PRESS INFORMATION

No. 011/2020

January 29, 2020

SAN FRANCISCO, Calif.

SCHOTT, Inkron, EVG, and WaveOptics: Global AR leaders team up to enable next-gen waveguides at Photonics West

Prominent Augmented Reality (AR) companies join forces to accelerate the journey to consumer-grade AR wearable devices. SCHOTT, Inkron, EV Group (EVG), and WaveOptics present the world's first waveguides made on glass substrate with a refractive index of 1.9 and a matching nanostructured polymer – produced on a 300 mm wafer platform ready for mass production.

SCHOTT, a leading international technology group and the inventor of optical glass, now unveils SCHOTT RealView™ high-index glass wafers with a refractive index of 1.9 and a diameter of 300 mm. These wafers are the basis for high-volume next-generation AR waveguide manufacturing at lower cost per unit, while also maintaining the extremely high precision standards that AR demands. The nanotech company Inkron manufactures the resin that matches the refractive index of 1.9. The resin was used to imprint as many as 24 waveguides on a single 300 mm SCHOTT RealView™ 1.9 wafer using the fully integrated and volume-proven EVG HERCULES® NIL nanoimprint platform. This product combines the glass expertise of SCHOTT and the formulation and resin innovation of Inkron with the standard-setting nanoimprint lithography (NIL) capabilities of EVG by using a renowned waveguide architecture of WaveOptics, the leading optical design house for high-performance waveguides. All companies are united by their aspiration to shape the future of AR. SCHOTT (booth 841), Inkron (booth 5279) and WaveOptics (booth #8 in Demo Hall) will display their parts of the story at the upcoming Photonics West 2020 in San Francisco, Feb. 1-6.

SAN FRANCISCO, Calif – January 29, 2020 – Consumer-grade Augmented Reality Wearables are one giant step closer. Fostering a new collaboration, SCHOTT announced today the latest update to the SCHOTT RealView™ portfolio of high-refractive-index glass wafers for Augmented Reality (AR) and Mixed Reality (MR) devices: a 300 mm wafer that allows a wide field of view, up to 65°, that enables a fully immersive user experience thanks to its 1.9 refractive index. Not only will it serve as a substrate for future AR and MR device generations, a proof of concept is now presented.

Larger wafer size with 1.9 refractive index – and optical resins

“The market has been clamoring for a high-index glass with matching high-index resin. Together with our partner Inkron, SCHOTT is again establishing a pioneering role in setting up the infrastructure for most advanced waveguide solutions,” said Dr. Ruediger Sprengard, Head of Augmented Reality at SCHOTT. “With the demonstration of a resin matching the optical properties of the latest SCHOTT RealView™ generation and meeting the requirements of EVG’s mass-manufacturing NIL process, the missing link in the fabrication system of next-level field of view waveguides is now accessible.”

At Photonics West 2020, the companies will publicly display the industry's readiness for high volume production of wide field-of-view devices for the first time. Leveraging this novel high-index combination of glass and resin on a 300 mm wafer diameter and proving compatibility with 300 mm mass production equipment paves the way for an efficient and lower-cost manufacturing ecosystem for AR waveguides.

The next milestone on the road to Consumer AR devices

"This development, together with our partners Inkron and EVG, is a major evolution towards addressing the consumer market. On the one hand, we fill the AR glass wafer innovation pipeline with products that feature outstanding properties; on the other, we team up with strong partners to fill these pieces with 'optical life', immediately ready for mass production!" states Dr. Frederik Bachhuber, Innovation Manager for AR at SCHOTT.

The fabrication of the demonstrator was carried out at EVG's NIL Photonics Competence Center using its proprietary wafer processing equipment. This included EVG's recently introduced HERCULES® NIL 300 mm fully modular and integrated UV-NIL system with SmartNIL® technology, which can replicate structures on substrates up to 300 mm in diameter.

Inkron's high RI resin IOC-133 features high refractive index (1.9) combined with excellent processability and optical properties. These material features combined with the SCHOTT RealView™ substrate and EVG's process expertise offer the solid foundation for WaveOptics' waveguide design.

WaveOptics, a leading designer and manufacturer of diffractive waveguides, offers the waveguide technology platforms that now feature the widest range of fields of view (between 15° and 60° diagonal), the largest eye-box and are readily customisable to meet the demands of any customer.

SCHOTT RealView™ glass wafers with a high refractive index are key components of next-gen AR/MR headsets. The glass wafers are the basis for customers' multi-layered RGB waveguides, and therefore are a key part of the AR/MR display unit that enables an immersive user experience (discover the technology here). SCHOTT offers the broadest product portfolio of the industry with refractive indices from 1.5 to 1.9 at wafer diameters of 100, 150, 200, and 300 mm.

A glass innovation that inspires a whole industry

SCHOTT scientists and glass experts are constantly improving the quality of AR/MR-grade optical glass and fueling the innovation pipeline with next-generation products in its German optical glass competence centers. Simultaneously, SCHOTT has proven mass production experience to consistently fulfill the highest quality demand of the industry prepared to serve the rapidly growing AR market. Regarded as the key component for the full immersion experience, SCHOTT's RealView™ glass wafers received the 2019 Display Industry Award for Display Component of the Year from the Society of Information Display, SID.

END

Additional info: Listen to the experts' speeches at SPIE AR VR MR Conference or join their special Industry Events:

"Nanoimprint lithography for AR waveguides manufacturing"
Christine Thanner, EV Group
February 2, 3:00 PM | SPIE AR VR MR

"High refractive index glass wafers for augmented reality – review of recent innovations enabling the ecosystem to implement the industry roadmap"
Dr. Frederik Bachhuber, SCHOTT
February 2, 3:40 PM | SPIE AR VR MR

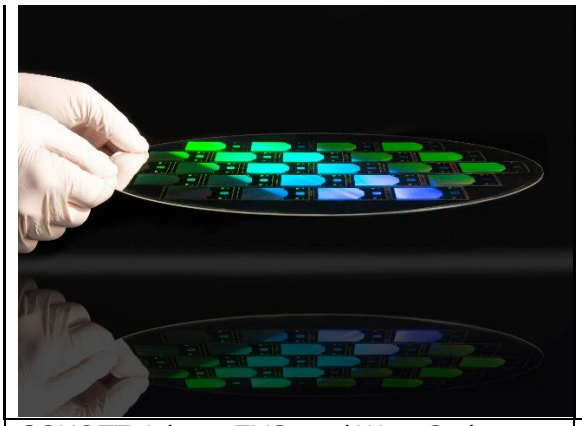
"Building a mass manufacturing capability for augmented reality waveguides"
WaveOptics & Goertek
February 3, 1:30 - 2:45 PM | Room 2009, Level 2 West @ SPIE AR VR MR

"Guiding and Harnessing Light: High Index Waveguides and Optical Materials Enabling AR Devices"
Dr. Ruediger Sprengard, SCHOTT
February 4, 9:30 AM | SPIE AR VR MR

"Enabling High Volume Manufacturing for AR Applications Using Nanoimprint Lithography"
Dr. Thomas Glinsner, EV Group
February 4, 9:50 AM | SPIE AR VR MR

"Diffractive and Reflective Waveguides: A Game of Trade-Offs"
Phil Greenhalgh, WaveOptics
February 4, 11:10 AM | SPIE AR VR MR

Images

	
SCHOTT, Inkron, EVG, and WaveOptics team up to enable next-gen waveguides. Image: EVG	*SCHOTT RealView™ high-index glass wafers bring Augmented and Mixed Reality to life. Image: SCHOTT*

About SCHOTT

SCHOTT is a leading international technology group in the areas of specialty glass, glass-ceramics and related high-tech materials. With over 130 years of experience, the company is an innovative partner to many industries, including the home appliance, pharma, electronics, optics, life sciences, automotive and aviation industries. SCHOTT has a global presence with production sites and sales offices in 34 countries. In the 2017/2018 fiscal year, the group generated sales of EUR 2.08 billion with over 15,500 employees. SCHOTT AG has its headquarters in Mainz (Germany) and is solely owned by the Carl Zeiss Foundation. This is one of the oldest private and largest science-promoting foundations in Germany. As a foundation company, SCHOTT assumes special responsibility for its employees, society and the environment.

About EV Group (EVG)

EV Group (EVG) is a leading supplier of equipment and process solutions for the manufacture of semiconductors, microelectromechanical systems (MEMS), compound semiconductors, power devices and nanotechnology devices. Key products include wafer bonding, thin-wafer processing, lithography/nanoimprint lithography (NIL) and metrology equipment, as well as photoresist coaters, cleaners and inspection systems. Founded in 1980, EV Group services and supports an elaborate network of global customers and partners all over the world. More information about EVG is available at www.EVGroup.com.

About Inkron

Inkron, a member of Nagase Group, is a developer and manufacturer of high and low Refractive Index (RI) coating materials. These industry leading optical coatings cover record breaking RI range between 1.1 and 2.0 in VIS/NIR range. The high RI materials are optimized for the Nano Imprint Lithography (NIL) process. Targeted applications include DOE (Diffractive Optics Elements) such as Waveguides for XR devices, optical diffusers, LIDAR and other photonic applications. High refractive index materials are complemented by Inkron's matching low refractive index materials with RI range of 1.1-1.4. Typical applications of the low RI materials cover anti-reflective coatings (visible and NIR range), waveguide claddings and adhesive layers. The in-house synthesized resins and formulations are optically clear, thermally stable and commercially ready for demanding applications. Other products offered by Inkron cover thermally conductive adhesives, encapsulant materials and a range of printable inks.

About WaveOptics

WaveOptics unlocks the possibilities of augmented reality (AR) for the mass market. Our waveguides and projectors are the key components in AR wearable devices and smart glasses, which allow digital images to be overlaid onto the real world. Founded in 2014, WaveOptics has a highly experienced team, with a breadth of skills and experience, who are driven and determined to make AR the next must-have technology. Our patented diffractive waveguide technology is readily customisable to meet the demands of any customer. Our technology was designed from the outset with mass manufacturing in mind, enabling efficient processes at low cost.

Press contact

Michael Mueller
PR & Communications Manager
+49 (0)6131/66-4088
michael-matthias.mueller@schott.com