

SURFACE AND NANOANALYTICS



INNOVATION

ENGINEERING

OPTIMIZATION

Single-Source Solutions – Combined Analytical Methods

Importance of surface and nanoanalytics

Surfaces and interfaces play a key role in many technical processes and products. Structures on the microscopic or molecular level often have a substantial influence on the macroscopic properties of materials and the course of processes. At Bayer Technology Services we identify these structure-property correlations for you. This makes it possible

- to offer crucial assistance in product development
- to identify starting points for product improvements through the use of systematic characterization
- to perform causal analysis of product quality problems and provide a basis for developing solutions

We use spectroscopic and microscopic methods to analyze

- the chemical composition of surfaces with depth information from the nm to the μm range
- the topography of surfaces with a lateral resolution down to the nm range
- the morphology of interfaces and structural elements (bulk microstructure)
- the distribution of nanoparticles in various matrix materials
- the particle concentration in aerosols

We do this by drawing on the expertise available at Bayer Technology Services, state-of-the-art analytical equipment and a network of national and international institutions and universities.



Using our expertise and experience to find solutions

By deploying a combination of modern methods and physical and chemical expertise in the field of surface physics and nanoanalytics, we can help you to solve your problems.



Crater in a coated surface (light microscopy image)



Bayer Technology Services
Powering Your Performance

Our analytical methods

We use the following methods to investigate your problems:

Spectroscopy:

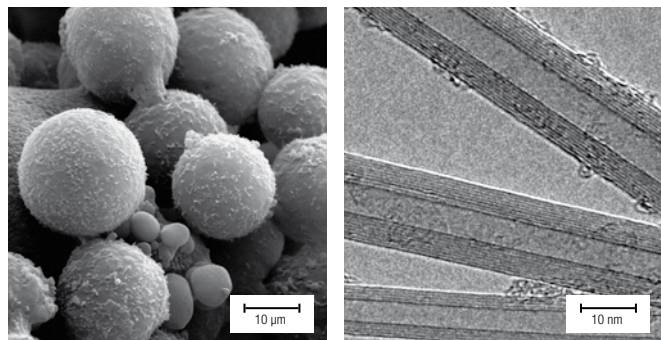
- SIMS (secondary ion mass spectrometry)
- ESCA/XPS (X-ray photoelectron spectroscopy)
- EDX (energy dispersive X-ray spectroscopy)
- Raman spectroscopy
- IR and UV vis spectroscopy

Microscopy:

- SEM/ESEM (scanning electron microscopy)
- TEM (transmission electron microscopy)
- AFM (atomic force microscopy)
- Profilometry
- CLSM (confocal laser scanning microscopy)
- LM (light microscopy)

Aerosol measurements:

- SMPS (scanning mobility particle sizer)
- CPC (condensation particle counter)
- NAS (nanoparticle aerosol sampler)
- PDM (portable dust monitor)



Left: Biological cell material (SEM image)

Right: Internal structure of carbon nanotubes (TEM image)

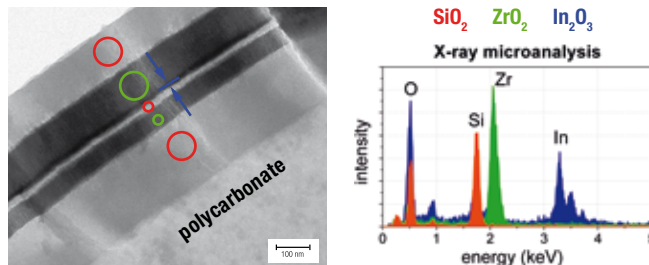
Focal points of our work

As part of a major chemical and pharmaceutical company, we address a wide variety of problems from diverse fields. Typical tasks cover subject areas such as

- Nanoanalytics, e. g. particle distribution in nanocomposites
- Adhesion and wetting phenomena, e. g. coating and foam adhesion, adhesion of electroplated layers
- Troubleshooting and quality assurance, e. g. contamination and flaws in polymer materials
- R&D support in material development, e. g. surface functionalization in the area of biosensors
- Nanoaerosols, e. g. nanoparticle concentration in ambient air

Experience and quality from a single source

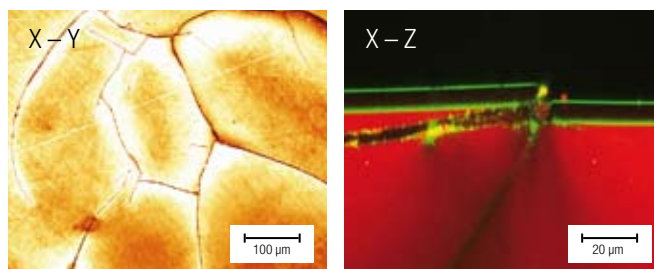
Our services in the fields of surface and interfacial physics and nanotechnology are practice-proven in the daily operations of our customers. We can draw on many years of experience, both with methods and with a wide variety of sample materials.



Layer analysis of an eyeglass lens coating (TEM image and EDX analysis)

We provide crucial support for the transfer of knowledge from development to practice and vice-versa with our continuous work on internal and external research projects, some of which are publicly funded. A multitude of manufacturers rely on our analytical work for the quality control of their products. Needless to say, our results are completely unbiased and we guarantee the confidentiality of proprietary data.

Having direct access to a comprehensive range of combined methods enables our team of scientists from the fields of physics, chemistry and engineering to offer the right analytical technique or combination of methods for your problem. This gives us the possibility to achieve an optimal price-performance ratio for you. Your orders are processed promptly; in some cases we can deliver the results in just a few hours. This equates to a real cash savings in the event of a production outage, for example.



Crack pattern in a coating (CLSM images): Plan view of the surface (left); optical section through a crack structure (right)

Our laboratories process your orders according to recognized rules of quality management. We have ISO 17025 accreditation for selected processes of the SEM, TEM and SIMS analytical methods.

