

OPLAS

OXALATE PRECURSORS LASER
SINTERING Station

ISP 14R038 FPI 0007 A

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Patented process – CNRS, Université Paul Sabatier, Thales

OPLAS fulfills the functions of three machines: Oxalate dispensing, pick and place and laser sintering.

OPLAS is optimized for the production of small series with innovating processes of electronic components transfer.



- Assembly of power modules at low temperature (160-180°C) and low pressure with state-of-the-art thermal conductivity
 - Sintering thanks to crystallization of metallic nano-materials created during the process completion
 - Concentration on a sole machine of oxalate dispensing, component transfer and sintering
 - Integrated high accuracy dispensing system
 - Automatic process completion by detection of phase changes
 - Dynamic servo control of process parameters: temperature, pressure, position
- Initial and final materials with micrometric size -> no constraint due to nano-particles regulation
- Optimized sintering quality : no void > 50µm, compatible with spatial applications
 - Assembly under vacuum or inert gas
 - Overheating localized on sintering area, protecting the component from overheating
- Process traceability and analysis for parameter optimization



Oxalate Precursors LAser Sintering Station

OXALATE DISPENSING SYSTEM

An automatic dispensing system allows the dispensing of an oxalate layer with an adjustable thickness from 50µm to 300µm with an accuracy of 5µm

LASER

As basic version **OPLAS** includes a continuous laser heat input YAG of 600W. This power allows the lead frame to reach a temperature of 250°C within 2s. The spot size is configurable from diameter 4 to 16mm with a « Top Hat » energy distribution. The temperature is homogeneous on the subordinate face of component. The overheating power is piloted throughout the process.

MONITORING

- Programming: The Man-Machine-Interface (MMI) allows the operator to select the program to be used during his manufacturing campaign. Beforehand programs are created on a user-friendly interface in the form of steps. These steps define the component sintering/soldering process.
- Process tracking: During the process cycle, displacements and force are displayed in real time on MMI. The operator can keep track of the process and check that the transfer cycle complies with scheduled sequences.
- Analysis and post-treatment: Parameters and data are saved for post treatment analysis of events that occurred during process cycle. This analysis allows process improvement and the combination of laser with electromagnetic head operation.

ASSEMBLY PROCESSES

OPLAS can integrate additional functions such as:

- automatic positioning assisted by camera,
- work area inerting by vacuum or inert gas,
- component rotation
- Automatic change of laser spot size...

MACHINE TECHNICAL DATA

Laser: YAG 600W continuous / integrated cooling unit (air cooling)

Electrical consumption: 5kVA

Electromagnetic head: Sintering force: up to 200N, travel resolution: 0.1µm

Electromagnetic head arm: 3 servo axes, interpolated: X,Y,Z

X,Y axes: linear motors and precision measuring

Z axis: ball screw / motor / Brushless brake absolute encoder

Axes positioning repeatability : ± 1µm

Laser head: Beam type « Top Hat », 3 interchangeable head optics (3x3/8x8/16x16)

Laser head arm: X,Y Axes: linear motors and precision measuring

Machine size: 1400mm x 1200mm x 2000mm

Machine weight: 1 ton

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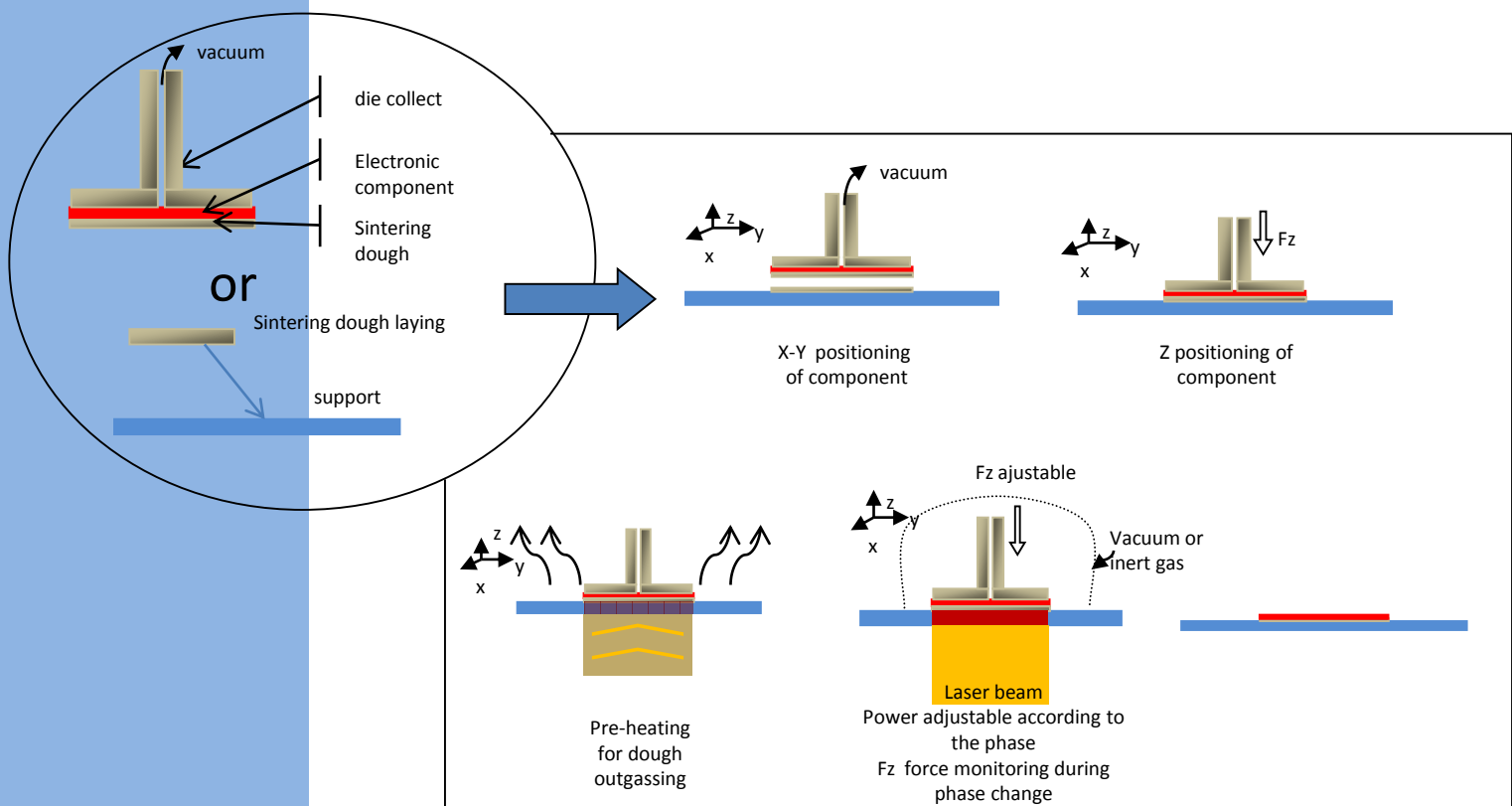
Oxalate Precursors Laser Sintering Station

Oxalate sintering process

- Metallic nano-materials sintering (low sintering temperature)
- Process patented by CNRS, Université Paul Sabatier, Thales (EP 2540437 A1),
- Licence granted to ISP SYSTEM
- Transformation of micrometric materials into nano-materials occurs just before sintering process, inside sintering joint → no health risk due to manipulation of nano-particles (primary and final materials are micrometric)
- Final joint is 100% metallic, thickness between 10 and 50µm

Sintering with OPLAS

Force applied to component and accurate management of laser heat input allow the user to explore all possible combinations of pressure and temperature in order to define the optimal laser sintering process



Advantages of Oxalate precursors sintering

- **Low sintering temperature (160-180°C)**
- **Low sintering pressure**
- **State-of-the-art electrical and thermal conductivity**
- **Excellent thermal resistance of assembly after sintering (> 500°C)**
- **No risk for the health due to nano-materials (Initial and final materials are micrometric materials)**

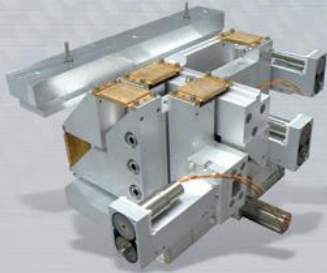




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MICRO-NANO
POSITIONING &
OPTO MECHANICS



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Providing highly innovative and custom solutions is our commitment. Our expertise in precision engineering helps us deliver solutions fitting customer's challenging application needs.

HIGH PRECISION
SPECIAL MACHINE
& ROBOTIC



ISP System's activity is based on 4 lines of products:

- > **Micro-nano positioning & Opto-mechanics**
- > **Electrical embedded actuators**
- > **High precision special machines & Robotics**
- > **Electrical medical devices**

EMBEDDED
ACTUATOR



Customized products can be offered to fully dedicate turnkey solutions, including design, testing and manufacturing. Our multidisciplinary skilled teams, specialists in their fields, have gained precision engineering knowledge.

Our competences will offer you thorough and adapted solutions for your applications. Thanks to the OEM solution, we will allow us to find and propose the finest development of your projects.

MEDICAL DEVICE



ISP SYSTEM delivers annually up to 10 000 micro-positioning devices and opto-mechanism, 10 000 embedded actuators, 50 machines, 5000 electrical medical devices mainly in Europe. **ISP SYSTEM** has been recently extending its activity all over the world.

ISP SYSTEM provides a spectrum of services including:

R&D, Design, Prototype Manufacturing, Industrialization, Mass production, Commissioning, After Sales ...

ISP SYSTEM is involved in many sectors of the industry and research as:

AEROSPACE | AUTOMOTIVE | DEFENCE
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ISP SYSTEM was founded in 1997. The company is a SME of 80 skilled peoples (including its factories), 30 % of them are graduates. **ISP SYSTEM** is Quality certified ISO 9001, ISO 13485 and EN 9100. **ISP SYSTEM** is member of competitiveness clusters such as "Aerospace Valley ", "Alpha-Route des Lasers" and "Cancer - Bio Santé ".