IRT M2P

Institut de Recherche Technologique

Matériaux Métallurgie et Procédés

ANALYSIS & CHARACTERIZATION

Understanding material properties and their link to structure and processes

In order to design new materials – or improve existing ones – it is necessary to characterize them and obtain insight into how processing parameters influence structure and properties.

M2P can provide a wide variety of testing platforms as well as analysis and characterization facilities for this need: chemical, physical, thermal, microstructural, mechanical and dimensional for metals, metal powders, multi-material assemblies and composites.

Our equipment also reproduces the thermal, chemical and mechanical stresses encountered under industrial conditions, in order to better understand and improve materials.

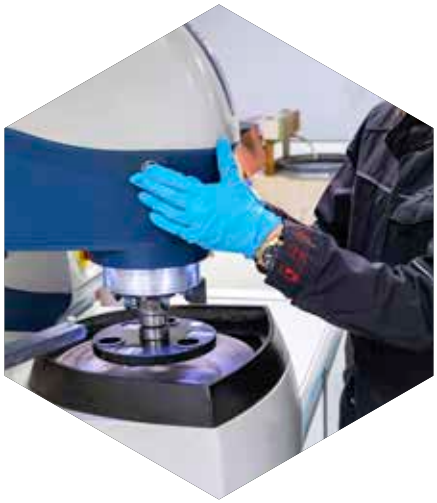
EXPERTISE & SERVICES

Characterization and analysis equipment are used in our collaborative projects, and are also available on-demand for private research

Resources and skills for punctual or regular analyses for industry or academia

Development of reliable methods to monitor and control processes, improve their performance, and guarantee the quality of the materials produced

Interpretation of results by a group of experts in the field of chemistry, metallurgy, mechanics and physics



TECHNOLOGY

Metal powders
- Flowability by Hall and Carney
- Particle shape and size analysis: dynamic image analysis and Keyence microscopy
- Chemical analysis by X-ray fluorescence, ICP-OES
- Dissolved gas analysis: ONH, CS
- Sample preparation/handling
- Access to a network with additional testing

Mechanical & Dimensional
- Hardness measurement with macro / microdurometer
- Coating adhesion measurement by indentation
- Mechanical tests: quasi-static tension-compression instrumented tests on metals, composites, multi-material assemblies
- Fatigue tests on metals, composites, multi-material assemblies using a servo-hydraulic mechanical testing machine
  > Cyclic tension-compression, Wöhler curves (SN or FN curves), creep
  > Instrumentation of tests with third-party means (thermal camera, etc.)
- Rotational bending fatigue tests (ISO 1143:2010 - Qualification by Airbus Helicopters)
- Tribological tests - Taber
- 3D measurements with 7-axis measuring arm
  > 3D probing and 3D scanning for the digital reproduction of the geometry of all types of metal parts, textile preforms or composite parts
  > Geometric differences between CAD model and real part

Microstructure
- Metallographic preparation (cutting, hot mounting presses, mechanical and ionic polishing)
- Different scales microscopies: Binocular, Optical and Secondary Electron Microscopy (SEM FEG)
- Topographic surface measurements: 3D digital microscope, Interferential microscope, Optical profilometry, Roughness meter
- Thickness measurement of coatings and surface layers: Coulometric methods, non-contact and non-destructive measurement ENOVASENSE®
- Measurement of closed porosities, detection of coating adhesion problem

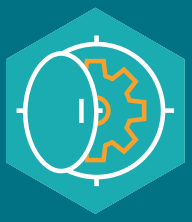
Physical & Chemical
- Solid-state chemical composition: Optical emission spectrometry, X-ray fluorescence (XRF), SEM-EDX, Glow discharge spectrometry
- Chemical composition of solutions: ICP-OES, electrochemistry
- Dissolved gas analysis: ONH, CS
- Corrosion resistance: salt spray, electrochemistry
- Crystallography - XR diffractometer
- Characterization of the electrical conductivity of coatings

Further information on our activities www.irt-m2p.fr

RELATED ACTIVITIES

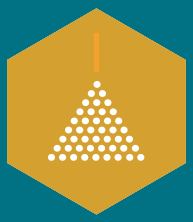
Analysis & Characterization is cross-sector and involve all activities at M2P.

MECHANICAL SURFACE TREATMENT



HEAT & THERMOCHEMICAL TREATMENT

SURFACE TREATMENT & COATINGS



METAL POWDERS

ADVANCED FOUNDRY

LIFE CYCLE ASSESSMENT & RECYCLING

MULTIMATERIALS JOINING

COMPOSITE MATERIALS

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About IRT M2P

The Institute of Research and Technology for Materials, Metallurgy & Processes (IRT M2P) is your partner for developing innovative products and processes to accelerate your company's growth.

We bring our expertise, a wide array of state-of-the-art semi-industrial technological platforms and a network of academic labs to the R&D projects we carry out with our more than 120 industrial partners.

Contact us to discover our 9 areas of technological expertise:

> Advanced Foundry
> Life Cycle Assessment & Recycling
> Metal Powders
> Surface Treatment & Coatings
> Mechanical Surface Treatment
> Heat & Thermochemical Treatment
> Composite Materials
> Multimaterials Joining
> Analysis & Characterization

Working together

- Multi-partner research projects with private/public co-funding
- Private research studies, tailor-made services
- Small series & prototype production
- Training

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