The Elemental and Isotopic Analysis Facility aims to carry out the relevant characterization of the surface and bulk of materials developed at LIST, other research centres or within industries. The use of complementary techniques, namely Dynamic-Secondary Ion Mass Spectrometry (D-SIMS) and electron spectroscopies (XPS, AES, UPS) allows us to determine the elemental composition (from H to U), provide chemical state information on the detected elements and trace isotopes with excellent sensitivity (from < ppm up to 100%).

By combining multiple capabilities for sample analysis (large areas or micro-analysis, mapping, depth profiling, angular analysis), a complete characterization and description of a wide range of materials compatible with ultra-high vacuum can be achieved. The facility addresses problematic areas such as adhesion, surface and interface chemistry, failure analysis, element and isotope tracking, corrosion, segregation or diffusion, among others.

Our analytical capabilities and skills have already been implemented in the automotive, packaging, building, microelectronic and polymer industries, as well as in the pharmaceutical industry and cosmetic research and development.

Our facility is the only public lab worldwide equipped in SIMS with both a CAMECA NanoSIMS and a CAMECA SC-Ultra, instruments dedicated to imaging with an optimized lateral resolution (down to 50 nm) and to depth profiling with an optimized depth resolution (down to 1 nm), respectively.

**Equipment**

- SIMS (Secondary Ion Mass Spectrometry): CAMECA NanoSIMS 50, CAMECA IMS-6F modified, CAMECA SC-Ultra
- XPS - UPS (X-Ray Photoelectron Spectroscopy, Ultra-violet Photoelectron Spectroscopy): Kratos Axis-Ultra DLD
- AES (Auger Electron Spectroscopy): ThermoVG microlab 350
- EDX (Energy Dispersive X-ray)
Expertise and possible applications

- Analyses of bulk materials, coatings, films and multilayers
- Determination of the elemental composition of materials
- Quantification of contaminants in solids
- Diffusion in materials, grain boundaries, surfaces and interfaces
- Detection of trace elements
- Quantification of dopants
- Isotopic tracing
- Imaging and depth profiling

Examples of analyses

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