dimensions: 400 mm

APPLICATIONS

- Defense: Ceramic armors, transparent IR windows, ultrastable mirrors...
- Energy: Thermoelectric materials, magnetic materials...
- Industry: Cutting tools, sputtering targets, wear resistant composite materials...
- Big Science: Oxide-Dispersion Strengthened Steels, bonding of dissimilar materials, IR windows, collimator materials...