

Molecular Analysis

The Molecular Analysis Facility responds to the growing demand from industry for analytical capabilities and skills relative to organic or composite materials and coatings. It focuses on both molecular imaging and identification and relies mostly on TOF-SIMS (Time-Of-Flight Secondary Ion Mass Spectrometry) and High-Resolution (HR-MS) Mass spectrometry (Orbitrap).

Additionally, a wide range of complementary techniques (MALDI-MS, GC/MS, GPC/fractionation, LC/MS, FT-IR) are available to optimally choose the right combination of tools to address the partner's needs.

With the ability to address topics related to the detection or localization of small (bio)molecules, resins, or even high molecular weight polymers, the Molecular Analyses Facility offers on-demand analytical developments in very wide range of applications. These latter namely include defect analyses, monitoring of production/synthesis processes and reverse engineering, as well as biological tissue imaging.

Our analytical capabilities and skills have already been helpful for the glass, steel, packaging, building, and polymer industries, as well as the organic microelectronics, pharmaceutical and cosmetic industries.

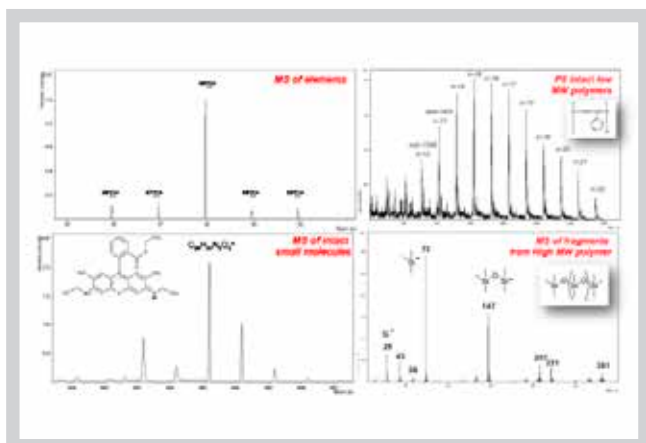
Equipment

- ▶ TOF-SIMS (Time-Of-Flight Secondary Ion Mass Spectrometry, IonTOF)
- ▶ High-Resolution Mass spectrometry (Thermo Scientific Orbitrap Elite), equipped with ESI, APCI, AP-MALDI, DART ionization sources
- ▶ MALDI-TOF (Matrix-Assisted Laser Desorption/Ionization - Time-Of-Flight Mass Spectrometer, Autoflex III Smartbeam, Bruker)
- ▶ Gel Permeation / Size Exclusion Chromatography / HPLC automated gradient system with integrated Fraction Collection (Thermo Scientific Ultimate 3000)
- ▶ Gas Chromatography (Varian Saturn 2000 GC/MS) with PAL auto-sampler for liquid, Headspace, SPME injections
- ▶ Fourier Transform – Infra-Red (micro-)spectroscopy (Bruker Vertex 70) with Hyperion microscope, Grazing Angle, Attenuated Total Reflectance, Gas Cell and Transmission modes

Expertise and possible applications

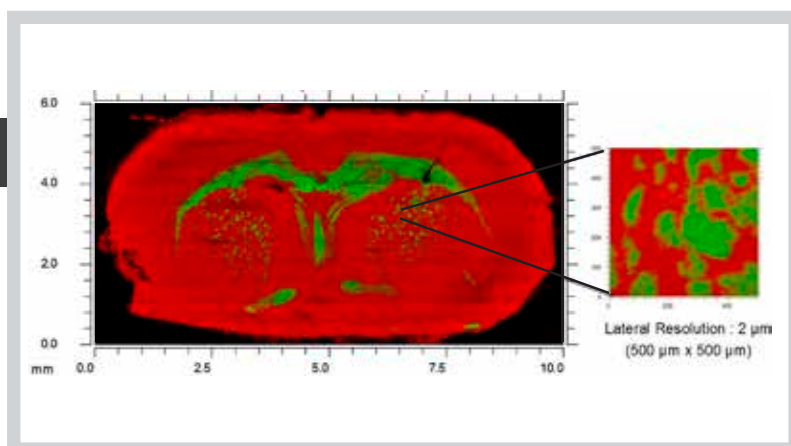
- ▶ Studies on adhesion defect
- ▶ Identification of surface contaminations on materials
- ▶ Process/synthesis monitoring
- ▶ Studies on (plasma)-polymerization for coatings
- ▶ Drug delivery
- ▶ Molecular histology
- ▶ Studies on cosmetic formulation stability
- ▶ Studies on polymer-based formulation ageing
- ▶ Molecular composition of organic materials (polymers, additives...)
- ▶ Retro-engineering
- ▶ Analysis of VOCs from materials
- ▶ Polymer/additives characterization after GPC fractionation
- ▶ Biological tissue imaging

Examples of analyses



◀ TOF-SIMS Analysis of elements, intact molecules, intact oligomer and high MW polymers

(Matrix-Enhanced)-TOF-SIMS Molecular imaging of biological tissue: sub-structures investigation with high lateral resolution (down to 400µm) ▶



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