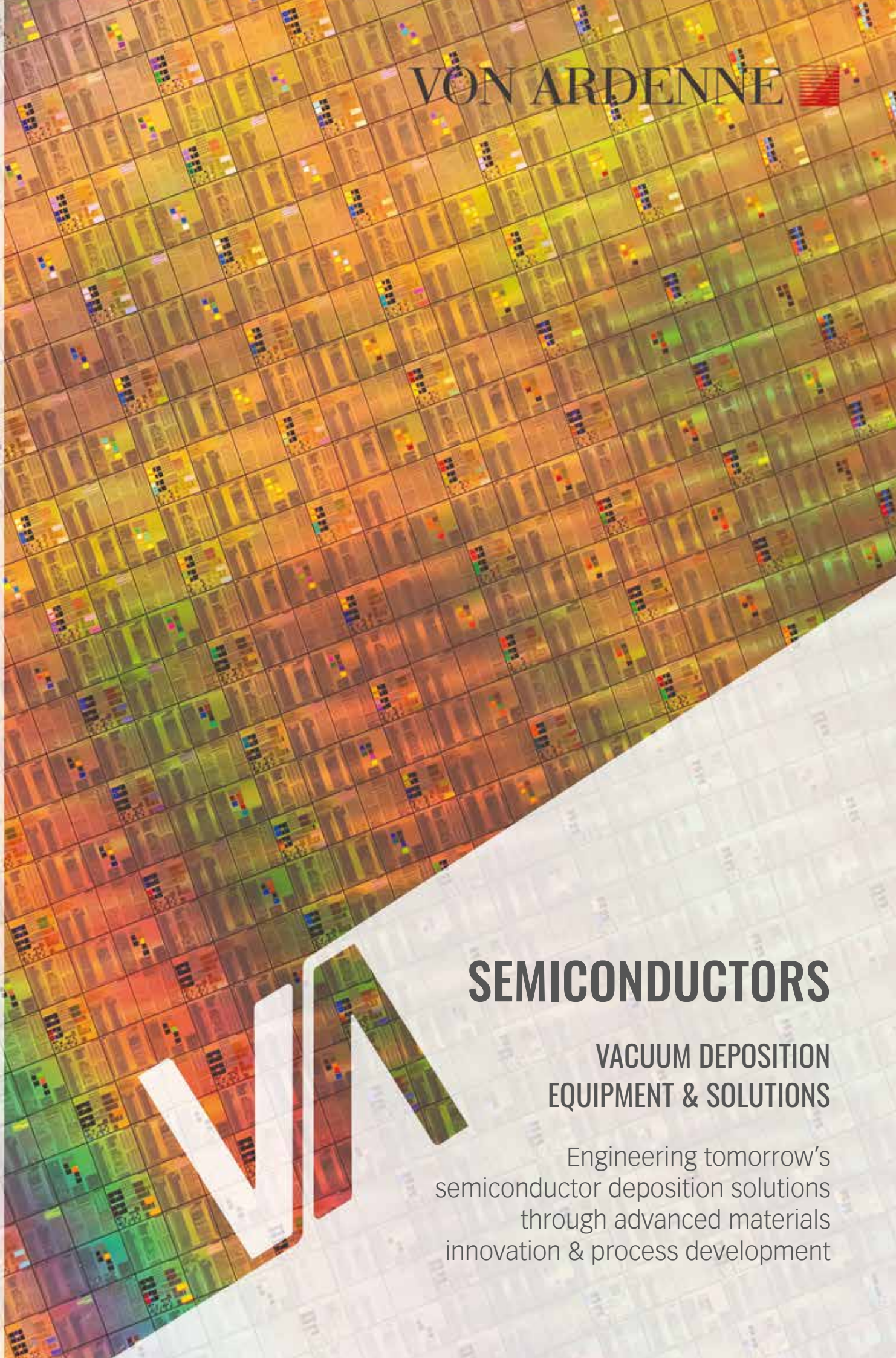


VON ARDENNE

SEMICONDUCTORS

VACUUM DEPOSITION EQUIPMENT & SOLUTIONS

Engineering tomorrow's semiconductor deposition solutions through advanced materials innovation & process development

ENGINEERING TOMORROW'S SEMICONDUCTOR DEPOSITION SOLUTIONS

through advanced materials innovation & process development

The world of semiconductors is always evolving. Meeting emerging requirements demands customer-oriented, flexible and new solutions.

As a deposition solutions specialist, VON ARDENNE offers comprehensive services to support our customers. Our high-precision engineering and materials science expertise enables custom design, engineering, manufacturing, commissioning and service for deposition equipment and components.

Our strong legacy in vacuum technology and deposition solutions, as well as materials and optics technologies, means we excel in developing leading-edge semiconductor processes and equipment to meet each customer's unique requirements.

Configuration of custom solutions to meet emerging requirements

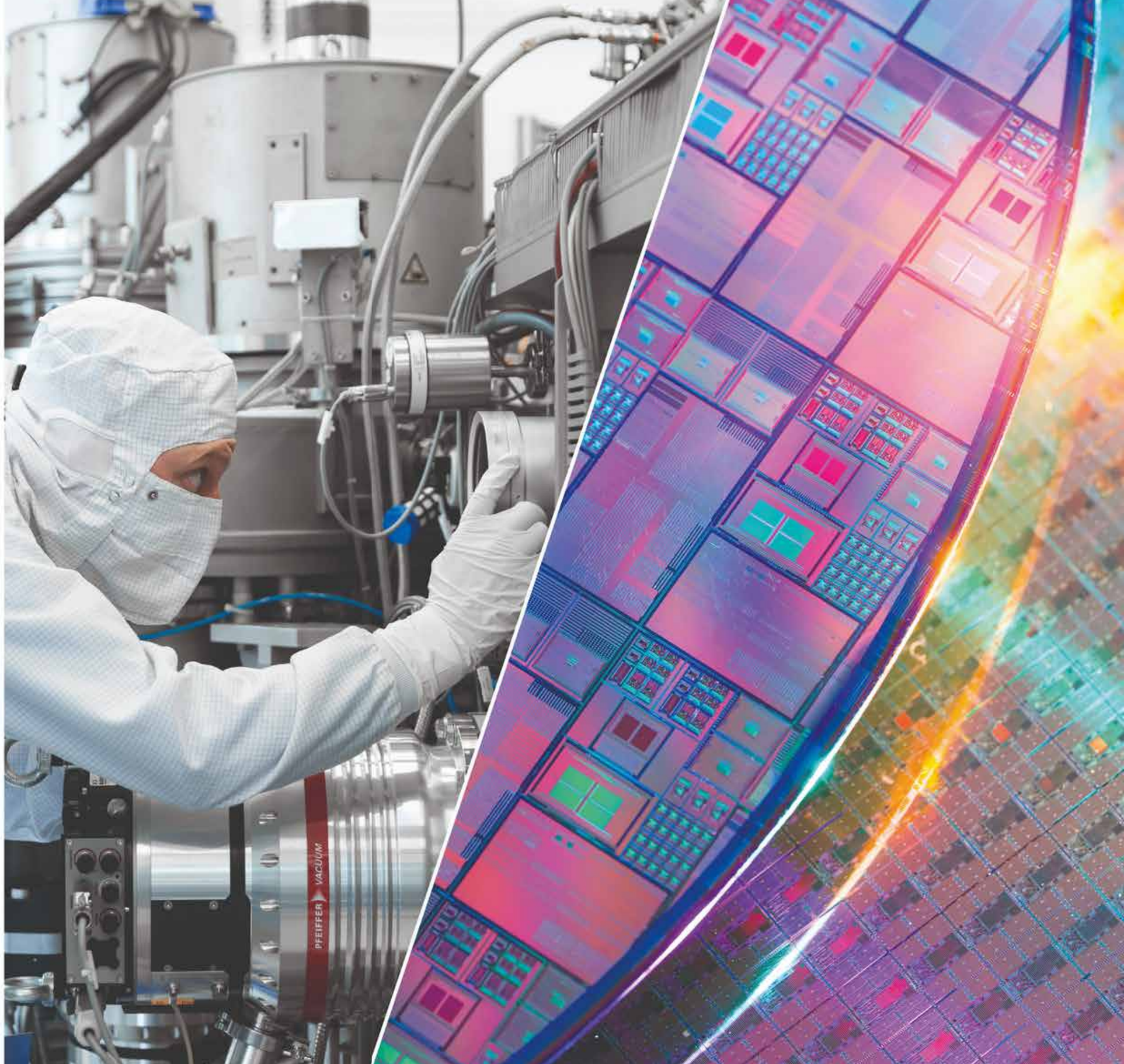
by highly experienced teams

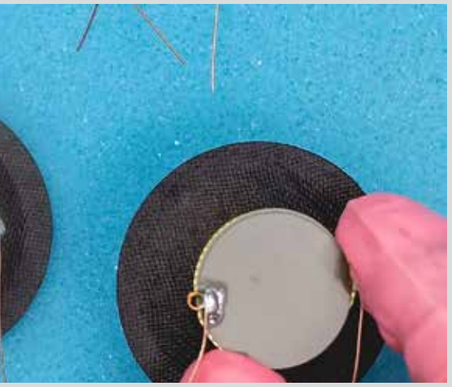
Configure-to-order flexibility

in platform & component development for advanced technologies

Long-term, highly collaborative partnerships

support customers from project start to finish





OPTA X
Rotary Disk Coating System

CLUSTER SYSTEMS
for Research, Development & Production

PIEZOMEMS

Overcoming film challenges for sensors & actuators with high-precision deposition of finely tuned piezo layers

From smartphones to smartwatches, piezoelectric microelectromechanical systems (piezoMEMS) power the tiny sensors that make our devices responsive, intuitive, and energy efficient. With ultra-low power consumption and high sensitivity, piezoMEMS are the invisible force driving the future of wearable tech, IoT, and smart living.

The OPTA X platform achieves the ultra-precise deposition of high-performance piezoelectric materials such as AlN and AlScN. The materials are tailored for piezoMEMS applications due to their excellent mechanical properties, CMOS compatibility, and environmental stability. These advanced thin films facilitate the creation of highly sensitive sensors and actuators by efficiently converting mechanical forces and displacements into electrical signals, and vice versa.

At VON ARDENNE, we have applied our extensive materials science and deposition expertise to support this emerging market. Our process is engineered to provide reliable homogeneity in both thickness and stoichiometry across 200-mm and 300-mm wafer substrates, optimizing throughput and yield in high-volume manufacturing.

Superior material properties

through highly engineered deposition processes

Modular design ensures flexible system configuration

to address any process requirement

Extremely high productivity

keeps operating costs low

ADVANCED PACKAGING

Metallization for advanced packaging with excellent material adhesion & uniformity

There are many approaches to advanced semiconductor packaging, the art of efficiently and compactly connecting multiple chips to maximize system performance.

Increasingly complex electrical systems are created by advanced packaging approaches. As a result, the requirements for the conductive and insulating layers are becoming more complex. At the same time, the substrates and the utilization of the available area must be optimized to manufacture these devices cost-effectively.

Materials, and the processes used to deposit them, are increasingly complex, demanding highly engineered platforms that can solve the most complex metallization challenges for high-aspect-ratio structures. And this is where we excel: innovation in materials and equipment, on wafer or panel substrates, with sub-nanometer precision.

Highly productive system platform

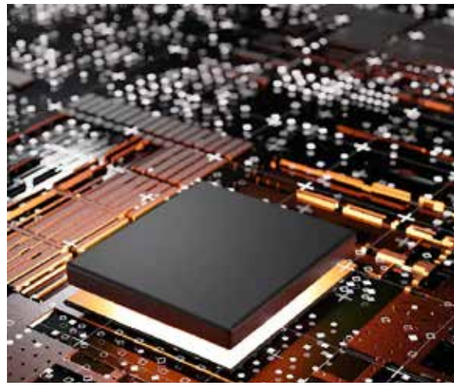
based on extensive process know-how

Easy adaptation to new processes & requirements

due to flexibly configurable equipment

Cost-efficient equipment

due to fully automated concept



OPTA X
Rotary Disk Coating System

HISS
Horizontal Coating System

CLUSTER SYSTEMS
for Research, Development & Production

VISS
Vertical Coating System

MEMS

Highly configurable systems for next-generation MEMS manufacturing engineering highly customized multi-process support

Microelectromechanical systems (MEMS) are tiny devices that combine the properties of mechanical and electronic components. They are used in a wide range of applications, including sensors, display technologies and microfluidics.

We offer flexible, highly configurable vacuum deposition systems for MEMS manufacturing. They enable you to combine different technologies, such as etching, deposition of metal, semiconductor and passivation layers, post-treatment or other custom requirements, depending on your specific application.

High-flexibility, configurable equipment

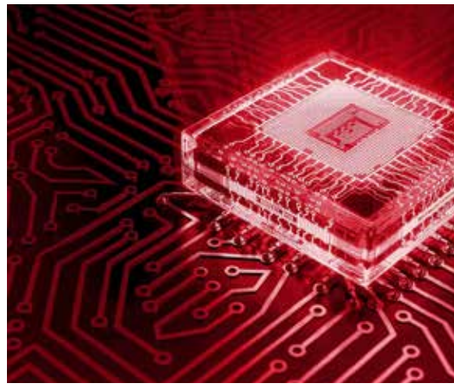
easily supports new processes & requirements

Compact design

saves valuable fab floorspace

Fully automated platforms

drive cost efficiencies



OPTA X
Rotary Disk Coating System

CLUSTER SYSTEMS
for Research, Development & Production

CLUSTER

HIGHLY FLEXIBLE & SCALABLE CLUSTER SYSTEMS

For research, development & production

Our cluster systems are modular coating systems suitable for highly flexible and highly productive processes in the development and production of semiconductors, optics, or in photovoltaic applications. They are specifically designed for processing substrates with a diameter or width of up to 300 millimeters.

This makes them ideal for developing new coating technologies and for producing layers or stacks with different materials, tailored properties, high precision, and excellent reproducibility.

Typical applications include MEMS, wide-bandgap or ultra-wide-bandgap (WBG/UWBG) devices and through-silicon vias (TSVs) for 3D advanced-packaging applications in the semiconductor industry, as well as standard conducting or insulating layers. Cluster systems can also be used to develop next-generation solar cells such as TOPCon and perovskite tandem.

Scalable

through modular design

Adapted to your needs

through flexible configuration

Helps you reduce operating costs

through flexibility

CS200

- Ideal for applications in the semiconductor and optics industries
- High throughput
- Compact dimensions

CS300

- Ideal for applications in the semiconductor, optics, and PV industries
- Optimized for R&D and production of TOPCon and perovskite tandem solar cells

APPLICATIONS

Thin-Film Sensors for Aerospace

Optical Windows

Lift-off Processes

Advanced Packaging

Dielectric Mirrors

Wafer-Level Optics

Waveguides for Augmented Reality

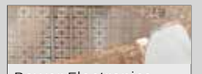
Automotive Displays

Displays for Consumer Electronics

MEMS

Heterojunction Solar Cells

Perovskite Tandem Solar Cells


Power Electronics

PiezoMEMS

TECHNICAL DATA

Subject to change without notice due to technical improvement.

Substrates
Wafers (Si, GaAs,..), glass, polymers, metals

Coating area
CS200: up to 200 mm diameter
CS300: up to 300 mm diameter

Deposition method
Sputtering: HIPIMS, DC, pulsed DC, AC, RF
Plasma source: inverse sputter etcher (ISE) or ion source

Substrate temperature
RT/ 800 °C

Transport
Automatic by robot

System control
PLC module, WICON control software

OPTA X

HIGHLY PRODUCTIVE DOUBLE-SIDED COATING

For demanding multi-layer systems

The OPTA X is a highly productive coating system for multi-layer stacks with a high number of alternating, high-precision layers. It is also suitable for the precise deposition of single layers of oxides, nitrides and other materials. It delivers excellent layer uniformities of typically ±0.25% and forms very thin, single-digit-nanometer layers as well as several 100-nanometer-thick layers in multilayer stacks of the same or different materials.

The platform is suitable for demanding optical multilayers made from silicon dioxide (SiO_2), niobium pentoxide (Nb_2O_5), tantalum pentoxide (Ta_2O_5), titanium dioxide (TiO_2), hafnium oxide (HfO_2), hydrogenated amorphous silicon (a-Si:H), and silicon nitride (Si_3N_4), as well as emerging semiconductor materials. These include high-performance piezoelectric materials such as aluminum nitride (AlN) and aluminum scandium nitride ($Al_{1-x}Sc_xN$), as well as gallium oxide (Ga_2O_3) and gallium nitride (GaN) for wide-bandgap and ultra-wide-bandgap (WBG/UWBG) applications.

The rotary disk system can coat one or both sides of the substrate simultaneously in a horizontal orientation, making the tool particularly well suited for stress-compensated coating of very thin or flexible substrates.

Highest precision & quality

through fast, clean, low-defect, homogeneous coatings

Anti-warp effect

through double-sided deposition with different materials

Variable product adaptation:

layers, layer systems & component geometry

OPTA X200

- Optimized for applications on substrates with diameters of up to 200 mm
- Meets the highest demands in optical applications through highly pure and defect-free optical layers
- Unique homogeneity and chemical composition of the electrical layers for optimal results in microelectronics and the semiconductor industry

OPTA X300

- Processing substrates with diameters of up to 300 mm, including G12 wafers
- Meets the highest demands in optical applications through highly pure and defect-free optical layers
- Unique homogeneity and chemical composition of the electrical layers for optimal results in microelectronics and the semiconductor industry

APPLICATIONS

Thin-Film Sensors for Aerospace

Optical Windows

Advanced Packaging

Dielectric Mirrors

Wafer-Level Optics

Waveguides for Augmented Reality

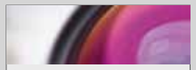
Automotive Displays

Displays for Consumer Electronics

MEMS

Power Electronics

PiezoMEMS


Lenses & Optical Domes

Optical Interference Filters

TECHNICAL DATA

Subject to change without notice due to technical improvement.

Substrates
Silicon wafers, glass, polymers, metals

Coating area
Up to 200/300 mm

Deposition arrangement
Double-sided, DC, pulsed DC, AC, CARS, meta mode, reactive sputtering, RF

Substrate temperature
RT / 300°C

Deposition technology
Magnetron sputtering: planar, rotatable

Type of transport
Carrier or robot

System control
Siemens PLC

VISS

HIGHLY FLEXIBLE & SCALABLE INLINE SYSTEMS

For vertical processes & medium productivity

The VISS400 and VISS600 are modular systems for vertical coating processes. They are ideal if you want to scale your laboratory applications to production level.

Both platforms are available as an inline version with one end or as a through-feed version for continuous processes. Depending on the model, they can be scaled for substrate widths of 400 mm or up to 600 mm. The substrates are transported using a carrier system that is tilted vertically by seven degrees. The system can be loaded and unloaded without touching the front side of the substrates.

This system concept allows for cost-efficient coating of large substrates. Together with the vertical substrate transport, this enables a particle-free coating process, qualifying the VISS systems for use in the semiconductor industry, especially for applications such as advanced packaging, power electronics, and piezo sensors.

Scalable

through modular design

Easily adaptable to your requirements

through flexible configuration options

Loading without touching the substrate front side

due to carrier transport

VISS400

Compact dimensions and low weight enable use in confined production spaces

VISS600

High productivity thanks to substrate widths up to 600 mm

APPLICATIONS

Aviation Transparencies

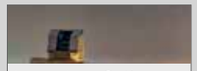
Optical Windows

Lift-off Processes

Advanced Packaging

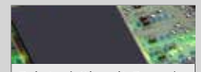
Dielectric Mirrors

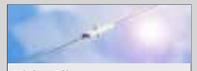
Waveguides for Augmented Reality

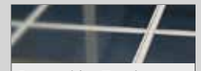

Large-Area Optics

Automotive Displays

Displays for Consumer Electronics


Printed Circuit Boards


Thin-Film Photovoltaics


Perovskite Tandem Solar Cells

Power Electronics

Optical Interference Filters

TECHNICAL DATA

Subject to change without notice due to technical improvement.

Substrates
Glass, polymers, metals

Coating area
Up to 600 mm x 2400 mm

Deposition arrangement
Double-sided, pulsed DC, AC, RF

Substrate temperature range
RT / 200°C / 350°C

Deposition technology
Magnetron sputtering, linear evaporation, pre- and post-treatment

Transport type
Inline, by carrier or stacker

Loading & unloading
Optional automation by robot

System control
VA WICON with graphical user interface

HISS

HIGHLY FLEXIBLE & SCALABLE INLINE SYSTEMS

For horizontal substrate transport

The HISS300 and HISS600 are modular coating systems designed for the horizontal coating of substrates. They are the ideal choice if you need a highly flexible production system with small to medium throughput, equipped with proven technology.

Thanks to their modular design, these systems can be configured to meet your specific needs. Various configurations are available, including a version with only one end, tailored for smaller production scopes.

The systems offer high process flexibility, supporting both sputtering and evaporation processes, as well as various pre- and post-treatment methods.

The flexible and dynamic design of the systems with standardized modules allows for customer-specific configuration. This adaptability enables customers to easily incorporate new processes or meet changing requirements, ensuring they can remain agile and responsive to product evolution.

Double-sided or single-sided coating

to suit your substrate & process requirements

High flexibility

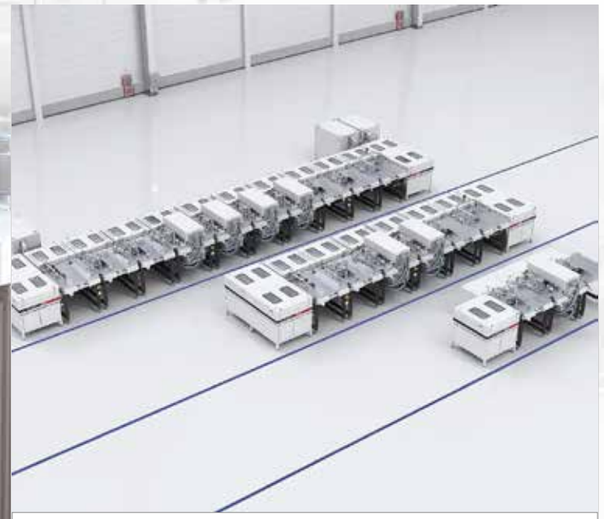
in process technology and equipment configuration

Ideal for R&D up to series production

through easily scalable processes

HISS300

- Focus on research and development of new coating systems or improvement of existing ones
- Testing of different process technologies with low space requirements
- Scalability to small series and production due to platform approach



HISS600

- Focus on developing new or improving existing coating systems
- Possibility of testing in small series and, if required, 24/7 production
- Scalability to larger system concepts due to platform approach

APPLICATIONS

Thin-Film Sensors for Aerospace

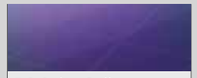
Advanced Packaging

Waveguides for Augmented Reality

Radar Antennas

Metallic Bipolar Plates

Printed Circuit Boards


BC Solar Cells

TOPCon Solar Cells

Heterojunction Solar Cells

Perovskite Tandem Solar Cells

Power Electronics

TECHNICAL DATA

Subject to change without notice due to technical improvement.

Substrates
Glass, polymers, metals, silicon wafers

Coating area
HISS300: up to 300 mm x 300 mm,
900 mm x 300 mm on request
HISS600: up to 1000 mm x 600 mm

Deposition arrangement
Double-sided or single-sided

Substrate temperature
RT … 250°C

Deposition technology
Magnetron sputtering, linear evaporation, pre- and post-treatment

Transport type
Carrier or glass transport

Loading & unloading
Optional automation by robot

System control
Siemens SPS and WinCC

SERVICE PORTFOLIO

CLOSE TO YOU!

Available around the globe

Overview

First-class technology, quality and productivity are the key to your success and an integral part of our coating systems.

VON ARDENNE equipment is used in more than 50 countries. We have installed over 1000 coating systems worldwide and support them from our local service locations or our headquarters in Dresden. For questions or issues of any kind, we assist you by phone, personally on site or by remote support.

Comprehensive support for your coating systems

over their entire service life

Worldwide at your side

with local service sites

Broad product portfolio

so that you get everything from a single source

AT OUR SERVICE LOCATIONS WE OFFER:

Local service hotline &
Qualified service personnel [up to 24/7]

Service sales

Spare parts management

Inspection & maintenance service

Upgrades & retrofits

Technical training

Customer training center
at our headquarters in Dresden

UPGRADES

UPGRADE? WORLDWIDE UP TO DATE

Technology that keeps up with you

We ensure for you that our coating technologies are state-of-the-art and continuously improved. Because we follow the conviction: Today's best technology standard must also be tomorrow's best, so that you can satisfy your customers and investors.

To achieve this, we offer:

Technical Upgrades

to improve throughput

Technology Upgrades

to improve configurations & parameters

Layer stack optimization

to improve your product with the help of our experience

Training in layer stack competence

to best prepare your workforce

IN THE RIGHT PLACE AT THE RIGHT TIME

Our service for spare & wear parts

Our coating systems are designed to meet your demands for quality – and above all those of your customers. To ensure that everything runs smoothly, maintenance and optimization of the systems and components are essential.

We pay particular attention to ensuring that spare and wear parts are available in the right quality at the right time and at the right cost.

VON ARDENNE supports you with a comprehensive and customized spare and wear parts package, so that all required parts are always available in sufficient quantity.

In addition, we actively support you in spare parts management, e.g. in the form of framework agreements to achieve cost advantages.

HEALTH CHECK & TRAINING

VA HEALTH CHECK

1

STEP 1
Preparation

Customized questionnaire
Remote query of system performance

2

STEP 2
On-site audit

Audit of the existing coating system & condition assessment
Identifying potential for optimization

3

STEP 3
Recommendation

Presentation of the results
Advice regarding risk mitigation & optimization
Deriving the necessary measures

Let our experts do a thorough check-up of your coating system.

With the VA HEALTH CHECK, we offer a comprehensive risk analysis of your recent configuration. And we will establish a solid basis for your future.

A secure supply of spare parts and the application of new technologies are keys to success. Therefore, we offer everything from a single source – from development to service and upgrades. Benefit now from the expertise of a technology pioneer.

SKILLED TEAM

Higher Performance

In customized seminars, we provide you with technical know-how tailored to your needs.

Our seminars cover both basic knowledge and in-depth knowledge of the use and operation of the equipment. This knowledge will help you to strengthen your team in everyday life.

WE OFFER THE FOLLOWING TRAININGS

Face-to-Face Training

worldwide or at your site with a practical component

Webinars & E-Learning

conveniently available online

TEST & SIMULATE

JOINT TESTING, SAMPLING & IMPROVEMENT

Sampling & Layer Development

At our Technology & Application Center (TAC), we work together with you on the next generation of your coating applications.

We simulate layer stacks and their functionality, produce samples on laboratory and pilot scales, and measure and evaluate coating and substrate properties to meet diverse requirements. This allows you to test your product's coating performance on relevant sample sizes before your production equipment is commissioned.

Gaining knowledge through simulation
of layer composition & properties

Risk reduction & quicker market maturity
through industrial trials

Individual access to a variety
of coating materials & services

Optimal equipment configuration
through testing in a scalable process

Technology & Application Center Dresden

SIMULATION

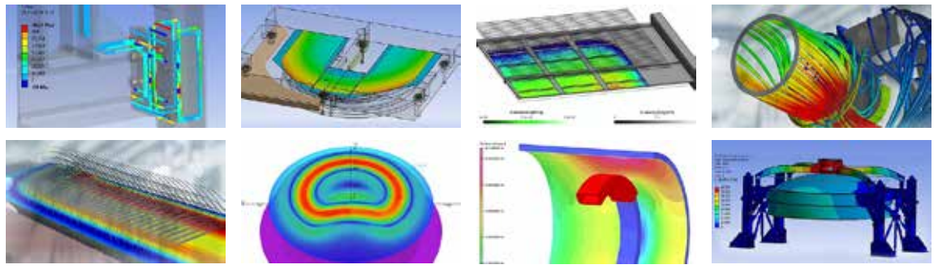
Helps you understand your process

You want to accelerate your product development? And you know that the answer is multiphysical simulation and modeling? You want accurate results. But which solution is right for you?

VON ARDENNE is a leading supplier of PVD coating equipment with more than 60 years of experience in electron beam processes and 50 years of experience in magnetron sputtering.

And now you can benefit from this experience.

Every day you face the challenge of staying ahead in your business. You strive to become faster and more cost efficient. Our job is to support you with industry-leading technology and process experience to add value.



VA CLEANROOM

CLEANROOM-COMPATIBLE SAMPLING & ASSEMBLY FACILITY

FOR PRECISION OPTICS, PHOTONICS & SEMICONDUCTOR APPLICATIONS

VA CLEANROOM

Sampling & Layer Development

Our new cleanroom offers the best conditions, with ISO 5 and ISO 7 zones for the assembly and commissioning of systems for complex tasks in the fields of semiconductor technology, as well as materials science and medical technology, partially even with the highest purity requirements (ISO 5 AMC).

The cleanroom will be equipped with a new OPTA X system, which will be available from mid-2026 for joint material and device developments. Together with a top-tier team of technicians and developers, we will be able to contribute to your next generation of coating applications.

We cover the entire process, from simulating layers and their functions, through laboratory- and pilot-scale sampling, to measuring and evaluating layer and device properties. This gives you the opportunity to test the function of the coating for your product in a relevant environment or to include your entire process chain in advance.

Wafer substrate handling in ISO5 environment

for analysis at the wafer level or for further external processing

Risk minimization & faster market readiness

through industrial testing

Gaining insights through accompanying simulation

of layer processing and related properties

Individual access

to a variety of coating materials & services as well as R&D partners

OUR STRENGTHS

In-House Technology & Application Center

- Sample coatings of customer applications
- Development of customized layer stacks
- Product & process verification and optimization
- Testing of new technologies and components

Professional Simulation Support

We offer professional simulation technology to ensure best process quality with regards to plasma, heat and cooling. Furthermore, our simulation tools help demonstrate, develop and improve layer properties and define or optimize processes, details and the performance of our systems.

Close Partnership

VON ARDENNE has a network of partners for even more profound R&D work and to identify future technologies. It consists of:

- Fraunhofer Institutes
- Institutes of the Helmholtz Association
- Universities
- Companies

Global Project Experience

VON ARDENNE equipment is used in over 50 countries. We have established an installed base of hundreds of coating systems worldwide, ranging from small tools to equipment for large-area coating applications for several markets.

Comprehensive Service Portfolio

- VON ARDENNE service hubs around the world
- On-site service
- Remote access by our technology department
- Regular technical and technological trainings
- Spare & wear part warehouse close to customers
- Lifecycle extension of wear parts

Upgrades & Retrofits

As soon as your business is growing, your VON ARDENNE equipment will grow accordingly - thanks to its modular design and the upgrades we provide. We will also supply you with the necessary technology upgrades if you decide to change your applications.
Furthermore, when your equipment is ageing, we will retrofit your systems with new components, no matter if they are VON ARDENNE or third-party machines.

WHO WE ARE & WHAT WE DO

VON ARDENNE develops and manufactures industrial equipment for vacuum coatings on materials such as glass, wafers, metal strip and polymer films. These coatings give the surfaces new functional properties and can be between one nanometer and a few micrometers thin, depending on the application. Our customers use these materials to make high-quality products such as architectural glass, displays for smartphones and touchscreens, solar modules and heat protection window film for automotive glass.

We supply our customers with technologically sophisticated vacuum coating systems, extensive expertise and global service. The key components are developed and manufactured by VON ARDENNE itself. Systems and components made by VON ARDENNE make a valuable contribution to protecting the environment. They are vital for manufacturing products which help to use less energy or to generate energy from renewable resources.

WORLDWIDE SALES AND SERVICE

VON ARDENNE GmbH (headquarters) I Am Hahnweg 8 I 01328 DRESDEN I GERMANY
Sales: +49 (0) 351 2637 189 I sales@vonardenne.com
Service: +49 (0) 351 2637 9400 I support@vonardenne.com
VON ARDENNE Vacuum Equipment (Shanghai) Co., Ltd. I +86 21 3769 0555 I sales-vave@vonardenne.com; support-vave@vonardenne.com
VON ARDENNE Malaysia Sdn. Bhd. I +60 4408 0080 I sales-vama@vonardenne.com; support-vama@vonardenne.com
VON ARDENNE North America, Inc. I Ohio office I +1 419 386 2789 I sales-vana@vonardenne.com; support-vana@vonardenne.com
VON ARDENNE Vietnam Co., Ltd. I +84 28 6272 3189 I sales-vavn@vonardenne.com; support-vavn@vonardenne.com
VON ARDENNE India Pvt. Ltd. I sales-vaid@vonardenne.com; support-vaid@vonardenne.com

Company | Career | Applications | Products | Service

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