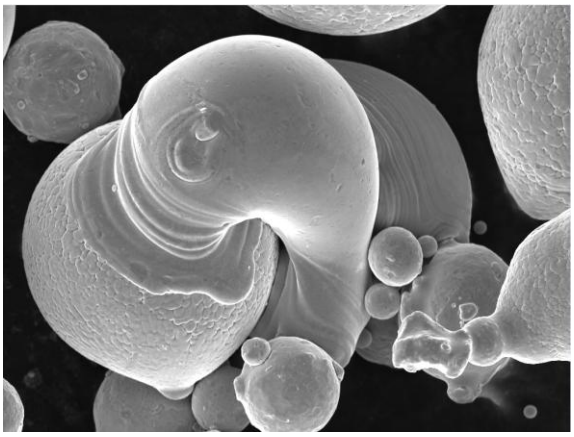
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Powder Analysis

Material expertise for additive manufacturing and powder metallurgy

Challenge

Mastering the metal powder quality is a key factor to success for additive manufacturing and all advanced shaping processes.
Raw material variability, recycling, supplier, production process and suitability process/material may impact directly the final parts quality, their performances and their production cost.
Industries need reliable data to qualify the raw material, secure their production line and boost their development.



SEM image of a powder sample

Solution

We combine our testing capabilities, knowledge of new processes, and exprtise about powder to support your studies and analysis needs:

- Physical, chemical and metallurgical characterization
- Expertise in additive manufacturing and powder metallurgy
- Correlation between powder properties, process parameters and part quality
- Support in defining technical specifications
- Supplier and material qualification
- Powder recycling and aging studies

Customer benefits

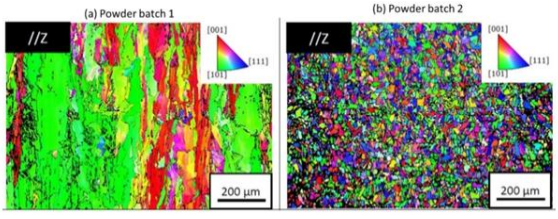
- Guaranteed quality: Reduction of defects and non-conformities through precise material characterization
- Process optimization: Improved control of parameters for high-performant and reliable parts
- Cost reduction: Fewer unnecessary tests, rejections, and delays thanks to targeted recommendations
- Time savings: Proactive issue identification to accelerate time-to-market
- Technical Expertise: Access to advanced analysis and expertise, as well as advice on implementation and post-processing

Applications

Additive Manufacturing:
L-PBF, DED powder/wire & laser/arc

Powder metallurgy:
Powder-HIP

Other granular materials:
Ceramics, welding flux, sands ...



Charts illustrating the impact of raw material selection in L-PBF

Your performance
is **our** everyday **commitment**

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Technical information

Tests capabilities for powder :

Powder analysis:

- Sampling equipment
- Morpho-granulometric analysis
- Rotary drum flow analysis
- Sieve analysis
- Bulk and tapped density measurement
- Flowability measurement (Hall and Gustavsson cones)

Physical properties:

- Scanning electron microscope (SEM) with EDS, EBSD, and FIB
- Transmission electron microscope (TEM)
- X-ray µtomography

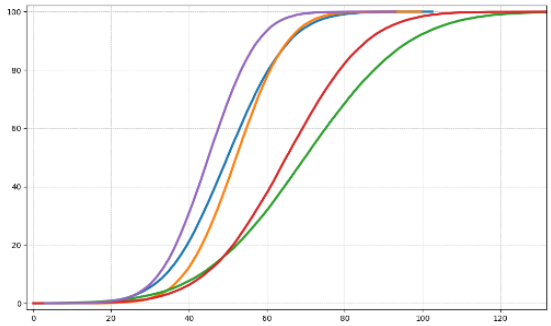
Chemical characterization:

- ICP-OES / ICP-MS analysis
- C, S / N,O analysis
- Humidity measurement

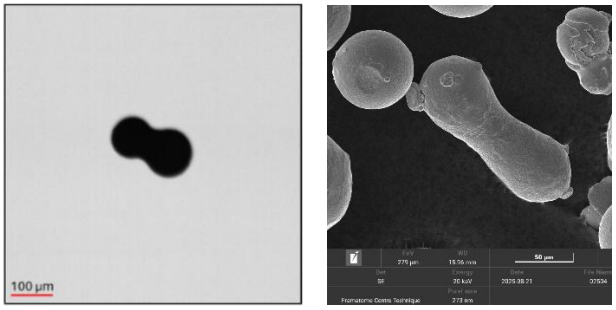
References

Our services are integrated within the Framatome Technical Center and benefit from this expertise available across its multi-disciplinary teams. The Technical Center is:

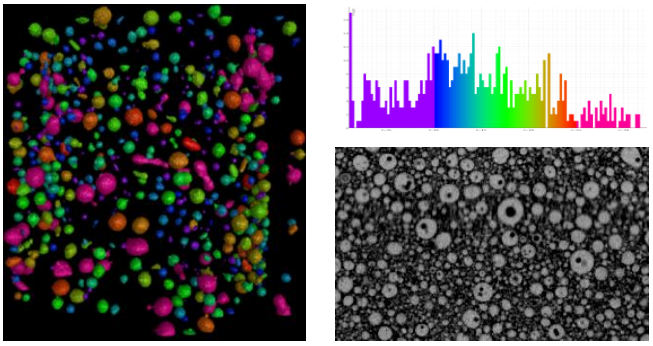
- ISO 9001 / ISO 19443 certified
- ISO/IEC 17025 accredited for a wide range of testing and measurement capabilities



Powder size distributions



Optical and SEM images of particles



µTomography: powder size classification and porosity analysis





Application examples

- Computed tomography analysis for 3D morphology and internal porosity assessment
- Evaluation of the performance and limitations of post-processing heat treatments
- Comparative studies to support the selection of raw material suppliers
- Development of functionally graded materials through powder blending and Hot Isostatic Pressing (HIP)

To go further

- Process development and parameter optimization
- Complete characterization of finished parts (mechanical, metallurgical, and microstructural analyses)
- Advanced powder characterization (nanoindentation, XPS, and other specialized techniques)

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Contact : laboratoireMGMI@framatome.com
www.framatome.com

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