



Analytical methods available at the COPT Center

The COPT Center provides its customers numerous state-of-the-art analytical methods for different purposes:

- Examination of the chemical, optical, electrical and energetic properties of materials.
- Investigation of surface properties and morphology of thin films.
- Electro-optical characterization of devices.
- Determination of the suitability of barrier layers.
- Evaluation of inks.

In addition, it is possible to receive the raw data for conducting your own evaluations.

To receive detailed information about our methods, the equipment and analytical services as well as customized offers, please contact us:

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The COPT Center offers its customers several options to solve their analytical problems.

- Equipment-only: Equipment can be rented and self-operated.
- Equipment + operator: Rent equipment and have an operator perform the measurement.
- Equipment + operator + data evaluation: Full-service in which an operator performs the measurement, ensures high data quality and provides an analytic report.

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	Method	Application
FILMS & SURFACES	UV/VIS-Spectroscopy	<ul style="list-style-type: none"> - Light absorption properties - Identification of materials / impurities - Specular reflectance measurements
	Photoluminescence	<ul style="list-style-type: none"> - Light emission properties - Photo-physical material characterization
	Optical microscopy	<ul style="list-style-type: none"> - Inspection of surface structures
	Confocal microscopy & white light interferometry	<ul style="list-style-type: none"> - 3D topography of surfaces (measurement area: μm^2 - mm^2; lateral resolution: nm - μm; vertical resolution: nm) - Determination of surface roughness
	Raman microscopy	<ul style="list-style-type: none"> - Identification of materials by their structural fingerprints - Tracking of changes in molecular structures or crystallinity
	Ellipsometry	<ul style="list-style-type: none"> - Determination of layer thicknesses and (spatial) sample composition - Wavelength dependent determination of refractive index (n) and extinction coefficient (k), important parameters for optical modeling
	X-ray diffraction	<ul style="list-style-type: none"> - Analysis of film morphology / crystallinity using small or wide angle x-ray scattering (SAXS, WAXS) - Surface sensitive analysis with grazing incidence small angle x-ray scattering (GISAXS) - Characterization of nanoparticles
	Contactless layer characterization	<ul style="list-style-type: none"> - Large area layer thicknesses determination - Estimation of spectral material properties $n(\lambda)/k(\lambda)$ - Determination of surface roughness - Refractive index profiling ($n(z)$)
	Scanning electron microscopy (SEM)	<ul style="list-style-type: none"> - Analysis of surface topography and morphology with resolution in the nanometer-range - Preparation of cross-sections by focused-ion-beam (FIB) milling: examination of multi-layer samples - Energy-dispersive X-ray spectroscopy: elemental composition with a resolution of approx. $1 \mu\text{m}$
	Photoelectron spectroscopy (PES)	<ul style="list-style-type: none"> - Photo-electron and inverse photo-electron spectroscopy (UPS; IPES): Determination of molecular orbital energies, valence / conduction band and work function, ionization energy,... - X-ray photoelectron spectroscopy (XPS): Determination of elemental composition
	Tactile Profilometry	<ul style="list-style-type: none"> - 3D topography of surfaces (measurement area: mm^2 - cm^2; lateral resolution: μm; vertical resolution: nm) - Determination of surface roughness - Analysis of material stress tests
	Atomic Force Microscopy (AFM)	<ul style="list-style-type: none"> - 3D topography of surfaces (measurement area: μm^2; lateral resolution: nm; vertical resolution: nm) and Determination of surface roughness - Electrical characterization of surfaces - Investigation of morphology
DEVICES & ENCAPSULATION	Water vapor transmission rate measurement	<ul style="list-style-type: none"> - Test of water barrier properties of the whole device encapsulation or single encapsulation components (foils, adhesives, ...)
	4-Point measurement	<ul style="list-style-type: none"> - Determination of sheet resistance / layer conductivity
	Electro-optical / electrical characterization of devices	<ul style="list-style-type: none"> - Electro-optical characterization of (organic) light-emitting diodes and solar cells - Electrical characterization of transistors
	Device lifetime tests	<ul style="list-style-type: none"> - Operating lifetime of (organic) light-emitting diodes or (organic) solar cells
INKS	Viscosimetry	<ul style="list-style-type: none"> - Determination of the viscosity of a fluid / solution
	Contact angle measurement	<ul style="list-style-type: none"> - Estimation of the wetting behavior of fluids / solutions - Determination of the surface tension of fluids / solutions
	Printing & Coating	<ul style="list-style-type: none"> - Deposition tests with screen, inkjet and gravure printing