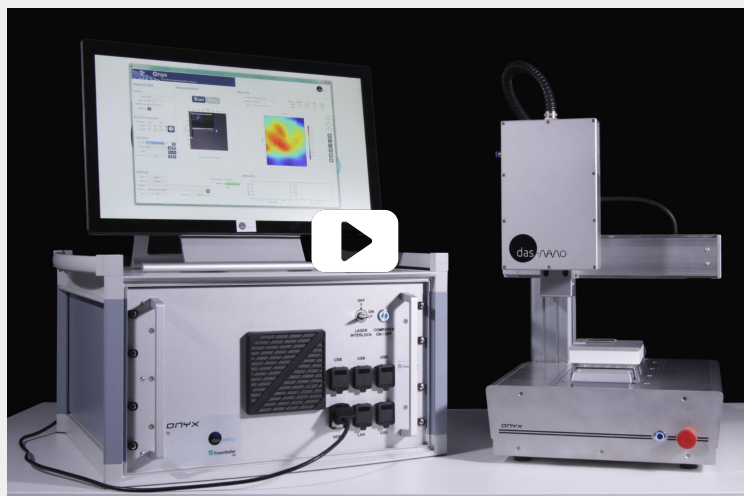


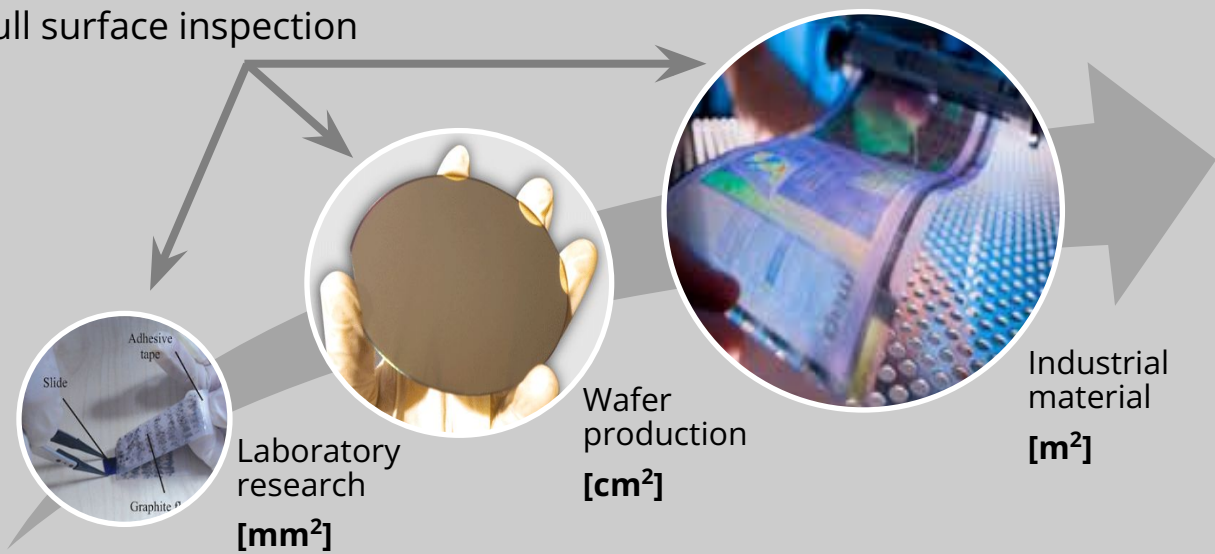
das-Nano Onyx

Terahertz research platform for bulk, thin films and 2D materials






das-Nano Onyx is the first system in the market designed to provide a full-area non-destructive characterization of electrical properties of bulk, thin films and 2D materials.







Full surface inspection



Improve and fully check your quality control process with das-Nano Onyx

-  **Electrical parameters** characterization system
-  **Contactless** and **non-destructive**
Terahertz-based system
-  **Full surface map** and single point of electrical properties
-  **Ultra-fast & high resolution** characterization
Up to 12 cm²/min & 50 μm
-  **Wide range of materials**
Graphene, semiconductors, ITO, GaN, NbC, IZO, ZnO, PEDOT...

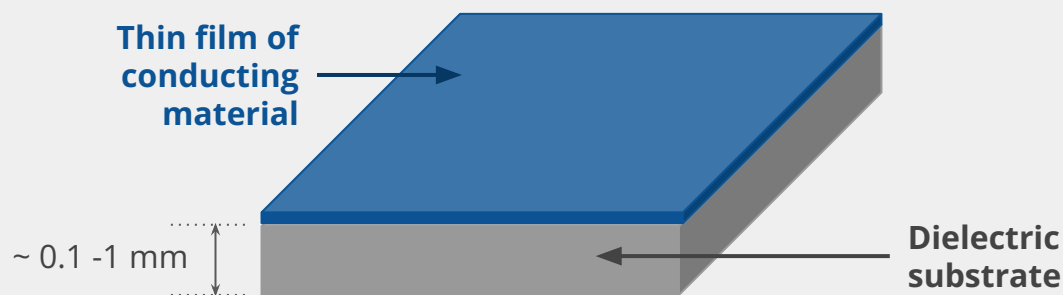
Direct benefits for your business

-  100% inspected production
-  Faster development of new materials
-  Knowledge of all of your material surface electrical quality
-  Cost savings: early detection of production errors

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MEASUREMENT CONFIGURATIONS

Materials	<p>Thin films and bulk materials</p> <p>Conductive films under protective coatings</p> <p>2D materials onto dielectric substrates:</p> <ul style="list-style-type: none">• 2D materials: graphene (mono- bi- and multilayer, inks, doped, epitaxial over SiC, powder & flakes, graphene oxide), PEDOT, ITO, NbC, IZO, ALD-ZnO, GaN, spin coated photoresins...• Substrates: quartz, silica, sapphire, high/medium resistivity silicon, silicon carbide, polymers... Thickness: 0.1 -1 mm.• Custom substrate characterization available.
Sample geometry	<p>No upper sample size limit ($> 1 \times 1 \text{ cm}^2$)</p> <p>Flat samples</p>
Wetness condition	<p>Dry, wet and cured materials</p> <p>Kinetics research tool available</p>
Markets of interest	<p>Photovoltaics, graphene, semiconductors, electronics, batteries, advanced materials...</p>



Scheme of a conductive 2D material onto a dielectric substrate

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PERFORMANCE OF THE SYSTEM

Terahertz polarization

Linear

Sheet conductance (0,1 - 40 mS)
Sheet resistance (25 - 10,000 Ohm)

Measurable parameters

Carrier mobility	Absorbed power
Carrier density	Single-frequency features
Carrier scattering time	Uniformity and homogeneity
Refractive index	Time-domain terahertz waveforms
Dielectric parameters, ϵ' and ϵ''	Terahertz spectra

Sampled area per point

3-mm terahertz spot size

Robot resolution

Selectable from 50 μm

Measurement time

Up to 50 ms/point
Ultra fast: up to 12 cm^2/min

Mapping

Single point and full area inspection

Measurement mode

Reflection
Normal incidence (0°)
Focused beam
Single side inspection

Measurement head distance to the inspected surface

Automatically adapted for every sample

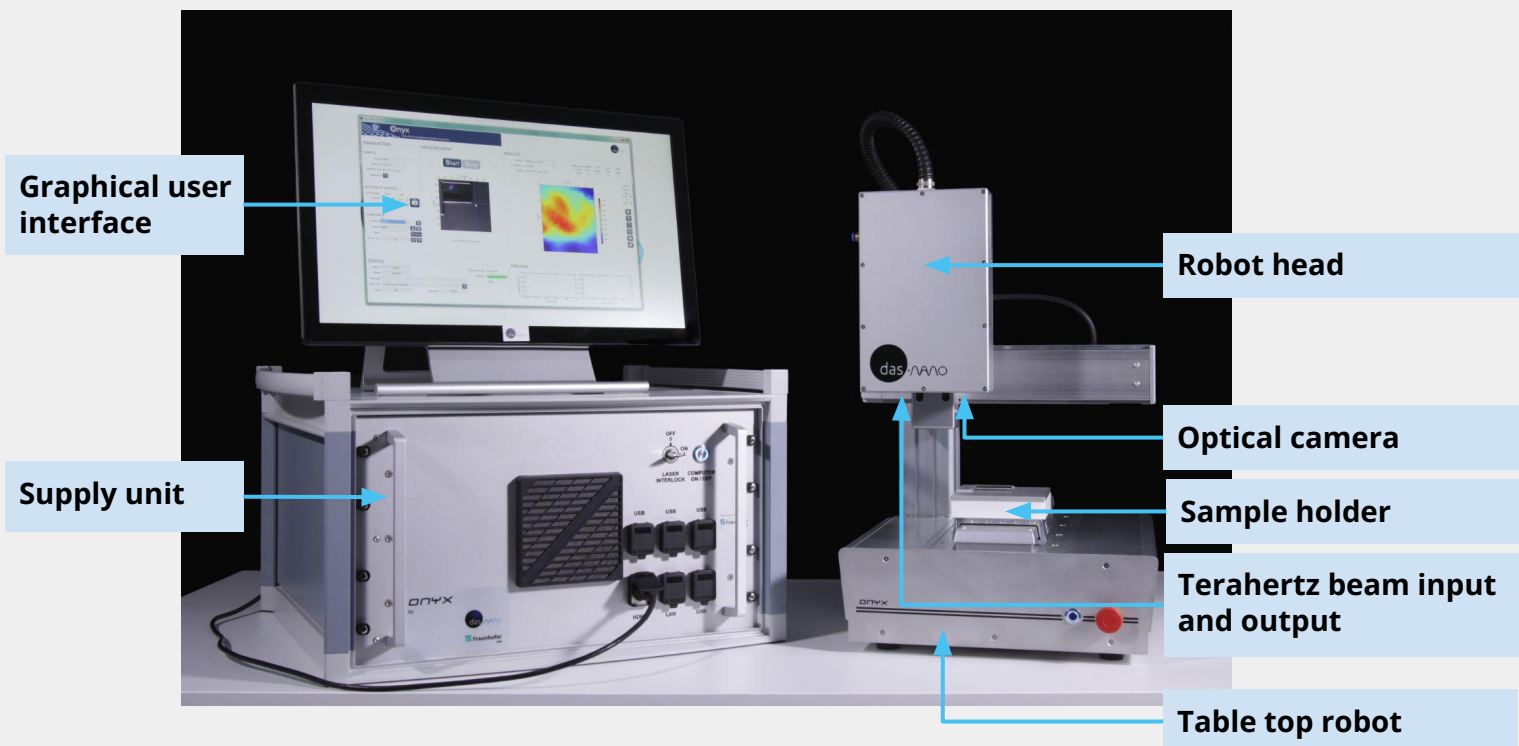
Measurement traceability

HD optical camera to ensure traceability

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HARDWARE, SOFTWARE AND CONNECTIVITY

Supply unit	610 x 581 x 332 mm (L x W x H), 46 kg
Terahertz head	176 x 67 x 260 mm (L x W x H), 2 kg
Actuator	Default: 401 x 535.5 x 546 mm (L x W x H), 27 kg, scanning area 200 x 200 mm. Plug and play system. Any conventional robot or cobot can be attached to das-Nano Onyx
Sample holder	Customizable shape and size
Reference samples	To check the correct functioning of the system: <ul style="list-style-type: none">• Quartz wafer (100 um thick)• PEDOT onto 100 um thick quartz wafer
Software	User-friendly graphical user interface <ul style="list-style-type: none">• Multiple selectable measurement and analysis parameters• In-situ and subsequent analysis• Temporal and spectral exportable results
Customizable	Available development support to adapt the product hardware and/or software to the end-user needs



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OPERATIONAL REQUIREMENTS

Robotic system	Compatible with any conventional robot: any model and brand
Operating temperature	15°C (59°F) – 35°C (95°F)
Operating humidity	Relative humidity < 75%
Operating atmosphere	Air, nitrogen, argon... Vacuum Non-condensing atmosphere
Sample preparation	No sample preparation required
Calibration	Autorefentiated measurements, no calibrations required
Power requirements	110 / 240 VAC, 4 A-line power, 50-60 Hz Single phase, two-wire plug
Auxiliary systems	No auxiliary systems are required Nitrogen output available for measurements at low humidity
Quality certifications	CE marking, REACH and RoHS compliant, ISO 9001, ISO 27001
Safety considerations	Non-ionizing radiation: harmless to humans
International standards	Complies with IEC TS 62607-6-10:2021 Nanomanufacturing - Key control characteristics - Part 6-10: Graphene-based material - Sheet resistance: Terahertz time-domain spectroscopy