CERIC

Central European
Research Infrastructure
Consortium

Open for
Industry

# Automotive and Aerospace

CERIC Partner Facilities provide support to the aerospace and automotive industries on advanced materials and devices to meet critical safety and performance requirements, assessing the capabilities and limitations of materials and systems even in extreme conditions.

- Components
- Manufacturing
- Composition, microstructure characterisation and behaviour of metals and alloys
- Catalysts, batteries and fuel cells
- Coatings, paintings and thin films
- Electrochemical systems, semiconductors, superconductors and topological insulators
- Polymers, composites and ceramics
- Defects and damages

www.ceric-eric.eu

## Components

CERIC can carry out components' analysis with high precision techniques, investigating deep layers of matter (even inside a container or machine), surface roughness, irradiation damage, residual stresses and irregularities, also performing 2D and 3D imaging, even during operations. CERIC has the capacity to analyse various kinds of materials in solid, powder, liquid and pressurized gas forms where no reference materials exist.

## Manufacturing

CERIC offers studies of the inside of large pieces of equipment, and inside vessels that have different conditions of pressure, temperature and environment applied for material manufacturing and testing (glass, ceramic, alloys). Fabricating high precision components that have to be coupled with precision systems, such as micro-gears, microparts for watches, microturbines and microfluidic channels, can also be carried out.

## Composition, microstructure characterisation and behaviour of metals and alloys

CERIC performs microstructural and morphological characterisation of nanostructured materials: defining the composition, crystal structure, texture, shape on a nanometric scale, aggregation and thermal behaviour through residual stress test and defects. CERIC can also follow the evolution of alloy composition and microstructure during operation and study the distribution of two-phase systems such as metal alloys.

## Catalysts, batteries and fuel cells

CERIC Partner Facilities can perform in-depth studies down to nanometer size of new materials applied to systems for renewable energy. Analyses of surface, interface and electronic properties and behaviour of catalysts, batteries and fuel cells can be done even during operation, including non-destructive probes. New materials for Li-ion batteries can be studied: composition of materials impurities and mixtures of polymorphs.

## Coatings, paintings and thin films

Among other things, CERIC can provide support with depth profiling of coatings or thin and multilayers films down to micro and nano size, including composition and analysis of dispersion.

## Electrochemical systems, semiconductors, superconductors and topological insulators

CERIC can offer studies of chemical and electronic properties and structure of materials such as semiconductors, high-temperature superconductors, topological insulators, low-dimensional materials and related devices. Electrochemical systems can also be studied in operando, including surface behaviour and surface interactions under realistic conditions down to nanoscale.

## Polymers, composites and ceramics

CERIC offers high precision analyses to understand the composition, properties, behaviour and interactions of modern smart materials, which can have nanoscale structure (composites, polymers with or without nanofillers). CERIC defines aggregation and microstructural defects to solve issues related to material characteristics and why problems related to their functioning occur.

## Defects and damages

CERIC offers the analysis of microstructural defects, inhomogeneity of casted materials, water uptake of solids, analysis of artefacts and machines, as well as dynamic measurements to follow time-dependant processes. CERIC can test the corrosion of metals applied in extreme conditions and intolerance of shot blasting systems to metalworking fluids. Characterisation of individual aerosol particles collected on filters can be also carried out.