

## Welcome to the German Pavilion

On 170 m<sup>2</sup>, the German Pavilion features twelve high-tech companies exhibiting state-of-the-art materials, components and manufacturing solutions for electronic flat panel displays (FPDs).

Despite nearly all FPDs are manufactured in Asia, Germany offers one of the most innovative supply industries in the world: Throughout the whole value-added chain - from FPD materials and components, manufacturing & process equipment to system integration and end-usage! Moreover, many basic and groundbreaking developments were made by German R&D teams.

The SID Display Week is the place to be for the display community to learn about the latest and newest developments in the field of flat panel displays. And this is what will be showcased at the German Pavilion!

Additional information on German products and suppliers is available at the official information center. Our experts will gladly advise you on further possibilities of co-operation and answer your specific questions.

You are cordially invited to visit the German Pavilion and to take advantage of the opportunity for an exchange of information and experience as well as for establishing or intensifying contacts with the German exhibitors.

The Federal Ministry of Economics and Technology (BWMi), the Association of the German Trade Fair Industry (AUMA) and the DFF - the German Flat Panel Display Forum within the German Engineering Federation (VDMA) - wish you a pleasant stay and a successful visit to this presentation!



*Robert Isele, BWM AG,  
DFF Chairman 'Applications'*

*Dr. Jörg Winkler, Plansee SE,  
DFF Chairman 'Technologies'*

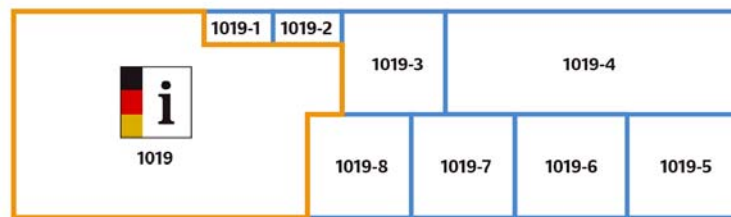
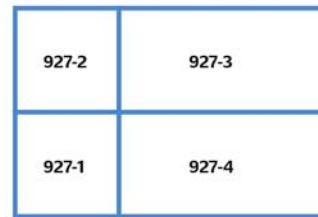


### About DFF - the German Flat Panel Display Forum

DFF - the German Flat Panel Display Forum - is the industry-led association of European FPD industry currently representing 62 companies and research institutes worldwide. Its members, material and component suppliers, equipment manufacturers, display manufacturers, system integrators, end users, and research institutes, are active along the whole FPD value chain. DFF strives to strengthen the European FPD industry. To this end, DFF offers various services to its members: effective platform for collaboration and networking, independent source of advice and information on FPD technology and markets, further education and training courses tailored to industry professionals, promotion of the FPD industry through joint publications and joint exhibition booths at international trade shows and lobbying of politics and the public.

Further Information: [www.displayforum.de](http://www.displayforum.de)

## German Pavilion Floorplan



## adt Deutschland GmbH



Booth number 927-1

adt's D<sup>3</sup>-Display Technology is having a multiple set of product features which offer various application areas. These application areas are ranging from low complex / low cost (e.g. single monochrome pixel as "LED" replacement) up to high complex / high cost display applications (e.g. billboards for out-of-home applications).

Initial products are single or multiple pixel D<sup>3</sup>-Indicators respectively D<sup>3</sup>-Matrix and D<sup>3</sup>-8-Segment Modules. Beside of applications in which extreme light or temperature conditions are present (e.g. outdoor applications: signs/signage) these products are especially intended for energy-sensitive product applications (due to their bi-stability, e.g. remote control or electronic consumer products with stand-by displays) as well as design orientated applications (due to their transfectivity resp. the option to use customer specific colors, e.g. for white goods).

### About adt:

The adt is a swiss company which is focused on the development and commercialisation of reflective display products ("sunlight readable display") based on a proprietary display technology called "Droplet Driven Display – Technology". The unique characteristic of this display technology is the use of real colored liquids to create printing-like visual content and colors as well as the use of electrowetting technology.

adt's display products - which are part of the reflective display category – are offering benefits which are in line with customers needs: real bi-stability and therefore extreme power-saving options ("Zero-Power Displays"), high design and application variability (for in- and outdoor use) as well as excellent optical and color properties.

adt is aiming for two main application areas: low content / low speed displays and large sized displays for outdoor applications (Public Displays).

## AIXTRON SE



Booth Number 927-3

AIXTRON is a leading provider of deposition equipment to the semiconductor industry. The Company's technology solutions are used by a diverse range of customers worldwide to build advanced components for electronic and opto-electronic applications based on compound, silicon, or organic semiconductor materials, functional polymers, as well as Carbon Nanotubes (CNT) and other nanomaterials. Such components are used in flat panel display applications, solid state lighting, energy harvesting and storage, fiber optic communication systems, wireless and mobile telephony applications, optical and electronic storage devices, computing, signalling and lighting, as well as a range of other leading-edge technologies.



AIXTRON's product portfolio for compound semiconductors includes:

- MOCVD Equipment (Metal Organic Chemical Vapor Phase Deposition)
- OVPD® Equipment for OLED display, OLED lighting, and organic semiconductor solutions
- PVPD(TM) Equipment for carrier-gas enhanced vapor phase in-situ polymerization for functional films
- Black Magic CVD and PECVD systems for the deposition of Carbon Nanotubes and Nanofibers and combinations thereof for advanced hybrid structures.

### About AIXTRON:

AIXTRON SE is a leading supplier of deposition equipment to the semiconductor industry. The Company's technology solutions are used by a diverse range of customers worldwide, enabling them to build advanced components for electronic and opto-electronic applications based on compound, silicon, or organic semiconductor materials, for polymers, as well as Carbon Nanotubes (CNT), Graphene and other nanomaterials.

## CODIXX AG



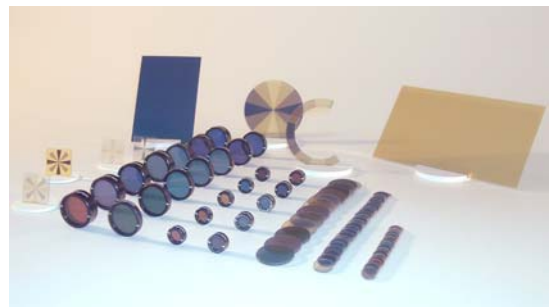
Booth Number 1019-7

CODIXX produces polarizers for the UV, VIS, NIR and MIR range which are distributed under the brand name colorPol® since 2003.

The colorPol® polarizer is a thin glass plate with embedded silver nano particles and can be processed like glass or semiconductor wafers. It is resistant to UV radiation, solvents and most acids and bases and complies with RoHS. In the UV, VIS, NIR and MIR range (340 nm up to 5 µm) these filters feature a high acceptance angle of  $> \pm 20^\circ$ , high transmittance up to 98%, a

very high contrast (extinction ratio) of 10,000,000 : 1 and cover a wide operational wavelength range: e.g. a bandwidth of 2500 nm with a contrast above 10,000 : 1.

They have also a wide operating temperature range from  $< -50^{\circ}\text{C}$  to  $+400^{\circ}\text{C}$ . The colorPol® technology enables CODIXX to produce the worlds unique colorPol® S: A customized patterned polarizer with adjacent areas of different orientation of polarization axes.



Beside the standard dimensions CODIXX supplies its colorPol® polarizers customized in desired shapes and dimensions. colorPol® filters are available with a low wavefront distortion of less than  $\lambda/4$  too. Also, the polarizers can be delivered with standard AR-coatings or customized AR coatings.

Applications for colorPol® polarizers include optical measurement equipment, telecommunication, sensor technology, laser application, illumination and imaging.

At the SID 2011 CODIXX presents its latest polarizers optimized for the use in the red, green and blue wavelengths - colorPol® VIS 006 AC3 (440-480 nm), colorPol® VIS 007 BC3 (500-550 nm) and colorPol® VIS 008 BC3 (600-650 nm). All polarizers feature an extinction ratio of above 1,000 :1, extreme temperature stability ranging from  $-50^{\circ}\text{C}$  ( $-58^{\circ}\text{F}$ ) up to  $+400^{\circ}\text{C}$  ( $+750^{\circ}\text{F}$ ) and show no bleaching (UV resistant).

CODIXX is a public company founded in 1998. It is ISO 9001:2008 certified.

## FLABEG Holding GmbH



Booth Number 1019-5



Making glass intelligent: FLABEG is a technological leader and innovator in optical thin-film technologies. When a high degree of transparency is needed we enhance glass to make it virtually invisible. Our magnetron-sputtered anti-reflection coatings for digital display glass, consumer electronics, public signage and UV protection for museum art are second to none.

This and our precision glass processing and fabrication capabilities combine to meet the diverse challenges of our world markets in solar power, automotive and technical glass.

### About FLABEG:

FLABEG is a world leader in manufacturing technical glass products for the global display market. Our strategic network of 13 facilities throughout the Americas, Asia and the European Union combine a unique range of core competencies resulting in integrated display glass product solutions for our customers.



## Fraunhofer Heinrich Hertz Institute

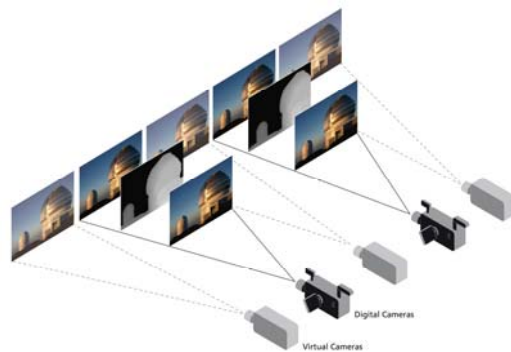
Booth Number 1019-4



3D movies for the multiplex have now entered the realm of home cinema. But whether in the home cinema or movie theater up to present you've always needed shutter or polarization glasses to experience the thrill of 3D. For some years now Fraunhofer HHI has been working on the next big thing – "3D without Glasses". "Multiview Generation for 3D Digital Signage" helps to prepare and optimize 3D content for these autostereoscopic displays for a single viewer or groups of viewers.

### 3D without Glasses

A newly developed 3D display technology can even blend multiview and single user modalities on one screen. This enables the realization of multi-functional all-in-one displays which is the starting point of a novel 3D display class. Spatial visualization can be combined with touchless interaction in a very natural way enabling users to interact with objects in the virtual world as if they were real. Fast hand-tracking algorithms facilitate this human computer interface.



### Multiview Generation for 3D Digital Signage

3D brings new perspectives to digital signage and other public displays that don't use 3D glasses. Format conversion from stereo to glasses-free 3D display specific multiview formats is a necessary postproduction step to bring existing S3D content into public areas where 3D glasses can't be used. 3D conversion creates the required number of extra views needed to generate autostereoscopic content.

In this forward-looking world of 3D without eyewear, the Fraunhofer Heinrich Hertz Institute provides dedicated conversion services for almost any type of existing autostereoscopic display.

### About Fraunhofer Heinrich Hertz Institute:

The Fraunhofer Heinrich Hertz Institute is a global leader in the development of fixed and mobile communication networks and the key technologies that drive them. One focus lies on innovative display technologies that make 3D viewing possible without the need for eyewear. "3D Multiview Generation" helps to prepare and optimize 3D content for these displays for a single viewer or groups of viewers.

## Fraunhofer IPMS

Booth number 1019-6



### OLED microdisplay based Eyetracking HMD

The Fraunhofer IPMS works on the integration of sensors and microdisplays on CMOS backplane for several years now. For example the researchers have developed a bidirectional microdisplay, which could be used in Head-Mounted Displays (HMD) for gaze triggered augmented-reality (AR) applications.



The chips contain both an active OLED matrix and therein integrated photodetectors. The combination of both matrixes in one chip is an essential possibility for system integrators to design smaller, lightweight and portable systems with both functionalities.

The OLED microdisplay based eyetracking HMD enables the user on the one hand to overlay the view of the real world with virtual contents, for example to watch videos at jog. And

on the other hand the user can select the next video triggered only by his gaze without using his hands.

On the SID 2011 a demonstrator will be presented for the first time, that has the following technical specifications:

- See-through optics with 32° FOV
- Monochrome
- Special Eyetracking-Algorithm for HMDs based on bidirectional microdisplays
- Front brightness: > 1500 cd/m<sup>2</sup>

Rigo Herold will present the system at the exhibitor forum at 17th of May 2011, 4:00 p.m.: "Eyecatcher: The Bi-Directional OLED Microdisplay".

#### **About Fraunhofer IPMS:**

Fraunhofer IPMS' carries out customer specific developments in fields of microelectronic and micro systems technology serving as a business partner who supports the transition of innovative ideas into new products. Fraunhofer IPMS develops and fabricates modern MEMS and OLED devices in its own clean room facilities. In addition to R&D services it offers ramp-up within a pilot production. With modern equipment and about 200 scientists and engineers, the range of projects and expertise covers sensor and actuator systems, micro scanner, spatial light modulators, wireless microsystems as well as organic materials and systems.

## **Novald AG**



*Booth Number 927-4*

### **OLED Light sculpture inspired by nature**

Novald will be introducing the 'Palm frond' - an OLED light sculpture evoking the idea of a palm leaf or a bird's van. The sculpture is 1,50m high, has a diameter of 60cm and is equipped with Novaleds innovative top emitting OLEDs. This OLED structure offers the realisation of OLED lighting products made on metal substrates. Metal substrates bring advantages such as good heat dissipation, mechanical stability, bended designs and open the roadmap towards low cost roll-to-roll production.



#### **About Novald:**

Novald AG is a world leader in the OLED (Organic Light Emitting Diode) field and specializes in high efficiency long lifetime OLED structures and is an expert in organic electronics. The company is known for its Novald PIN OLED® technology, its proprietary OLED materials and the customized OLED products and services. Novald has developed long term partnerships with major OLED producers throughout the world. Based on more than 400 patents granted or pending, Novald has a strong IP position in the field of OLED technology, and was named No. 1 in a list of 'up and coming' world market leaders by the

German newspapers Handelsblatt and Wirtschaftswoche. Its main investors include eCAPITAL, Crédit Agricole Private Equity, TechnoStart, TechFund and CDC Innovation. For further details please visit [www.novaled.com](http://www.novaled.com).

## PolyIC GmbH & Co. KG

Booth Number 1019-8

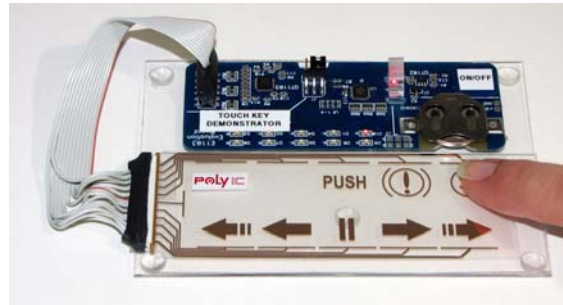


The booming market for displays, touch screens, capacitive control elements, and EMC shielding is driving the development of efficient new ways to manufacture transparent conductive films. The



indium tin oxide (ITO) coatings currently in use are reaching their limits due to a scarcity of resources as well as the

expensive process involved. The newly developed films from PolyIC offer a genuine alternative. Here, high-resolution conductor structures are printed on thin, flexible PET substrates in an economical roll-to-roll process. This type of film, which is marketed by PolyIC under the brand name PolyTC®, features a high level of transparency, high and adjustable electrical conductivity, and customer-specific layouts. These reasons, in conjunction with cost-effective mass production, will lead to a broader scope of applications in the marketplace.



All advantages of transparent conductive films from PolyIC

Compared to conventional ITO technology, PolyTC® transparent conductive films offer high transparency, flexibility, and cost-effectiveness.

The advantages of PolyTC® conductive plastics at a glance:

- High optical transparency over the entire visible wavelength range
- Individually customizable layout
- Individually adjustable electrical conductivity
- High availability as a result of mass production in a roll-to-roll process
- High flexibility on PET film
- Cost-effective alternative to structured ITO films

Liberate yourself from your dependence on indium – with conductive films from PolyIC.

### About PolyIC GmbH & Co. KG

PolyIC develops and markets products based on the platform technology printed electronics. Based on the platform technology, PolyIC offers three product lines: PolyID® (printed RFID), PolyLogo® (printed smart objects) and PolyTC (transparent conductive films). Furthermore, PolyIC works on topics like organic photovoltaics and printed components, such as memories.

PolyIC focuses on its expertise in materials, new adapted chip design methods as well as mature and newly developed mass production processes of roll-to-roll printing in order to develop and market this new technology.

PolyIC is a member of the OE-A (Organic Electronics Association), a working group under the umbrella of the VDMA (Verband Deutscher Maschinen- und Anlagenbau). The OE-A promotes organic electronics

internationally. Furthermore, PolyIC is a member of DFF, the German Flat Panel Display Forum and of AIM-D e.V., an association for automatic identification and mobile data capture.

Since September 2010, Leonhard Kurz owns 100% of PolyIC's GmbH & Co. KG shares. PolyIC was set up in November 2003 as a joint venture between Leonhard Kurz and Siemens. PolyIC is headquartered within the Nuremberg Metropolitan Region in Fuerth on the premises of Leonhard Kurz Stiftung & Co. KG.

## Institute of Microelectronics, Saarland University

Booth Number 1019-3



The Institute of Microelectronics of Saarland University (Germany) is in research and development of processor, controller and drivers for display applications.

For a specific display technology we strive for at least one of the following goals:

- lower power consumption
- higher visual quality like static contrast, frame rate etc.
- higher display lifetime
- higher yield, simpler process for display manufacturing and lower Cost of Sales

Our institute is active in the following fields of various display technologies and applications:

OLED: We developed a power efficient driving schemes for PM OLED displays. The power efficiency is lifted to the level of AMOLED, allowing median resolution displays e.g. QVGA.



Another topic is a Digital Drive Algorithm for AM OLED displays. We expect to double the power efficiency compared to analog drive (state of the art) while achieving higher manufacturing yield and simpler manufacturing processes.

A third IP is the Multiline Addressing Algorithm (MLA) for PMOLED and E-Paper. It increases the display lifetime of PMOLED displays significantly and leads to quicker response of the display and/or lower driving voltage for E-Paper.

Local Dimming of LCD Backlight: The main focus of our present research lies on local dimming LCD backlight. A proprietary local dimming algorithm has been developed and designed to reduce the power consumption of TVs, tabs etc. and to increase the static contrast and improve the black level of a LCD at the same time.

Physical modeling allows dedicated minimization of power and enhancement of static contrast. The specific construction of Edge-Lit is fully considered. The Sorted Sector Covering algorithm (SSC) for local Dimming is seamless integrated with the pixel compensation. Same luminance and considerably higher contrast are achieved compared to undimmed LCDs. The Low Cost FPGA implementation in a serial TV is and an automotive display is demonstrated at our booth.

Key Features are:

- High Power Saving (up to 50%)
- >10 times higher static contrast
- Low HW costs
- Easy for seamless integration in existing systems
- Proven for serial TV models

## About The Institute of Microelectronics of Saarland University

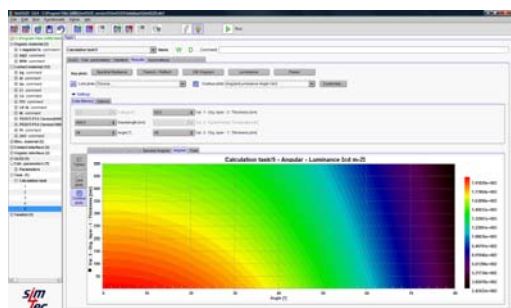
The Institute of Microelectronics of Saarland University (Germany) is involved in the development of processor, controller and drivers for display applications. The main focus lies on local dimming LCD backlight. Proprietary a local dimming algorithm has been developed and designed to reduce the power consumption of TVs, tabs etc..

## sim4tec GmbH



Booth Number 1019-1

sim4tec GmbH is the dominant software tool supplier to accelerate the organic material and device industry. The organic device industry is one of the fastest growing industries for the next decade and has a big demand to shorten the OLED development time and to get a much better understanding of the physical properties of the organic materials. We are the only company offering a complete solution along the OLED design cycle with the SimOLED software family and our material fitting service.



At the SID Display Week 2011, sim4tec introduces a brand new module SimOLED FITTING. “The newly introduced automated fitting module is a breakthrough for a seamless optical and electrical OLED simulation”, says Dr. Robert Nitsche, CEO of sim4tec. “Up to now, there was no economical way to measure directly the organic material properties like HOMO, LUMO, hole and electron mobility. However, these physical parameters are of paramount importance and have to

be well determined for a compelling electrical OLED simulation. Our new module SimOLED FITTING enables the user for the first time to generate reliable physical organic material parameters based on simple experimental data like I-V curves. Moreover, this new tool will allow scientists to explore new domains, make predictions and prove or disprove hypotheses.”

As an additional contribution to the market sim4tec is offering an organic material fitting service. This service will help customers to save development time to get fast access to reliable material properties generated by our professional experts.

All our software tools, whether it is SimOLED OPTICAL, SimOLED ELECTRICAL or SimOLED FITTING, produce reliable results through very robust and proven software algorithms. The software packages are working seamlessly together on a standard windows PC. The operation is intuitive and allows a fast interpretation of results by an outstanding graphical representation. To get a first impression of our outstanding products, we offer a complete demo version upon your request.

SimOLED is the answer if you want to understand the organic materials or accelerate your OLED design cycle!

### About sim4tec:

sim4tec is the leading provider of numerical simulation software for OLEDs. The main product is the OLED simulation software SimOLED®. SimOLED® calculates OLED key figures like current density, brightness, color and much more.

## Springer Verlag GmbH

Booth Number 1019-2



At SID 2011 Springer is presenting, in particular, the book and e-book

Handbook of Visual Display Technology

Editors-in-chief: Fihn, Mark, Chen, Janglin, Cranton, Wayne (Eds.)

Jointly published by Springer and Canopus Publishing

1st Edition., 2011, Approx. 2000 p. 2000 illus., 1600 in color.

ISBN: 978-3-540-79568-1

- The first and only reference work in the field of electronic display
- Comprehensive, one-stop resource on technology, human interaction, economics and more
- Extensively cross-referenced throughout the book
- Covers established and emergent display technologies, including organics and 3D technologies

The Handbook of Visual Display Technology is a unique work offering a comprehensive description of the science, technology, economic and human interface factors associated with the displays industry. An invaluable compilation of information, the Handbook will serve as a single reference source with expert contributions from over 150 international display professionals and academic researchers. All classes of display device are covered including LCDs, reflective displays, flexible solutions and emissive devices such as OLEDs and plasma displays, with discussion of established principles, emergent technologies, and particular areas of application. The wide-ranging content also encompasses the fundamental science of light and vision, image manipulation, core materials and processing techniques, display driving and metrology.

### About Springer:

Springer ([www.springer.com](http://www.springer.com)) is a leading global scientific publisher of books and journals, delivering quality content through innovative information products and services. It publishes close to 500 academic and professional society journals. Springer is part of the publishing group Springer Science+Business Media. In the science, technology and medicine (STM) sector, the group publishes around 2,000 journals and more than 6,500 new books a year, as well as the largest STM eBook Collection worldwide. Springer has operations in about 20 countries in Europe, the USA, and Asia, and more than 5,000 employees.

## VON ARDENNE



Booth Number 927-2

VON ARDENNE develops and manufactures industrial coating technology for substrate sizes of up to 3000 x 6000 mm for the deposition of inorganic thin films by means of PVD. VON ARDENNE started the development of linear evaporation sources for organic materials in 2007. High yields at high throughputs are our main focus in respect to large area coating equipment regardless of the film material. This is condition precedent to a successful market introduction of new products. It becomes essential at extensive material cost like for small molecules as well as for replacing established products, e.g. LCDs by OLED-displays or incandescent light bulbs by OLED-lightings.

Material yields for co-evaporation of two types of organic molecules in vacuum by linear evaporation sources are typically in the range of 40% - 60%. Additional types of organic materials in one layer, e.g. three dyes and one matrix material for white light emission entail even lower material yields. The numbers apply to coating of the whole substrate surface. However, partial coating of the surface, e.g. one color of an OLED-display by a shadow mask, results in material yields of only 10% - 20%. Therefore a strong improvement of the material yields in production is of high importance.



In addition to low materials yields, shadow masks couldn't be scaled to regular television sizes in production so far due to technical challenges like warping or registration issues. Hence various types of laser scanning lithography methods have been initiated by leading OLED-display manufacturers as alternative to shadow masks. But even high speed scanning methods are rather slow regarding throughput compared to parallel methods like optical lithography with masks for LCD-processing. Multi-laser beams increase the complexity of the lithography system dramatically because of stitching requirements for writing fields and other technical challenges. Therefore multibeams are not suitable to address the throughput issue in a cost effective manner.



VON ARDENNE developed a new type of lithography for small molecules in vacuum. Smallest feature sizes of less than 10 $\mu$ m have been printed without solvents utilizing a derivative of optical lithography for inorganic semiconductors. According to LCD-processing, this lithography method shows the potential to be scaled to Gen10 glass sizes (2850mm x 3050mm) at comparable processing times.

#### **About VON ARDENNE:**

VON ARDENNE is an internationally operating manufacturer of industrial equipment for vacuum processes in plasma and electron beam technologies.

In PHOTOVOLTAICS, VON ARDENNE's key competence lies in thin-film technologies, which are used to manufacture the different kinds of solar modules. VON ARDENNE produces equipment for the manufacture of photovoltaic modules and supplies the cost and technology leaders of the branch.

ARCHITECTURAL GLASS coating is the most effective form of environmental protection, as modern glazing methods considerably lower energy consumption for heating and air conditioning. VON ARDENNE has been manufacturing industrial glass coating equipment since 1972. Today, VON ARDENNE supplies the leading glass manufacturers with state-of-the-art machinery, which is equipped with rotatable magnetrons from in-house production.

Tailored service, excellent product quality and availability increasingly determine customer requirements. The philosophy at VON ARDENNE: Flexibility and customer proximity ensure availability and cost-effectiveness over a long machinery lifetime.

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