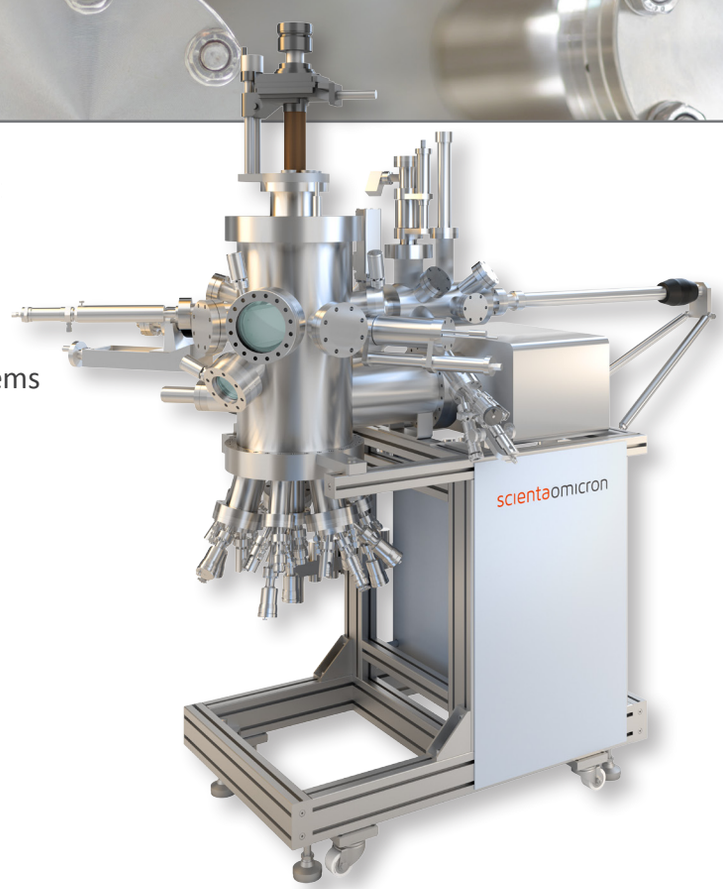
Lab10 MBE

scientaomicron

MBE Solution for Surface Science



- Research tool for innovative material development
- Configurable and customisable
- Low cost of ownership
- Growth process controlled by advanced software
- Defined interface to Scienta Omicron analysis systems

Lab10 MBE
Compact Research MBE System

The Lab10 MBE is a turnkey small sample research tool for innovative material development under UHV conditions.

This system is designed to fulfil the highest and most stringent requirements of modern thin-film deposition. Furthermore, the small sample concept is intended to interface the MBE system with an UHV analysis module to offer the best platform for fundamental research of novel materials.

Flexible System Platform

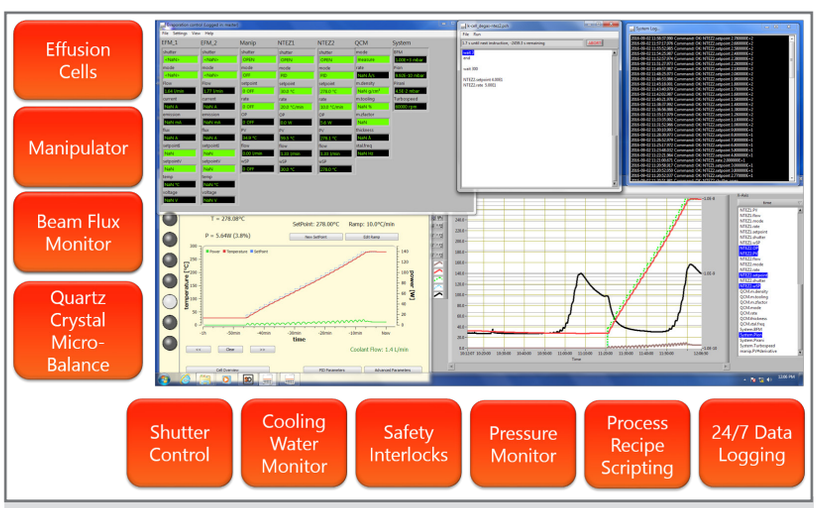
The Lab10 MBE is designed for forefront research. It is a proven platform with more than thirty of such small-sample systems installed worldwide. Our customers use their systems for a variety of material systems, such as:

- Semiconductors
- Organics
- Topological Insulators
- 2D Materials
- Oxides
- Intermetallic Compounds
- Heterostructures
- Thin Film Solar Cells

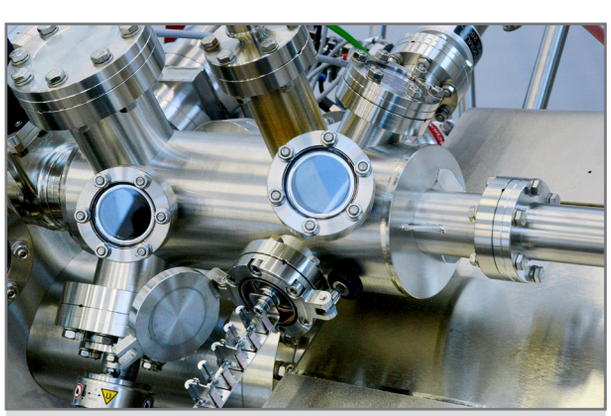
Applying our wide range of expertise, we can offer the best possible solution for every intended purpose. Our local Scienta Omicron sales representatives are trained to assist you in the configuration of your individual system.

Product Description

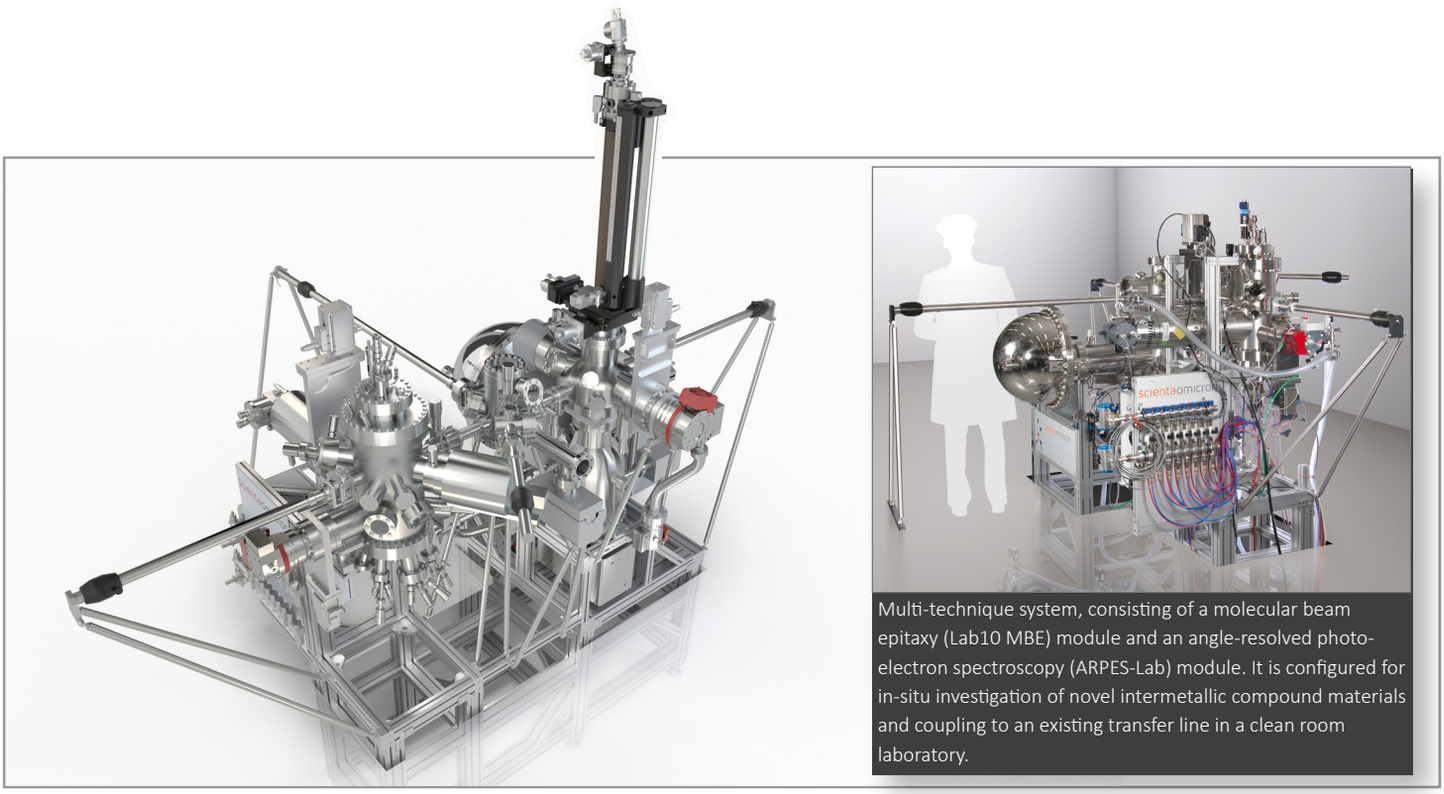
The system consists of a deposition chamber and an access chamber for sample introduction. The deposition chamber is equipped with an efficient cryopanel and an exchangeable cluster flange. It can be equipped with a wide range of high quality effusion sources. Additional ports for in-situ growth control and viewports are prepared. The Lab10 MBE employs the MISTRAL control system with touchscreen or remote PC interface. Furthermore, safety interlocks protect the UHV system in case of power failure.



The Lab10 MBE includes the MISTRAL control system together with a powerful evaporation control software. The control system is based on certified standard components for supreme reliability and provides a graphical status overview of all sensor values. With this software bundle, experiments can be conducted under well-controlled and reproducible conditions.



The access chamber of the Lab10 MBE system is designed to accept five Scienta Omicron small sample plates, an optional heater stage and a sputter or effusion source. It can be upgraded to a dedicated preparation chamber by adding a separate fast entry lock.



Multi-technique system, consisting of a molecular beam epitaxy (Lab10 MBE) module and an angle-resolved photoelectron spectroscopy (ARPES-Lab) module. It is configured for in-situ investigation of novel intermetallic compound materials and coupling to an existing transfer line in a clean room laboratory.

Building Block for Customized Multi-Technique Systems

Investigation of novel materials, especially nanomaterials, is influenced by surface contaminations. The intrinsic properties of material systems can be accessed by in-situ preparation and characterization without breaking the vacuum. Scienta Omicron is the leading company for such integrated Multi-Technique solutions.

The Lab10 MBE is fully compatible with the broad scope of Scienta Omicron analytic modules. Ultra-clean layer growth can be combined with advanced surface science techniques like SPM, AFM, XPS, HAXPES, ARPES and many others without breaking the vacuum. Such multi-technique systems enable in-situ sample preparation, thin film growth and characterization under UHV conditions. Due to the compact footprint, the Lab10 MBE is an ideal module for multi-technique systems designed for state-of-the-art research, saving valuable lab space. More than thirty years' experience in designing and building multi-technique systems result in a wide range of technology and expertise. The ability to expand and upgrade the Lab10 MBE system at a later date ensures a future-proof investment.

Tailored Solutions

The Lab10 MBE system is a flexible platform, which can be modified to perfectly match the vision of our customers. We support more than 30 different experimental techniques, and for each you will find a number of specialists in our company who can support you in project planning, assessment of technique suitability, system design, equipment training, applications support and system upgrades. Thereby, unique systems like the above shown Multi-Technique system are created, by which direct access to structural and electronic information of the in-situ synthesized materials is provisioned by LEED and the high-performance DA30-L analyser.

Lab10 MBE advantages:

- Small footprint
- Low cost of ownership
- Defined interface to Scienta Omicron analysis systems
- Software for growth process control
- Each system fully tested in-house
- Consultation by experts
- Configurable and customisable
- Local support team
- Upgradable and expandable

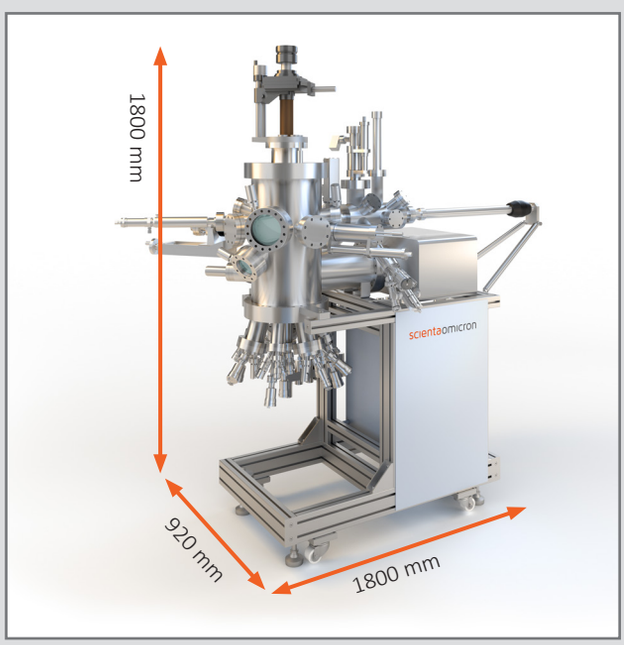
Scienta Omicron
Worldwide MBE Installation Base

With more than sixty MBE systems installed worldwide, Scienta Omicron is proven as a reliable partner for customized solutions.

Technical Data

Property	Target Specification*
Vacuum tank	Stainless steel
Pressure	< 1×10^{-10} mbar
Pressure sensor	Ion gauge
Cryopanel	Included
Baking temperature	150 °C
Viewports	Equipped with Viewport Shutters
Access Chamber	Included
Software package	Included
Preconfig. flanges	RHEED
	Quartz Micro Balance
	Beam Flux Monitor
	Quadrupole mass analyser (RGA)
Manipulator**	10 x 10 mm sample size
	Temperature RT < T < 1170 K
	X/Y- travel ± 8 mm
	Z- travel 50 mm
	Azimuthal rotation ± 180°
	Provision to work with direct sample heating
Cluster flange	3x DN63CF
	4x DN40CF
	1x central DN40CF

* Specifications for standard configuration. Customizations can influence specifications. Please contact us for details.
** Standard manipulator. Options for higher temperatures, LN_2 cooling, oxygen resistance and continuous rotation are available.



The compact dimensions of the Lab10 MBE system of 1800 x 920 x 1800 mm allow to integrate it in an existing laboratory or as an ideal module of a multi-technique cluster system. In standard configuration the deposition chamber is pumped by an ion getter pump, a titanium sublimation pump and a turbomolecular pump, backed by an oil-free roughing pump.

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