

# Newsletter

Advanced Solutions for Optics, Opto-Electronics, Lithography and Science!

**SCHOTT**  
glass made of ideas

Vol. VI, No. 3, November 2011

## TECHNICAL INFORMATION & PRODUCT NEWS

Production of IR material now in the US 1

SCHOTT as high-tech provider of wafers & substrates 2

New coating for sapphire windows 3

Special glass from SCHOTT even reflects neutrons 3

## VOICE OF THE CUSTOMER & INDUSTRY TRENDS

Advanced Optics cooperates with leading Korean Photonic Institute 4

SCHOTT hosts webinar "Introduction to optical glass" 4

Workshops give insight into SCHOTT Advanced Optics 5

## REGIONAL & CLOSE UP

Diamond turning technology at SCHOTT in Duryea 6

New version of the EU's RoHS Directive went into effect on July 21 7

SCHOTT to present the works of Christopher Ries at Photonics West 2012 7

**UPCOMING SCHOTT EVENTS** 8

## Page **Production of IR Material now in the US**

Advanced Optics is continuously expanding its portfolio reflecting the needs of our customers and current market development. That was the principle reason to expand our activities in the field of IR and finally to open up a production of chalcogenide glasses directly in the USA. SCHOTT is now offering chalcogenide glasses for infrared (IR) optics from US production at our facility in Duryea as a blank or final component.

SCHOTT's IG series of chalcogenide glasses is ideal for defense and security applications like night vision and thermal

imaging. It guarantees high transmission quality across a wide range of the IR spectrum, from the near-infrared (NIR) to long wavelength infrared (LWIR) regions. Like many of SCHOTT's glasses for defense applications, chalcogenide glass has a broad transparency range and consistent optical behavior over a wide temperature range. That results in minor defocusing even under extreme environments, which is a key advantage over germanium in many IR applications.

The new chalcogenide glass melting, fabrication and metrology capabilities at the Duryea facility will now provide a family of IR glasses that are able to meet the specific customized requirements, whereas Chalcogenide glasses represent a cost-effective, high performance alternative to germanium in many IR optical designs that demand consistent performance across broad temperature ranges.

The official opening of the IR production will be celebrated early December.



*Chalcogenides made in Duryea*

## SCHOTT as high-tech provider of wafers & substrates

Committed to the customers' success

SCHOTT is a high-tech provider of wafers and substrates made from leading edge thin glass materials: AF 32<sup>®</sup> eco aluminosilicate glass, D 263<sup>®</sup> T eco borosilicate glass and B 270<sup>®</sup> crown glass. SCHOTT provides these materials in various shapes and processing stages and is equipped to meet customers' needs and challenges due to its strong expertise in production, structuring, materials science and metrology.

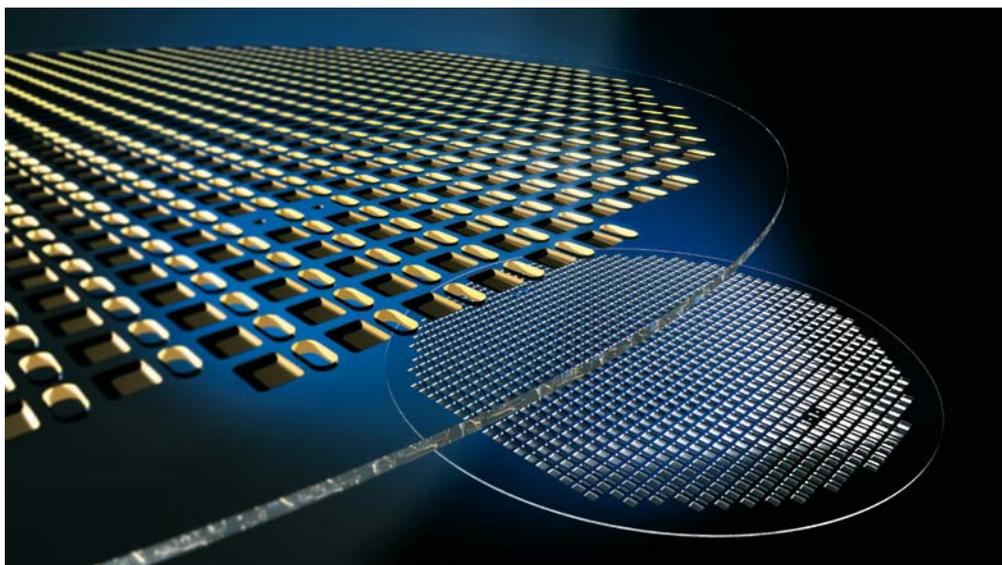
Advanced Optics provides application-specific glass materials that have unique surface qualities with less than 1 nm surface roughness that can be structured with ultrasonic drilling or powder blasting to meet customer specific requirements. In addition it can be provided in clean room compatible packaging so the products are ready-to-use by the customer. These steps are all done with integrated production processes meeting ISO 9001:2000 requirements and standards. Typical applications include micro optics in digital cameras and mobile phones, MEMS sensors for automotive and consumer

electronics, Wafer Level Packaging for image and RF sensor devices, substrates for microfluidics and DNA analysis in the biotechnology and life science fields.

D 263<sup>®</sup> T eco and AF 32<sup>®</sup> eco are made by a SCHOTT specific down-draw process in thicknesses ranging from 0.03 mm to 1.1 mm. Each has its own specific properties but both are flexible in the sub 0.1 mm thickness range, have high transmission, are non-permeable to humidity, stable against heat and sunlight, and easy to cut using laser or scribe and break methods. The material B 270<sup>®</sup> in thicknesses < 0.8 mm to 10 mm is manufactured by a SCHOTT specific up-draw process, has high transmission, high stability with respect to solarization, a fire polished surface and high chemical stability.

With these materials and a wide range of sophisticated capabilities, glass substrates and wafers offered by SCHOTT are the material of choice for many applications.

[BACK TO INDEX](#)



*Wafers from SCHOTT made out of different materials and offered in different processing stages*

## New coating for sapphire windows

After the recent installation of a new magnetron sputtering machine, SCHOTT now offers new ultra hard AR coatings designed especially for sapphire substrates.

After the watch industry had been requesting an AR coating that provides similar scratch resistance performance as sapphire itself, the research team of SCHOTT developed a new ultra hard coating with broad angle anti-reflex functionality. This new coating has already gone into mass production.

Sapphire is also used in defense and security due to its combination of mechanical hardness and IR transmission. The sapphire windows that SCHOTT manufactures are placed e.g. in front of airborne sighting systems and periscopes. The coating competence center in Yverdon has also developed a new IR anti-reflective coating for this application. This coating offers high transmission values for visible, near IR (1,5  $\mu\text{m}$ ) and mid IR (3–5  $\mu\text{m}$ ) wavelengths.

For further information please contact us at: [info.optics@schott.com](mailto:info.optics@schott.com)

[BACK TO INDEX](#)

## Special glass from SCHOTT even reflects neutrons

SCHOTT has been active in neutron guide projects all over the world for several years and provides Borokron-glasses and Borofloat. Those materials make up the main raw material structure of the neutron guides due to their high boron-oxide content of about 12%. This high concentration guarantees that very little neutrons leak out of the guides.

SCHOTT is capable of supplying various supply forms from cut blanks to pre-polished substrates with a roughness of less than 0.7 nm. These can have diagonal formats of up to 600 mm.

[BACK TO INDEX](#)

## Advanced Optics cooperates with leading Korean Photonic Institute

Goal to develop innovative products for the Korean market

SCHOTT Advanced Optics will be cooperating with the Korea Photonics Technology Institute (KOPTI) in Gwangju, Korea, in the field of photonics in the future. Gwangju is a city with a population of several millions that is located in the southwest of Korea. A "Memorandum of Understanding" (MOU) was signed this August by the President of the Technology Institute (KOPTI), Kim Seon-Ho, the mayor of Gwangju, Kang Un-Tae, and the head of Advanced Optics, Dr. Marita Paasch, at the Erich Schott Center in Mainz.



*Dr. Marita Paasch and Kang Un-Tae*

In his welcoming remarks, Mayor Kang Un-Tae explained that Gwangju is considered to be the top site for the fast-growing optics industry in Korea and follows the strategy of "Science to Business" that is aimed at commercializing the Institute's scientific work. Dr. Marita Paasch emphasized the global importance of the high-tech nation Korea and the significance of the photonics industry as an "enabler" of other industries, in the presence of the twenty-member delegation from Korea.

Dr. Paasch noted that the goal of the SCHOTT-KOPTI cooperation is to support the development of innovative products for the Korean market.

[BACK TO INDEX](#)

## SCHOTT hosts webinar "Introduction to optical glass"

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ON TWITTER AT:  
[www.twitter.com/  
SCHOTT\\_AO](http://www.twitter.com/SCHOTT_AO)

In September 2011, Dr. Mark Davis, a Senior Research Scientist from SCHOTT North America, Inc., hosted a webinar for OSA (Optical Society of America) that was entitled "Introduction to Optical Glasses: Characteristics, Applications and Customizations."

High-quality optical glasses have remained the key enabling material for realizing increasingly sophisticated imaging systems. Advancements in image correction have relied not only on the use of sophisticated ray-tracing techniques and clever engineering, but also on the availability of high-quality optical glasses with the desired attributes. The webinar highlighted the principal characteristics of optical glasses, including their optical, mechanical, and thermal

properties, and offered an introduction to selecting appropriate glasses for specific applications. The range of optical glasses that are currently available and the ability to customize compositions and/or processes to meet specific customer requirements were reviewed. Finally, a brief introduction to materials that provided useful optical functionality outside the wavelength range of traditional optical glasses was given.

SCHOTT Advanced Optics knows of the increasing importance of new media and by now providing webinars it made an important step to strengthen its presence in a new relevant communication channel.

[BACK TO INDEX](#)

## Workshops give insight into SCHOTT Advanced Optics

### Designer workshops hosted in Marseille and Toulouse

Workshops as one of our favorable marketing and communications tools are being held by SCHOTT Advanced Optics on a regular basis.

Early June, a workshop hosted by SCHOTT took place in Toulouse organized by the French Aeronautic and Space Administration CNES. The agenda covered topics on optical glass, optical filters and ZERODUR® zero expansion glass ceramic focusing on the aviation and space industry. More than 50 attendees came from all over France and also from Switzerland and gave very positive feedback: "Very interesting presentations on the technical point of view, and very precise, detailed and useful information for the optical designers."



*Dr. Peter Hartmann and Dr. Ralf Biertümpfel hosting a workshop for optical designers*

In September a similar event was realized in Marseille. In a workshop for optical designers in cooperation with SPIE, about forty participants heard about SCHOTT's portfolio, development trends, glass properties, production processes, product availability, application examples, standardization activities, and special glass types (radiation resistant, low fluorescent, IR transmitting glass types, and glass types for digital projection) in a one day event. Lively discussions proved the good reception of the provided information.

The workshop was collocated with the SPIE conference "Optical Systems Design" which was attended by about 400 optical experts (20% up; 71% Europe, 10% US, 19% China). At the conference SCHOTT also contributed two presentations; one on "LED collimation using high index glass" by Dr. Ralf Biertümpfel and one on "Optical Glass – Dispersion in the Near Infrared" by Dr. Peter Hartmann.

If you want to hear further details on our workshops, please contact us at: [info.optics@schott.com](mailto:info.optics@schott.com).

[BACK TO INDEX](#)

## Diamond turning technology at SCHOTT in Duryea, PA

SCHOTT's US manufacturing site in Duryea has been extending its processing capabilities and invested in the development of a single point diamond turning technology (SPDT). This process is used to manufacture optics of complex shapes in support of the chalcogenide glass melting facility that came on line in August 2011. Chalcogenide glass belongs to a family of materials that transmit infrared radiation (IR), and therefore, can be used for sensing, focusing, and transmitting information to IR detectors. While the material is opaque to the human eye, it serves as an efficient transmitter at infrared wavelengths.

Diamond turning is a lathe operation that uses a small diamond to cut material in the same way that conventional lathes use high-speed steel or carbide inserts. The difference lies in the accuracy of both the equipment and the cutting tool. The SPDT machine in Duryea is capable of 0.34 Angstrom resolution (less than 1 millionth of a human hair), while the diamond surface can be controlled to less than 100 nanometers. This enables

production of highly accurate optical surfaces such as aspheres and diffractives that would otherwise be difficult to produce using conventional methods.

Measurement of these complex surfaces also requires precision equipment capable of providing highly accurate data. For this reason, the Duryea facility decided to invest in interferometry and surface profilometry tools. While the profilometer has been added to the manufacturing, SCHOTT employees have received many hours of training to ensure that precision manufacturing and metrology is available to meet customer demands.

The optics produced at SCHOTT are put to use as components in the imaging systems used in medical, security, and defense industries. Possible applications are automotive night vision, medical monitoring, industrial inspection, fire-fighting, energy conservation and surveillance.

[BACK TO INDEX](#)

## New Version of the EU's RoHS Directive went into effect on July 21

The new version of the RoHS Directive entitled "Directive 2011/65/EU of the European Parliament and of the council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (recast)" was published in the official Journal of the European Union on July 1, 2011. This went into effect on July 21, 2011.

SCHOTT Advanced Optics has been following the revision of this RoHS Directive and supporting it by providing data on optical glasses and filters.

Advanced Optics' products are compliant with the requirements of the new version of the RoHS Directive. Effective July 21, we changed the respective RoHS certificates to the new terminology "2011/65/EU".

SCHOTT Advanced Optics will continue to follow developments regarding the legal requirements and remain a reliable partner to its partners in the area of global environmental management.

[BACK TO INDEX](#)

## SCHOTT to present the works of Christopher Ries at Photonics West 2012

SPIE's Photonics West ranks as the society's largest trade show and conference (2011 approx. 20.000 visitors) and addresses disciplines ranging from optical engineering, lasers, electronics, medical, sensing, and display technologies.



*Glass sculpture made by Christopher Ries*

Also in 2012 SCHOTT will be present at the show and present its new products and latest development at its booth, at various product demos and speeches.

Besides the actual SCHOTT products in 2012 the work of the artist Christopher Ries will be showcased again.

Ries' impressive sculptures embody materials science, while the artist's favorite medium is precision optical glass from SCHOTT. Ries works in concert with SCHOTT at its plant in Duryea, PA. and designs and executes massive sculptures while benefiting from SCHOTT's melting, fabricating, and handling expertise. Ries' sculptures will be presented at Booth 1236. Please also visit us at the SCHOTT Booth 1601.

[BACK TO INDEX](#)

## Upcoming SCHOTT Events

*Here we are listing the events where "Advanced Optics" proactively attends as an exhibitor, speaker or has an active part such as "chair of technical conferences," etc.*

VISION 2011 – Booth 6B15  
Messe Stuttgart  
November 8th–10th, 2011

COMPAMED 2011 – Booth 8H08  
Düsseldorf  
November 16th–18th, 2011

SPIE BiOS – Booth 8904  
San Francisco, CA  
January 21th–22th, 2012

SPIE Photonics West 2012 – Booth 1601  
San Francisco, CA  
January 24th–26th, 2012