PRO flextronics

Media Hub for Organic, Flexible and Printed Electronics

Flexible Displays & Smart Surfaces

LG Display, Samsung Display, Beneq, FLEXOO, AUO, Silicon Austria Labs, PROFACTOR, Armor, Alper

Events

Previews: TechBlick Berlin 2025, LOPEC 2026

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Companies in the flextronics SPOTLIGHT

Hamamatsu Photonics, BST, Heraeus Electronics, Hoenle, KROENERT

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No 5 - Oct 2025

PRO Flextronics – The Next Generation of Electronics

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Flextronics is our abbreviation for flexible electronics: Lightweight, thin, low-cost, sustainable, and easily integrated. Start into your flexible future with us!

We report on new form factors, more sustainable production methods and exciting product novelties. Accompany this growth sector on its way into the mass markets!

PRO Flextronics will be published three times annually as Print Magazine and E-Paper, accompanied by bi-monthly newsletters and daily online-news. The magazine's language is English.

Editorial preview PRO Flextronics 2026

PRO Flextronics 6
Advertising deadline: 20.01.2026
Publication date: 17.02.2026

» **Smart Living & Mobility**

LOPEC, 24.-26.02.2026, Munich
embedded world, 10.-12.03.2026, Nuremberg
Touch Taiwan, 08.-10.04.2026, Taipei
Interpack, 07.-13.05.2026, Düsseldorf

PRO Flextronics 7
Advertising deadline: 15.04.2026
Publication date: 18.05.2026

» **Flexible Displays, Smart Packaging & Energy Storage**

SID Display Week, 03.-08.05.2026, Los Angeles
The Battery Show Europe, 09.-11.06.2026, Stuttgart
TechBlick, 10.-11.06.2026, Mountain View
Nanotexnology, Juli 2026, Thessaloníki

PRO Flextronics 8
Advertising deadline: 09.09.2026
Publication date: 06.10.2026

» **Organic Photovoltaics, Healthcare & Smart Cities**

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electronica, 10.-13.11.2026, Munich
CES, Januar 2027, Las Vegas
LOPEC, Frühjahr 2027, Munich

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A love letter to Additive Manufacturing

Dear Readers,

Just a few days ago, I had the unique opportunity to attend a guided tour through the BMW plant in Munich, their oldest and most well-known site. As a tech enthusiast, I really enjoyed seeing all these sophisticated robots in action – welding, cutting, painting, etc. It was a fascinating ballet of sparks and steel, precision and repetition, all orchestrated to build one of the most iconic products of German engineering: the automobile.

Still, I couldn't help but compare this manufacturing method to the one we experience in our Flexible and Printed Electronics industry. Traditional car manufacturing is a highly optimised subtractive process. Sheets of metal are cut, shaped, welded, and coated. Each step adds complexity, but it also creates material waste and locks the product into a rigid form early on.

By contrast, printed electronics relies on additive manufacturing. We build functionality layer by layer, using only as much material as needed, precisely where it is needed. This approach reduces waste dramatically and opens up design freedom that traditional methods cannot match. Circuits can be embedded onto flexible foils, integrated seamlessly into surfaces, or produced on demand in small series without costly tooling.

The comparison highlights why additive manufacturing is so exciting: it is not about replacing established methods overnight, but about complementing them where they make most sense. Just as a car plant requires thousands of tonnes of steel and energy, our field shows how much can be achieved with grams of ink and a clever process. The sustainability benefits, the adaptability to new applications, and the creativity unlocked by printing electronics are reasons to be excited!

One more thing to be excited about is the upcoming TechBlick Berlin exhibition and conference, which we will be attending live. Let's meet up and have a chat there!

Enjoy reading!

Martin Hirschmann
Editor-in-Chief

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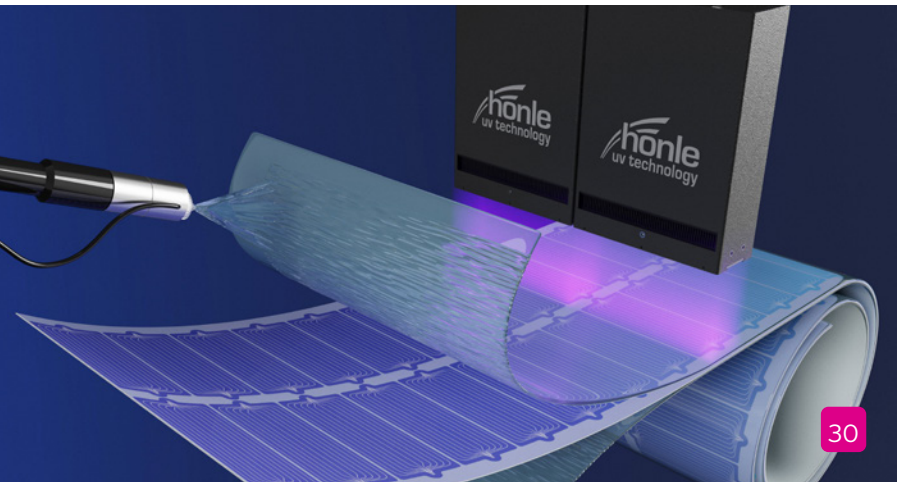

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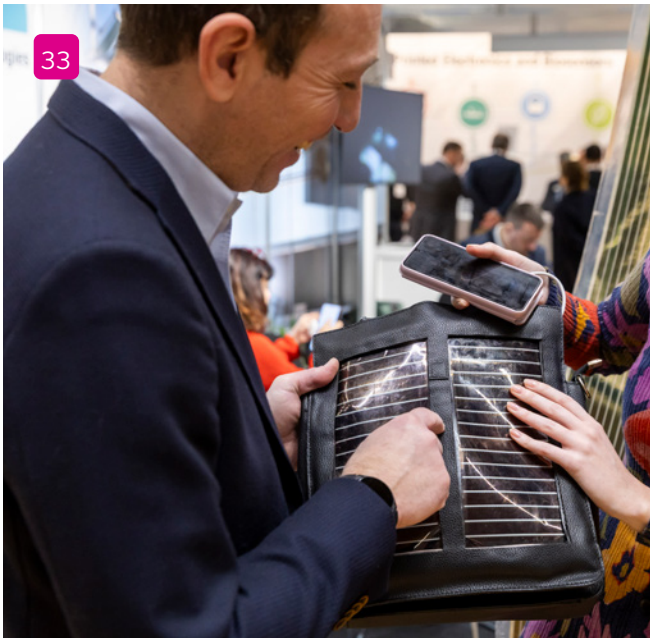
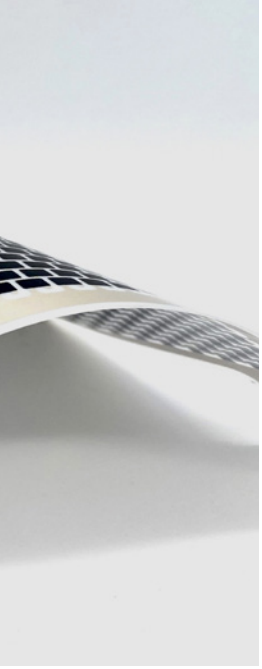




Flexible Displays & Smart Surfaces

Events

Flextronics Family

Flextronics Spotlight

oe-a Spotlight

Schreiner Group announces TIM leadership change

Schreiner Group has seen a change at the helm of Technology and Innovation Management (TIM): Dr Jens Vor der Brüggen, who had been leading Research and Development (R&D) for many years, has assumed responsibility for TIM from Robert Weiss, who will support the change during the transition phase as "Senior Management Consultant, Technology Management," and continue to perform key strategic tasks.
"I am delighted about the trust that has been placed in me and about this new challenge," said Dr Jens Vor der Brüggen. "Technologically, we have a strong foundation that we intend to jointly develop further. My goal is to systematically drive innovations and to broaden Schreiner Group's technology base even further." Dr Vor der Brüggen joined the company in 2002 and has decisively shaped Schreiner Group's evolution ever since then.
President and CEO Roland Schreiner emphasised the importance of the new role by stating that "Dr. Jens Vor der Brüggen is an experienced and highly competent expert taking the helm of our Technology and Innovation Management. He has been familiar with Schreiner Group and our technology landscape for more than two decades. I am convinced that he will continue to strengthen our company's innovative prowess."
Schreiner Group's Technology and Innovation Management (TIM) is far more than a classic development function, combining a variety of areas of expertise and forward-thinking skills under a common umbrella:

Dr Jens Vor der Brüggen

Research and Development (R&D) with their three specialised teams – Basic Technologies, Functional Components, and Laboratory/Prototyping – the Schreiner LogiData, Schreiner ProSecure, Schreiner Services, and Schreiner Digital Solutions Competence Centers, and cross-functional Innovation Management that is focused on Development and Patent Management, and includes an in-house Pilot Plant.

www.schreiner-group.com
Image source: Schreiner Group

TactoTek appoints industry leader Harry Andersson Bettencourt

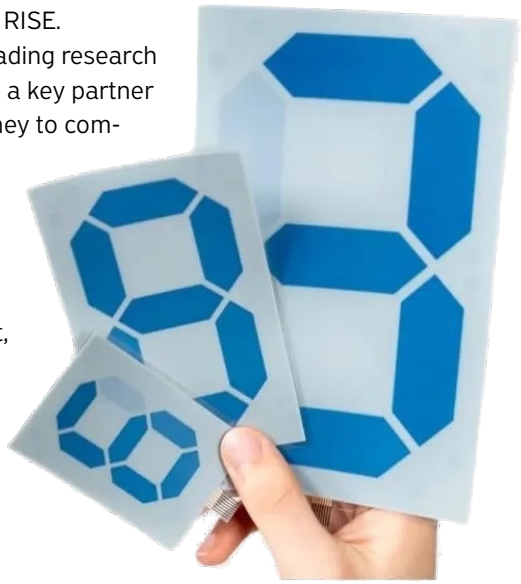
Harry Andersson Bettencourt

TactoTek, the global leader in In-Mould Structural Electronics (IMSE), announced the appointment of Harry Andersson Bettencourt as Senior Advisor to the company. A seasoned executive with extensive international leadership experience in the consumer, automotive, pharmaceutical, and industrial markets, he will advise TactoTek on expanding its IMSE technology adoption into high-growth non-automotive sectors.
Harry Andersson Bettencourt brings over three decades of strategic and operational expertise in driving exponential growth, global product development, electronics integration, and building technology partnerships. Notably, he spent nearly 14 years at Harman (a Samsung company), a global automotive and audio technology leader known for brands such as JBL, Harman Kardon, and Mark Levinson..
Jussi Harvela, CEO of TactoTek, says: "We're thrilled to welcome Harry to our team. His unique perspective and proven leadership in both established and emerging markets will be invaluable as we accelerate our expansion. Harry's guidance will help us connect with new customers and partners, ensuring that IMSE technology delivers real value wherever it's needed."

www.tactotek.com
Image source: TactoTek

Ynvisible inaugurates new production facility in Sweden

Ynvisible Interactive Inc. announces the successful relocation and commissioning of its roll-to-roll (R2R) high-volume production line to a new, state-of-the-art facility in Norrköping, Sweden. Strategically located in Norrköping – widely recognised as a European centre of excellence for Printed Electronics – Ynvisible's new facility is embedded in a vibrant innovation ecosystem of companies, research institutions, and start-ups. The company now benefits from seamless access to cutting-edge pilot manufacturing infrastructure and technical expertise, while being co-located with long-term partner RISE.



Display solutions from Ynvisible

RISE, Sweden's leading research institute, has been a key partner in Ynvisible's journey to commercialise printed electrochromic display technology. Through an exclusive license agreement, Ynvisible holds worldwide rights to key patent families developed by RISE. This collaboration extends beyond licensing into a robust R&D alliance focused on advancing the next generation of printed e-paper products. With direct access to RISE's globally recognised team of experts and facilities, the relocation to Norrköping further strengthens this strategic partnership, enabling closer collaboration and faster innovation cycles.

This move also marks a significant milestone in Ynvisible's long-term commitment to advancing roll-to-roll manufacturing and innovation in Printed Electronics. The new facility not only strengthens the company's production capabilities for its proprietary printed e-paper display technology but also expands its capacity to support the production of other emerging Printed Electronics components, including sensors, batteries, and solar cells – placing it at the forefront of scalable, sustainable Printed

"Being integrated into the local Printed Electronics ecosystem in Norrköping is a strategic advantage for Ynvisible," said Ramin Heydarpour, CEO of Ynvisible. "We are now closer than ever to our long-term partner RISE and surrounded by a dynamic community of innovators. We are deeply grateful to Norrköping Science Park for their warm welcome."

www.ynvisible.com
Image source: Ynvisible Interactive Inc.

Pragmatic appoints John Quigley EVP of Engineering

John Quigley

Pragmatic Semiconductor Ltd. announced the appointment of John Quigley as Executive Vice President (EVP) of Engineering with responsibility for Technology Development, IC Design and Applications Engineering at the company. With an extensive career of over 35 years in the semiconductor and technology sector spanning engineering, operational and leadership roles, Quigley brings industry-leading technical domain expertise to Pragmatic, in addition to a wealth of experience leading and scaling technology and product portfolios in large public and growth businesses on a global scale.

Most recently John was Senior Vice President of Research and Development, Microprocessor and Microcontroller Engineering at NXP Semiconductors, with operational and strategic leadership responsibility for large global engineering organisations.

David Moore, CEO, Pragmatic Semiconductor, said: "I am delighted to welcome John to the executive leadership team at Pragmatic Semiconductor to lead our engineering development and execution across our Technology Development, IC Design, and Applications Engineering teams. He joins us at an extremely exciting time, during a period of rapid growth, as we service global customer demand through the delivery of our innovative FlexIC technology via our products, platforms, and advanced manufacturing. John's deep technical expertise, significant industry experience, and track record of scaling technology and leading successful engineering teams around the world, coupled with his extensive experience partnering with large global customers to deliver industry-leading solutions to market, will be of enormous strategic value to the company."

www.pragmaticsemi.com
Image source: Pragmatic Semiconductor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PROFLEX2025

and meet the PRO Flextronics Team there, 22-23 Oct 2025

TechBlick Boston 2025

From the East Coast to the West Coast

The second edition of Tech-Blick USA – The Future of Electronics RESHAPED took place in Boston once again from 11-12 June. Numerous key players from additive, sustainable, hybrid and 3D electronics gathered for the exhibition and conference that further established itself as a must-attend event in North America.

Due to high demand, the organisers at TechBlick have found a new venue for the 2026 edition: From 10-11 June 2026, TechBlick USA will take place in Mountain View, California.

www.techblick.com
Image source: TechBlick

LG Display

Displays lead the way in AI innovation

LG Display, a leading innovator of display technologies, recently presented innovations optimised for the AI age alongside its vision for the future at IMID 2025, the largest academic display conference in Korea.

The International Meeting on Information Display (IMID), hosted by the Korean Information Display Society (KIDS), brings together more than 2,000 display experts annually. IMID 2025 was held at BEXCO in Busan for three days from 20 August.

Choi Hyun-chul,
Executive Vice President at LG Display

Displays as a cognitive interface

At the opening ceremony, Choi Hyun-chul, Executive Vice President at LG Display, delivered a keynote speech under the title of “Beyond Screen: Display as Cognitive Interface,” outlining the company’s future vision of displays whose role has grown in the age of AI. “With the advancement of AI, the display has become a cognitive interface – a window where humans and AI meet and communicate,” Choi said. He presented the direction of display technology, form, and evolution that will lead AI innovation, including the evolution of the user interface, the evolution of the spatial structure, and the sustainability of AI. First, introducing the evolution of the user interface, he explained that there is a growing need for displays that can accurately express human intentions and emotions when it comes to AI, emphasising that OLED is the most optimised technology for this purpose. “As AI evolves to understand human behaviour, displays will move beyond simply showing information,” he said. “In the future, when AI recognises our intentions and emotions, what matters then is how precisely displays can express them.”

Optimising OLED designs

Choi emphasised that high brightness, high resolution, and high colour accuracy technology is needed to deliver brighter, clearer, and more accurate colour expression. “To achieve this, it is necessary to not only continue developing optical structures for light extraction but also to optimise OLED designs as we have seen with third- and fourth-generation OLED and layered structures such as Tandem OLED.” He then highlighted the evolution of the spatial structure of displays. He cited “form-factor-free” examples such as Slidable OLEDs and Stretchable displays, and mentioned 3D, augmented reality (AR), virtual reality (VR), transparent, and hologram displays as “technologies that have evolved to offer deeper visual depth and multidimensionality.” Slidable OLEDs are displays that are as thin as paper and can be hidden in narrow spaces such as car ceilings. With their bright and clear screens, they enable movie viewing and video conferencing, greatly reducing time and space limitations. Stretchable displays are the ultimate in free-form screens that can be freely transformed into any shape, including by stretching, folding, or twisting them. LG Display unveiled a Stretchable display

A curved computer screen from LG Display

with the industry's highest screen elongation rate (approximately 50%) in November last year.
Finally, Choi explained the conditions for the sustainability of AI. He said that technology is needed to selectively show content to intended users in order to protect privacy. In this regard, he introduced Switchable Privacy Mode (SPM), a field of view control technology that detects the line of sight of people nearby and displays information only to necessary users. He also insisted that "AI devices inevitably require increased power consumption for real-time responses," adding that "displays are the most critical component for power efficiency."

Eco-conscious technology

In addition, he emphasised the importance of eco-conscious technology, as LG Display has been implementing various activities such as carbon reduction and water reuse. As a result, the company has this year been awarded a "Platinum" rating by global ESG evaluation agency EcoVadis, which means it is in the top 1% for ESG management.
Choi concluded his speech by saying, "In the AI age, OLED is the most suitable display for accurately implementing users' intentions in various forms according to context and considering the sustainability of technological evolution." He added, "OLED will be a turning point that leads the innovation and expansion of the display industry along with the growth of AI."
Meanwhile, LG Display set up a special exhibition hall for IMID visitors to experience its 18-inch Slidable OLED for vehicles, Stretchable display, 83-inch fourth-generation OLED TV panel selected as "Display of the Year" at the conference, and Gaming OLEDs. The company additionally presented 23 research papers on OLED and next-generation displays during the event, emphasising its differentiated technological leadership.

www.lgdisplay.com/eng
Image source: LG Display

Samsung Display

Exceptional Durability

Samsung Display announced that its latest foldable OLED panel remained fully functional after a 500,000-fold durability test, once again proving the exceptional durability of its foldable OLED technology.

The panel was tested and verified by the global testing, inspection, and certification company Bureau Veritas. Samsung Display raised its internal durability testing standard from 200,000 to 500,000 folds, which is 2.5 times its previous benchmark, underscoring its confidence in the panel's long-term resilience. The panel is used in the recently launched Samsung Galaxy Z Fold7.

The Galaxy Z Fold 7 with technology from Samsung Display

Panel remained functional after 500,000 folds

According to Bureau Veritas, the test was conducted over 13 days at 25°C (77°F), and the panel remained fully functional after 500,000 folds. A total of 500,000 folds translates to over 10 years of use for average users folding their device about 100 times a day, and over 6 years for heavy users folding more than 200 times daily, proving that durability is no longer a limiting factor in the lifespan of foldable smartphones.

This remarkable durability is made possible by Samsung Display's newly developed shock-resistant structure, inspired by the design principles of bulletproof glass. Traditional bulletproof glass consists of multiple layers of strengthened glass and plastic films engineered to absorb and disperse energy on impact. When a bullet strikes the surface, the elasticity of the outer glass layer absorbs much of the impact energy, preventing penetration. Samsung Display applied this concept by increasing the thickness of its outermost UTG (Ultra Thin Glass) by 50% and introducing a new high-elastic adhesive applied to each layer inside its OLED panel, offering over four times the recovery performance compared to the previous material. These enhancements significantly improve the panel's ability to absorb external impact.

New flattening structure

In addition, a new flattening structure was incorporated to distribute shock evenly across the panel, and a titanium plate was adopted to support the display. The titanium plate offers high strength while being lighter and thinner than conventional materials – resulting in a slimmer form factor with greater protection.

"As foldable OLED enters its seventh year of commercialisation, we've achieved another meaningful breakthrough in both durability and design," said Hojung Lee, Executive Vice President and Head of Mobile Display Product Planning Team at Samsung Display. "This new panel not only builds consumer confidence in foldable OLED durability but also underscores the technological advantage that makes Samsung Display distinguished in the industry."

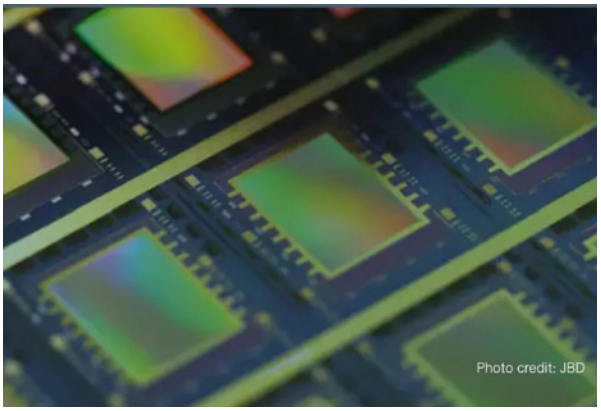
https://global.samsungdisplay.com
Image source: Samsung Display

Beneq

Advancing MicroLED leadership with growing demand

Beneq, a global leader in Atomic Layer Deposition (ALD) technology, announces significant progress in the microLED display market, underscored by repeat orders from industry-leading technology innovators.

MicroLED technology is revolutionising the future of displays across sectors including consumer electronics, augmented and virtual reality (AR/VR), and the automotive industry. With unparalleled brightness, contrast, energy efficiency, and durability, microLED represents a paradigm shift in how displays are designed and manufactured – enabling ultra-fine pixel resolution, seamless scalability, and longer device lifetimes. As demand for next-generation display solutions accelerates, microLED is poised to become the backbone of future visual interfaces.



Beneq aims to lead the way in microLED innovation

Enormous growth projected

According to Yole Group, global microLED display shipments are projected to grow at a compound annual growth rate (CAGR) of 180.6% from 2022, reaching 42.4 million units by 2029. Despite its promise, microLED development presents formidable challenges, particularly in scaling down pixel sizes to below 10 micrometres while maintaining uniformity, stability, and manufacturability. As pixels shrink, precise material control and surface passivation become critical to device performance. Atomic Layer Deposition offers a unique solution, enabling ultra-thin, conformal coatings with atomic-level precision. ALD addresses key barriers in microLED production, such as surface defect passivation, sidewall protection, transparent conductive oxides and final passivation, thereby improving both device efficiency and long-term reliability. "Our top-tier customers rely on ALD technology to advance monolithic integration of microLEDs and driver electronics on a single chip. This integration paves the way for a new class of smaller, more powerful display products – delivering faster data transfer, lower power consumption, and a significantly more compact footprint," says Mikko Söderlund, Head of Semiconductor ALD Sales. "These repeat orders validate Beneq's solution and demonstrate the company's commitment to support customers through both the demanding development phase and the critical transition to volume manufacturing."

Transform ALD cluster platform

Beneq's Transform ALD cluster platform stands at the forefront of this technological evolution. Designed for high-throughput production and advanced technology development, the Beneq Transform combines modularity, flexibility, and productivity, making it an ideal tool for microLED manufacturers. Its multi-chamber architecture supports a wide range of materials and processes, enabling customers to fine-tune optical and electrical properties while seamlessly scaling from lab to fab. By equipping microLED pioneers with the tools needed to overcome manufacturing barriers, the Beneq Transform is helping accelerate the commercialisation of microLED displays – paving the way for brighter, smarter, and more sustainable electronic experiences.

https://beneq.com
Image source: JBD

AUO Display Plus

Display innovation for Hamburg's public transportation

AUO Display Plus (ADP), a subsidiary of AUO specialising in display solutions for vertical applications, has partnered with S-Bahn Hamburg – a subsidiary of Deutsche Bahn AG (DB), Europe's largest railway operator—to unveil a new concept train featuring ADP's industry-exclusive HiRaso display technology.

Built on Cholesteric Liquid Crystal Display (ChLCD), this distinctive reflective and bistable technology enables a zero-power information display, demonstrating a commitment to sustainability through reduced energy consumption. It enhances passenger communication and operational efficiency while contributing to DB's green transformation initiatives and supporting the vision of smart, sustainable, and net-zero cities. The concept train features ADP's 28.5-inch HiRaso Panel PC, an industrial-grade embedded solution that combines an energy-saving display with robust computing capabilities. It delivers clear, dynamic guidance across various applications – from passenger information systems to bicycle and luggage areas, enhancing reliability and creating a seamless travel experience for passengers.

Innovative e-paper solution

Unlike traditional displays, ADP's HiRaso display technology is an innovative e-paper solution that leverages the bistable properties of Cholesteric Liquid Crystal Display (ChLCD) and ambient light reflection to achieve highly efficient energy use. Power is consumed only during image updates; otherwise, the display operates at zero-power for continuous static content – resulting in a significant 90% reduction in power consumption compared to conventional LCD technologies.

The concept train features ADP's 28.5-inch HiRaso Panel PC, an industrial-grade embedded solution that combines energy-saving display with robust computing capabilities. It delivers clear, dynamic guidance across various applications – from passenger information systems to bicycle and luggage areas, enhancing reliability and creating a seamless travel experience for passengers

The HiRaso Panel PC features a wide operating temperature range of -30 to 85°C, ensuring reliable performance in harsh conditions. Additionally, its compliance with IEC-61373 shock and vibration standards meets the stringent safety requirements of railway transportation. This guarantees consistent image quality and colour representation under demanding conditions, including frequent vibration and high temperatures – while supporting a longer lifespan for the reliable and durable delivery of passenger information. This technological advantage enhances the efficiency of multimedia delivery in concept trains, ensures stable operations, and creates an intuitive, convenient, and comfortable experience for passengers—at the same time aligning with the mission of green transportation.

Green transformation at DB

DB is committed to aligning with the EU's climate change policies, with its green transformation strategy focused on improving energy efficiency, reducing carbon emissions, and developing safer, more convenient, and sustainable transportation. Supporting this mission, ADP is propelling DB's shift toward low-carbon concept trains by providing highly reliable, top-quality display solutions. In line with future trends in electrification, intelligent systems, and autonomous transportation, AUO remains committed to its biaxial transformation strategy. It will continue collaborating with ecosystem partners across various sectors, from Passenger Information Display Solution (PIDS) providers to public transport operators, to accelerate smart transportation innovations and navigate toward a sustainable mobility future.

www.auo.com
Image source: Deutsche Bahn

HyPELignum & PROFACTOR GmbH

Reshaping the life-cycle of electronics with wood-based materials

Reimagining the entire life-cycle of electronics – from raw material sourcing to end-of-life management – is essential for building a sustainable economy and society. The HyPELignum project addresses this challenge by exploring a holistic approach for manufacturing electronics with net zero carbon emissions, centred around additive manufacturing and wood-derived materials.

Innovating with wood-based materials

Wood has long been a cornerstone of construction and household applications, and its biogenic nature makes it critical for Europe's carbon-neutral ambitions, aligning with the New European Bauhaus initiative. HyPELignum goes further by creating novel materials derived from wood feedstock, such as lignocellulosic composites, bio-derived resins, and functional compounds incorporating abundant, low-impact metals. These new materials expand the technological possibilities for electronics while maintaining a strong focus on environmental responsibility.

Key pillars of the project

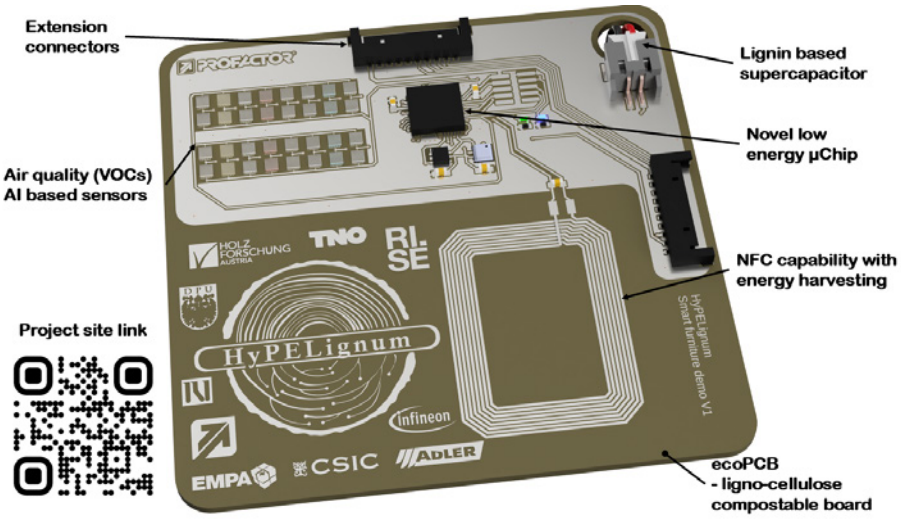
1. **Wood as a substrate for Additive Manufacturing:** Leveraging wood's natural versatility as a base for electronic devices, enabling innovative designs while keeping environmental impact low.

2. **Novel functional materials:** Developing a wide range of new materials derived from wood waste and bio-polymers, including advanced resins, lignocellulosic composites, and functional elements that reduce dependency on critical raw materials.

3. **Energy-efficient microchips:** Designing µchips optimised for minimal energy consumption, capable of driving integrated sensing systems with high performance and low environmental cost.

4. **Recycling and circularity:** Investigating methods to recycle wood substrates and recover functional electronic materials, supporting the transition toward circular electronics.

Smart Furniture Demonstrator Module (rendered): Showcases integrated wood-based electronics in a functional furniture setting. New wood-derived materials were created from lignocellulosic waste and biopolymers, like lignocellulose printed circuit board and lignin-based supercapacitor. Novel µChip shows energy-efficient microchips operating within wood-derived electronics. Functionality for air quality monitoring utilises an AI to measure the VOCs level with inkjet-printed array of sensing elements. The module is produced to be integrated inside of furniture to provide information about air quality surrounding the user. It is made from materials designed to be fully recyclable and degradable to lower the carbon footprint and environmental impact.



Sustainability assessment at the core

HyPELignum places sustainability at the heart of innovation. Life-cycle assessments, biodegradability studies, and toxicity evaluations provide a deep understanding of the environmental impact of these new materials. The project also aims to:

» Actively contribute to defining green and circular electronics.
» Provide a decision-making framework for evaluating the sustainability of novel electronics materials and processes.

Smart Furniture demonstrator

A key demonstration of HyPELignum's approach is the smart furniture demonstrator, which integrates wood-based electronics, energy-efficient µchips, and sensors into a functional furniture design (see Figure 1). This render illustrates how wood-derived materials can host electronic components in a practical, aesthetically pleasing application, highlighting the synergy of sustainability, design, and functionality.

A vision for greener electronics

By pioneering new materials from wood feedstock and integrating them into advanced electronics, HyPELignum demonstrates that innovation and sustainability can go hand in hand. The project highlights how bio-derived compounds can redefine electronic components – from substrates to functional materials – offering a path toward environmentally responsible design without compromising performance.

Acknowledgement: Project HyPELignum (Exploring wooden materials in hybrid printed electronics: a holistic approach towards functional electronics with net zero carbon emissions) funded by the European Union under Grant Agreement no. 101070302.

Written by: Václav Procházka (PROFACTOR GmbH), et al.

www.hypelignum.eu
www.profactor.at
Image source: HyPELignum

Silicon Austria Labs GmbH

Smart wooden surfaces – Where high-tech meets nature

The "WoodSigns" project demonstrates how wood can be transformed into a smart material of the future through printed electronics.

Wood is one of humanity's oldest materials and has been used for many purposes. Now it is set to continue this tradition and take on a new role: as a carrier of intelligent functions. In the WoodSigns project, Silicon Austria Labs GmbH (SAL), the Kompetenzzentrum Holz GmbH (Wood K plus) and F. LIST GmbH are working together to integrate sensors, lighting elements and displays directly into wooden surfaces. The project is led by Lukas Rauter (SAL).

Rethinking wood – Sustainable and functional

Traditionally, wood has been used for centuries in construction, furniture and vehicles – valued for its natural beauty, unique pattern, and elegance. But the WoodSigns partners are aiming higher: to establish wood as an intelligent material.
To achieve this, researchers are developing innovative technologies that allow electronics to be invisible and seamlessly embedded into natural wood veneers without compromising their aesthetic appeal. This is enabled by printed electronics technologies, which allow for deposition of electronics materials, large-area functionalisation, and lightweight integration. The primary application focus in this project is on business jet interiors, where luxury design meets cutting-edge functionality.

» Wood K plus improves the mechanical properties of veneers and provides flame-retardant treatments through coatings and surface modifications.
» SAL develops printed sensors, antennas, wiring and displays printed directly onto wood – resource-efficient, battery-free, and semi-transparent.
» F. LIST brings in technology, and use-cases from aviation industry and evaluates the practical feasibility, testing whether the smart veneers meet the strict requirements.

Results: Touch and light on wood

The first research outcomes are highly promising:

» Transparent touch sensors: Using silver nanowire inks, researchers successfully printed invisible capacitive touch sensors on wood. A protective coating shields them from unwanted environmental influences, ensuring stable performance. The sensors are highly precise (standard deviation 0.7%) and can be adapted through design options to fit various applications.
» Printed light-emitting displays: For the first time, fully printed electroluminescent displays were manufactured directly on veneers. The multilayer structures (electrodes, dielectric, emissive layer) emit blue light (455nm) with a luminance of 15.7 cd/m².
» Elegant demonstrators: Semi-transparent prototypes illustrate how sensors and displays can be invisibly integrated into the surface without disrupting the wood's natural look.

These innovations have already gained international attention – most recently presented in 2025 at LOPEC in Munich, at the IEEE FLEPS Conference in Singapore and at WWSC at KTH in Stockholm.

A material with future

WoodSigns highlights the enormous potential of wood: sustainability, elegance and high-tech do not exclude one another – they enhance each other. Smart wooden surfaces may soon set new standards not only in aviation and automotive applications but also in furniture and architecture. In an era of transformation, wood demonstrates its enduring relevance – not only as a traditional and sustainable material but also as one with a strong future. By combining natural elegance with advanced functionality, it bridges heritage and innovation.

www.silicon-austria-labs.com
Image source: Silicon Austria Labs

Wood as a smart surface

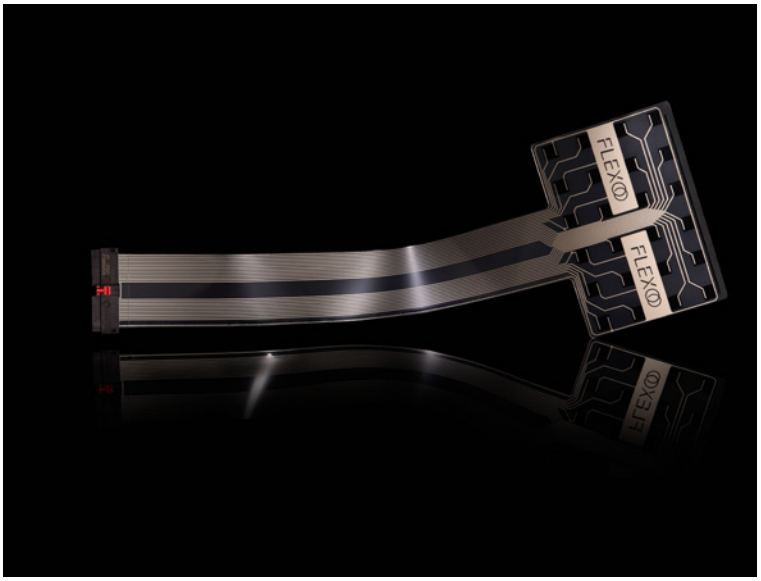
FLEXOO GmbH

Multisensing technology for Physical AI applications

FLEXOO announced the commercial availability of MultiMoS, a wireless sensor technology that combines ultra-thin form factors with multi-parameter sensing capabilities. The sensors enable real-time data collection in confined spaces and support Physical AI applications across automotive, energy, industrial, and healthcare sectors.

Addressing specific sensing challenges

Many sensing applications face limitations, including high installation costs, restricted access to tight spaces, and the need for multiparameter measurement in single deployments. MultiMoS addresses these challenges through its ultra-thin design that fits into confined spaces while simultaneously measuring multiple parameters.



MultiMoS wireless sensor technology from FLEXOO

Technical specifications

MultiMoS wireless sensors offer the following capabilities:

» Up to 26 sensing points
» Multiparameter sensing with pressure and temperature measurement as standard, expandable to humidity, VOC detection, gas sensing, and custom parameters
» Bluetooth Low Energy 5.4 connectivity with a 30-metre range and up to 150 fps transmission rate
» 1 Gbit onboard data storage with 50-hour continuous measurement capability
» Operating temperature range: 10°C to 100°C for sensors, –20°C to +60°C for electronics

Industry applications

MultiMoS technology addresses monitoring requirements across energy, automotive, industrial, and healthcare sectors. In battery applications, the sensors provide cell-level pressure and temperature mapping for BESS systems and EV battery development, including leak detection in cooling systems. Industrial applications encompass pipeline monitoring and torque measurement with easy attachment to existing infrastructure. In smart logistics, pressure sensing enables shelf occupancy detection and automated inventory management. Healthcare and MedTech applications range from wearable devices and foot health monitoring to sensor integration in beds, chairs, and floor systems for continuous monitoring solutions.

Key features

MultiMoS provides several operational advantages:

» Ultra-thin design: Sensors integrate into spaces where thickness constraints limit other sensing options
» Real-time data: Continuous measurement with high-resolution data transmission and onboard storage
» Cost efficiency: Automated manufacturing processes support volume production
» Connectivity: Bluetooth Low Energy plus upcoming LoRaWAN expansion for different deployment scenarios
» Multi-parameter capability: Simultaneous measurement of multiple parameters reduces the need for separate sensor deployments

www.flexoo.com
Image source: FLEXOO GmbH

Alqio – Armor Group

Empowering scalable innovation in functional surfaces

With over a century of industrial heritage, Armor Group has established itself as a global leader in advanced coating technologies. Founded in 1922 in France, the group now operates across four continents, employing more than 2,450 people and generating a turnover of €446 million in 2024. Its diversified portfolio spans thermal transfer printing, sustainable printing solutions, primed foils for battery current collectors, and more recently, with the creation of its Alqio affiliate, innovation-driven services with an industrial mindset.

Initially created under the name Armor Smart Films, the Alqio affiliate transforms materials to give them new functions. These transformations give rise to unique and innovative solutions: new formulations, smart films, functionalised membranes, customised coatings, and components designed to accurately integrate the products of tomorrow. More than just a manufacturer, Alqio defines itself as a catalyst. The company works alongside its customers to help them overcome technical and industrial challenges. Alqio actively contributes to customers' development, helping them to refine and scale up their innovations. Together with them, the company develops responsible, concrete, meaningful industrial solutions right from the design stage.

A new identity, rooted in accuracy

Officially created in 2024 under the name Armor Smart Films, Alqio's rebranding was part of a desire to accelerate its development. Recently unveiled, Alqio's new brand universe is the result of positioning work carried out by the teams to best reflect its identity. Alqio's mission is to enable its partners to increase the performance of their products by integrating flexible, durable, and discreet components designed with precision at every level: materials, technology, energy, cost, and integration. For Alqio, the future of industry can be traced to a delicate point of balance: between what the planet can sustain, what technology allows, and what industry demands. That point is called accuracy. It is more than a principle – it is the compass that guides their choices, from the careful use of materials and resources to the way knowledge is shared. This vision is what gave rise to their baseline, 'when accuracy matters', and it continues to inspire a vision of industry that delivers performance without losing sight of people or the environment.

A company built on a century of expertise

Alqio benefits from the full industrial and technological ecosystem of Armor Group. With access to state-of-the-art facilities, including ISO8 clean rooms, dedicated labs, and high-capacity coating and printing workshops, the company is equipped to handle everything from R&D to large-scale production. Its industrial capabilities include roll-to-roll (R2R) and sheet-to-sheet (S2S) formats, with coating, printing and ink production capacities reaching several million square metres and tons per year, respectively. The team – composed of experts in management, R&D, development, and manufacturing – works closely with other Armor Group's entities such as Armor-iimak and Armor Battery Films, ensuring cross-functional collaboration and rapid innovation cycles.

Mission-driven innovation

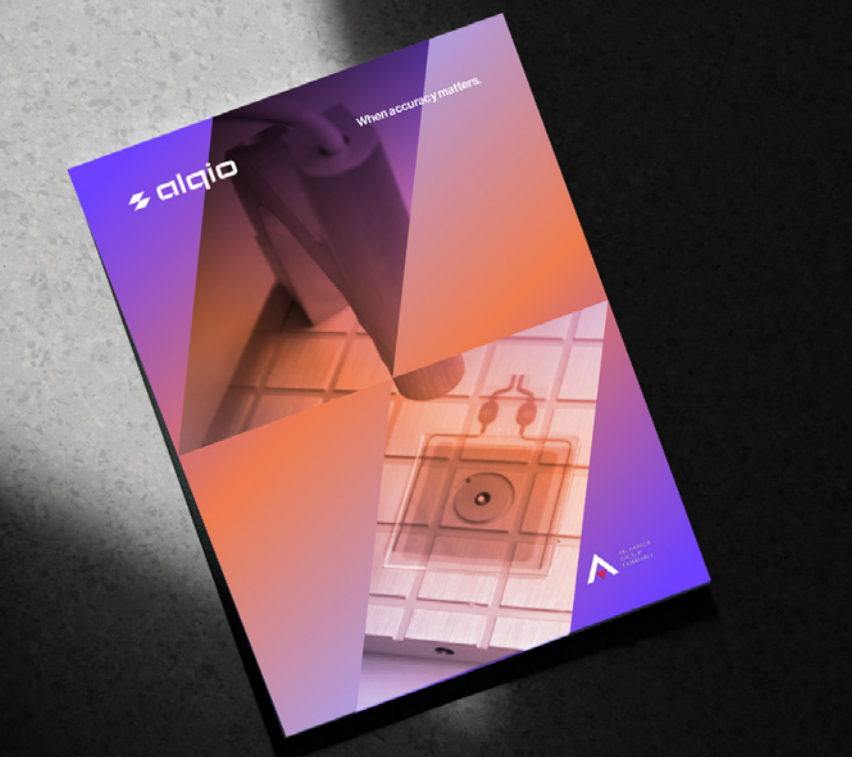
Alqio's mission is to design and industrially produce solutions that enhance the performance of innovative products. This involves a continuously holistic approach to material selection, energy efficiency, technological integration, and economic optimisation, with resource efficiency as a guiding principle. This approach enables greater performance, fairness, and alignment with economic goals. The affiliate supports its clients throughout the entire development process – from formulation and prototyping to industrialisation – offering tailor-made solutions that accelerate time-to-market.

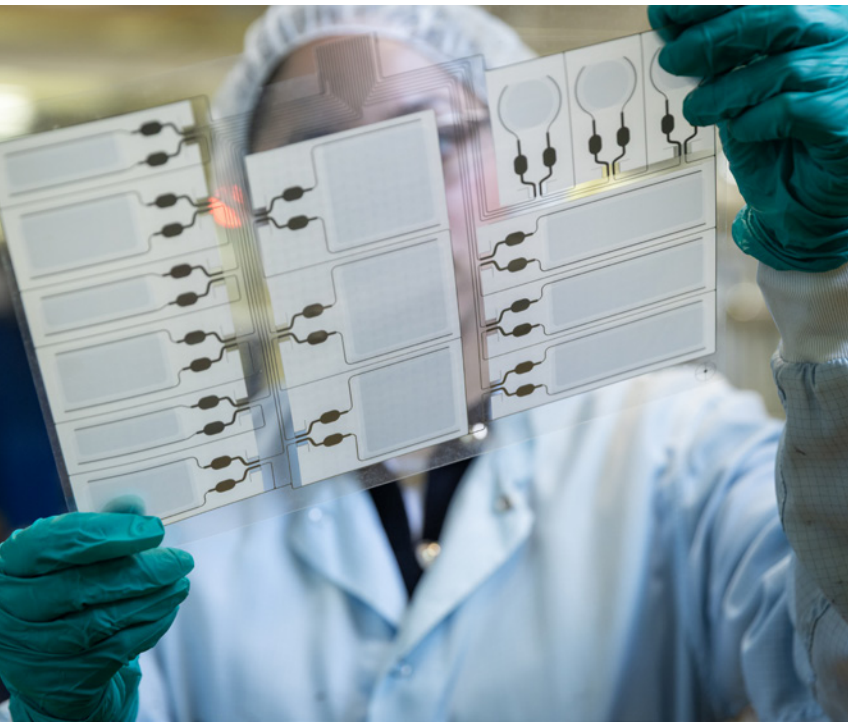
Product focus

1. Electroactive solutions

Alqio is actively developing core components of electroactive solutions based on advanced materials and scalable processes. These innovations are engineered to meet the growing demand for smart, responsive, and energy-efficient components across multiple industries, and can be fine-tuned to match specific customer requirements.

Poled films based on P(VDF-TrFE): In collaboration with Arkema Piezotech, Alqio formulates and processes poled films using P(VDF-TrFE) copolymers. These materials exhibit superior piezoelectric





properties, high thermal stability, and mechanical robustness. Compared to traditional PVDF, they offer better coupling factors, enhanced dielectric strength, and printability – making them an ideal solution for integrating transducers into smart devices.
Piezoelectric sensors (R2R and S2S): Leveraging roll-to-roll (R2R) and sheet-to-sheet (S2S) technologies, Alqio designs and manufactures customised piezoelectric sensors. These sensors are thin, flexible, and scalable, ready to be integrated into the devices to measure and monitor pressure, vibration, and acoustic signals with high sensitivity. The company supports clients from material formulation and sensor architecture to full-scale production and collaborates with experienced partners for system integration, data collection and analysis. These two piezoelectric-based technologies are suitable for applications in medical diagnostics, sports and wearables, predictive maintenance, smart mobility and connected environments, virtual reality equipment, loudspeakers etc...

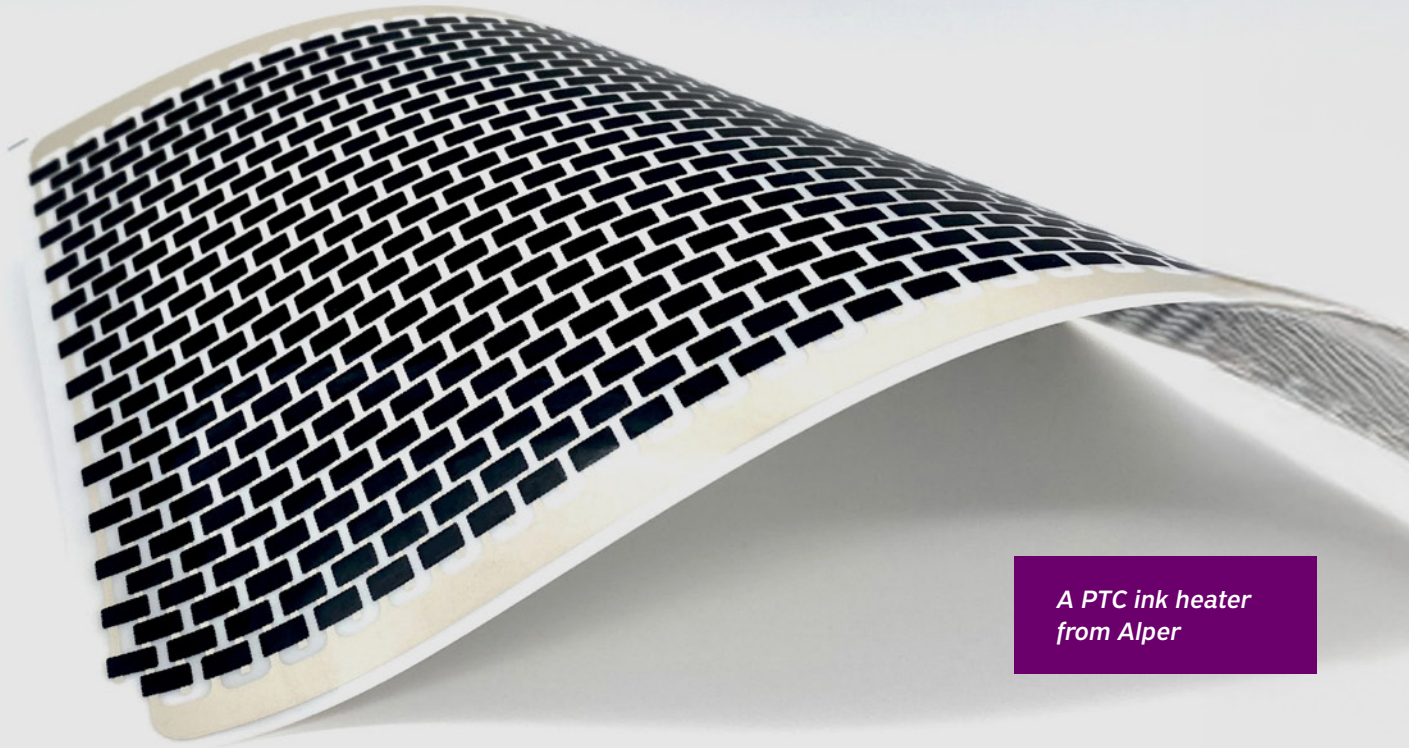
2. Other developments in printed electronics: Printed heating films
Alqio also develops printed heating solutions using advanced resistive inks such as carbon, graphene, and silver. These films are tailored for power-driven or temperature-controlled applications and can be processed onto various substrates (PET, paper, TPU, etc.). The ability to synergise plain coating of resistive inks and printing of electronics (wires, electrodes) is one of Alqio's core strengths. Applications include heated car seats and components, domestic appliances, smart flooring, industrial thermal management etc...

3. Functional Films and Coatings
Beyond electroactive technologies, Alqio offers functional coatings that enhance the mechanical, chemical, and protective properties of selected substrates. These solutions represent the strategic capability of the company.
Alqio develops and applies specific formulations – polymeric, organic, or mineral – designed to meet the unique requirements of each client. These coatings can:
» Improve mechanical resistance (abrasion, flexibility, tensile strength)
» Enhance chemical properties (hydrophobicity, corrosion resistance, barrier effects)
» Provide protective layers (UV shielding, anti-scratch, anti-fouling)
The company's coating and printing processes are adaptable to a wide range of substrates and formats. Whether working with flexible films, rigid sheets, or complex multilayer structures, Alqio ensures seamless integration of functional layers into the final product.

A strategic partner for innovation

Alqio is more than a manufacturer – it is a strategic partner for companies seeking to innovate in the field of functional surfaces. Whether it's developing electroactive sensors, printed heaters, or other advanced coatings, the company combines scientific rigor with industrial agility to deliver solutions that are ready for market. By leveraging the legacy and infrastructure of Armor Group, Alqio is accelerating the transition from concept to commercialisation, helping clients stay competitive in fast-evolving industries.

www.armor-group.com
Image source: Armor Group



A PTC ink heater from Alper

ALPER

The role of printed electronics in next-generation applications

Printed electronics bring industries new advantages, including lightweight, ultra-thin, and flexible components. By replacing traditional technologies, they enable the development of smart surfaces, flexible displays, and energy-efficient systems.

One of the techniques used in the production of Printed Electronics is screen printing, an additive manufacturing process that allows materials to be deposited where needed, reducing waste and permitting design freedom. Alper has adopted this approach to develop flexible circuits, performing heating elements and advanced sensors and circuits, offering industries solutions that are lighter in weight, thinner in thickness and adaptable to next-generation applications. In doing so, Alper develops smart solutions that combine innovation, adaptability and sustainability.

Sustainable electronics manufacturing additive printing with purpose

To manufacture with additive technology, Alper uses conductive inks such as silver, carbon ink and PTC carbon ink. These materials are printed on PET substrates that are as thin and flexible as a foil for lightweight and versatile applications.

Unlike traditional subtractive methods, this additive approach allows less material waste and more sustainable production. Among the most impactful applications of Printed Electronics there are flexible printed heaters. Alper develops tailored solutions for sectors such as automotive, healthcare, professional equipment and for the industry in general.
One of the areas where printed electronics proves highly effective is in the thermal management of displays. Modern displays installed in cold environments (train stations, vehicles, or outdoor advertising) require stable operating temperatures to work properly. This is where printed heaters find their application, fitting perfectly into small spaces where other solutions would be cumbersome and difficult to integrate. Displays require a reliable thermal management. Printed heaters, allow displays to maintain clarity and functionality even in challenging environments, from cold climates to humid conditions.

Alper heating solutions

Carbon ink heaters vs. PTC ink heaters, the key differences – In the field of flexible heaters, Printed Electronics has enabled the development of two main types of heating technologies: Carbon ink (Constant Power) heaters and PTC Carbon ink (Positive

Temperature Coefficient) heaters. Carbon ink heaters are ultra-thin, flexible, and lightweight, widely used in anti-condensation systems, comfort solutions and equipment heating. They provide uniform heating while maintaining minimal thickness, allowing for seamless integration without compromising design. PTC carbon ink heaters, on the other hand, offer self-regulating properties. Their resistivity increases with temperature, automatically limiting (decreasing) its power and preventing overheating. This makes PTC heaters highly reliable and safe, particularly in applications where precise thermal control is critical, such as automotive components, display panels and smart devices. Together, these two technologies demonstrate how printed electronics can deliver versatile, efficient, and safe heating solutions across a wide range of industries.

Smart surfaces, beyond displays

The potential of printed electronics goes far beyond displays. Smart surfaces are emerging across industries, from medical devices with integrated sensing and heating capabilities to advanced capacitive and presence sensors. These innovations enable more efficient, responsive, and adaptable solutions for a wide range of applications.

Stretchable electronics – the future of sensors

In addition to heaters, Alper combines highly flexible and stretchable substrates to produce sensors on materials like TPU (Thermoplastic Polyurethane). These solutions expand the possibilities for wearables, healthcare devices, and advanced monitoring systems, where both flexibility and mechanical resilience are essential. Their excellent conformability allows the perfect integration onto complex or curved surfaces, enabling innovative applications that were previously unattainable.

Printed Electronics for a smarter, greener future

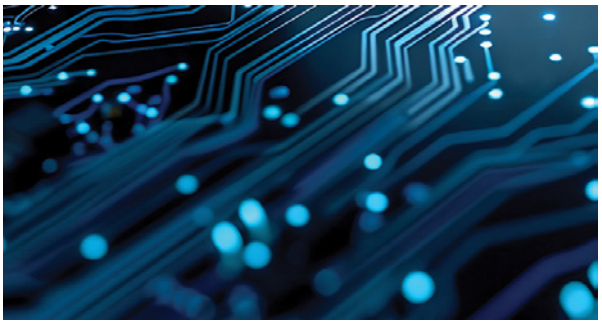
Printed electronics continues to grow as the demand for lightweight, flexible, and high-performance electronic solutions increases across industries. From Carbon ink (Constant Power) heaters to PTC ink (Positive Temperature Coefficient) heaters for advanced safety but not only, Alper's product range reflects a forward-looking approach where performance, adaptability, and sustainability define the future of electronics. The next generation of electronic devices will not only deliver power and functionality but also align with a commitment to smarter use of resources and greener innovation.

www.alper.it
Image source: Alper

Hamamatsu Photonics

How laser sintering can transform printed electronics production

In the electronics industry, printing technologies have become increasingly ubiquitous in recent years, and for good reason. Printing processes like screen printing and inkjet use deposition techniques to selectively deposit conductive materials onto a substrate, unlike more traditional electronics production methods like etching and lithography, which are subtractive by nature and are highly complex. The printing approach has numerous benefits, such as lower production costs and less material waste. Printed electronics are also more versatile, opening up possibilities for miniaturised circuits, flexible electronics, and more.



Electronics printing workflows comprise several vital steps, starting with pre-printing steps like circuit design and material and substrate selection. After the printing stage, where conductive inks are selectively deposited onto a substrate, the next step is sintering (sometimes called curing). The importance of sintering can't be overstated, as it is responsible for fusing the metal nanoparticles in the ink to create durable circuits with low resistivity and thus enhanced conductivity.

How laser sintering of conductive inks works

In printed electronic post-processing, sintering is typically carried out using heating ovens, infrared emitters, or broadband flash lamps. While each of these processes has specific strengths, they are all burdened by challenges, like being energy-intensive or challenging to scale. That's where laser sintering comes in. Hamamatsu Photonics, a Japan-based specialist in semiconductor lasers, is aiming to transform how printed electronics are post-processed, positioning its hardware, like the SPOLD LD irradiation light source, as a more economical, sustainable, scalable, and versatile solution for printed electronics manufacturers. As we'll see in more detail, semiconductor lasers can effectively overcome bottlenecks associated with conventional sintering equipment and create opportunities for more types of electronic devices. Before we dive deeper into the benefits of laser sintering, let's take a closer look at how it works in a printed electronics workflow. With inkjet printing, for example, print heads selectively deposit ink to create a pattern on a substrate. These inks contain nanoparticles of a conductive material, such as silver, which are held in a polymeric matrix. The sintering process heats the ink, removing some of the ink components, matrix and fusing the conductive nanoparticles to create dense traces with low resistivity, enabling the smooth flow of electrons through the circuit for optimal performance. Laser sintering stands out among other sintering processes because it uses laser light technology (laser spot optics or line optics) to selectively sinter the ink without heating the substrate.

The benefits of laser sintering printed electronics

Compared to more conventional sintering methods used to process printed electronics, like sintering ovens, lasers offer a number of advantages that enable circuit manufacturers to overcome scalability bottlenecks, minimise production costs, and develop more sophisticated electronics. These benefits include:

Faster post-processing speeds: There are a couple of factors that make laser sintering a significantly more rapid post-process than conventional sintering ovens. For one, near-infrared (NIR) lasers are capable of sintering metal nanoparticles in conductive ink in just milliseconds. By contrast, the post-processing step can take several minutes with sintering ovens. On top of that, Hamamatsu's semiconductor laser modules can be integrated in-line with printing

workflows, scanning and sintering freshly printed circuits in a conveyor-like manner. According to the company, its laser technology can process printed electronics at a speed of several hundred millimetres per second in roll-to-roll production.

Less energy consumption: Among the various methods for sintering conductive ink traces, laser sintering is the most energy efficient, since semiconductor lasers have a high conversion rate from electrical power to light power. For example, the Hamamatsu SPOLD laser only requires about 1kW of electrical power for roll-to-roll sintering. The next most efficient sintering technique, flash lamps, require 5kW of electrical power or more. Ovens are the most energy-intensive, requiring over 60kW of energy to reach the necessary temperatures for sintering the metal nanoparticles.*[1]*

More compact footprint: As mentioned, laser sintering solutions can be integrated seamlessly into roll-to-roll printing workflows using a conveyor system for scalable post-processing of printed circuits. This approach also has another important benefit: it means printed electronics manufacturers can scale without significantly increasing the footprint of their hardware. Whereas sintering ovens take up substantial space, sintering laser modules are very compact, facilitating their adoption and enabling manufacturers to maximise their factory floor. On top of that, Hamamatsu's lasers are coupled with an extendible fibre, allowing the laser source to be positioned away from the laser light without impacting performance.

Wider material compatibility (substrates and inks): One of the biggest advantages of choosing laser sintering for printed electronics is that the post-processing hardware is compatible with a greater range of substrate materials and conductive inks. With other sintering processes, it is not possible to use heat-sensitive substrates since the heat required to sinter the inks can damage and even melt the underlying material (such as PET or paper). Laser sintering makes it possible to use these materials by selectively heating the conductive traces using line beams or circular beams, leaving the substrate untouched.*[2]* More specifically, Hamamatsu's lasers can be tuned to specific wavelengths so that the light is only absorbed by the ink. This has a big impact on facilitating the production of flexible electronics, such as wearable displays, at scale. Laser sintering can also allow the use of different types of conductive inks, including low-cost copper and aluminium inks. These inks, which have comparable conductivity properties to silver, have been limited due to their sintering requirements. Fortunately, Hamamatsu has been working closely with ink manufacturers to develop optimised sintering parameters for a variety of inks, leading to more validated material options.

Application support

To date, the widespread implementation of laser sintering has been limited by a lack of understanding of the process and, as Hamamatsu says, "anxiety about reliability and quality control." To overcome this hurdle, the Japanese company has a team of application engineers who work with customers to develop the optimal parameters for their printed electronics sintering applications. This application support facilitates the integration of its laser sintering solutions in existing workflows and new printed electronics production lines, giving customers confidence in the process and ensuring greater efficiency in terms of performance, cost, and throughput.

Conclusion

Ultimately, printed electronics manufacturers can only seek to benefit from the integration of laser sintering in their circuit post-processing. The technology is not only more energy efficient and scalable than more conventional sintering ovens, it also has less restrictions in terms of the substrates it can process, opening the doors to industrial-scale processing of flexible electronic devices, such as conformable displays, thin-film transistors, wearable sensors, and photovoltaic cells. Hamamatsu's laser sintering solutions, like the SPOLD LD irradiation light source, are engineered for easy integration into printed electronics workflows and offer the reliability and consistency necessary for everything from R&D to industrial circuit production.

www.hamamatsu.com
Image source: Hamamatsu Photonics

Resources
[1] Optimize printed electronics manufacturing with laser sintering. Hamamatsu Photonics Europe, August 30, 2024. https://www.hamamatsu.com/eu/en/news/featured-products_and_technologies/2024/optimize-printed-electronics-manufacturing-with-laser-sintering.html
[2] Mitra D, Mitra KY, Buchecker G, Görk A, Mousto M, Franzl T, Zichner R. Laser Sintering by Spot and Linear Optics for Inkjet-Printed Thin-Film Conductive Silver Patterns with the Focus on Ink-Sets and Process Parameters. Polymers. 2024 Oct 14;16(20):2896. https://pmc.ncbi.nlm.nih.gov/articles/PMC11510878/

Heraeus Electronics

Advancing medical sensors with polymer thick film technology

Artificial intelligence is accelerating breakthroughs in healthcare, enabling earlier disease detection, personalised treatment, and remote monitoring. With AI's ability to process vast datasets, medical professionals can now deliver faster, more accurate care – even from the comfort of a patient's home. At the heart of this transformation are medical sensors, such as continuous glucose monitors (CGMs), which provide real-time insights into patient health.

Polymer Thick Film (PTF) technology is a key enabler of this innovation. Known for its cost-efficiency, reliability, and manufacturing flexibility, PTF materials support the development of compact, high-performance sensors. Heraeus Electronics' PriElex product line, including silver/silver chloride (Ag/AgCl) inks, leads the market in biocompatible electrode materials for internal medical applications.

Smaller, smarter, greener

As medical devices become smaller and more integrated, manufacturers face the challenge of maintaining performance while reducing size and cost. PTF materials offer a solution by enabling miniaturised circuits, low-temperature processing, and greener manufacturing. These benefits are critical for scaling wearable medical technologies that improve patient outcomes and accessibility.

Sensor evolution and industry standards

Medical sensors have evolved from bulky diagnostic tools to sleek, wearable devices. CGMs, for instance, continuously track glucose levels, helping patients manage diabetes more effectively. These sensors rely on electrochemical detection, often using Ag/AgCl electrodes for signal transmission. Industry standards like ISO 10993 (biocompatibility) and IEC 60601 (medical electrical safety) guide the development of safe, effective sensor technologies.

A continuous glucose monitor

Introducing AG-810: A cost-effective silver ink

To meet the growing demand for compact and affordable sensors, Heraeus developed AG-810, a silver-based PTF ink optimised for simple circuit designs. AG-810 features ultra-low silver loading while maintaining high conductivity, helping manufacturers reduce material costs without compromising performance. It is compatible with flexible substrates like PET and polyimide and supports screen printing for scalable production.
AG-810 is part of the PriElex portfolio and is designed for global usability, meeting international manufacturing and environmental standards. Its low-temperature curing (100–130 °C) and excellent printability make it ideal for medical sensor applications.

Silver paste in a jar

Heraeus Electronics' PriElex product line

What's next: Technical insights and real-world impact

In the next section, we'll explore how AG-810 works, its integration with other materials, and its performance in real-world medical sensor applications. AG-810 addresses a critical challenge in sensor manufacturing: the rising cost of silver. By optimising particle size distribution and formulation chemistry, AG-810 achieves high conductivity with minimal silver content. It can be blended with carbon-based materials to further reduce costs and is compatible with other Heraeus products like dielectrics and overcoats, enabling complete sensor stack designs.

Its architecture supports:

» Fine-line resolution
» Low-temperature curing
» Stable electrical performance
» Excellent adhesion and flexibility

These features make AG-810 ideal for wearable medical devices, where durability and precision are essential.

Real-world applications and results

Heraeus' PriElex materials have been successfully used in biosensors, ECG electrodes, and CGMs. In comparative testing, AG-810 demonstrated a 20–30% reduction in silver usage while maintaining >95% conductivity compared to traditional inks. This results in significant cost savings, material efficiency, and sustainability for manufacturers.

Challenges and limitations

While AG-810 reduces silver content, maintaining conductivity remains a challenge. Current products still rely on silver for optimal performance. Heraeus continues to refine particle engineering and hybrid formulations to push the boundaries of low-silver inks. The medical industry demands high-reliability, scalable, and cost-effective materials. Heraeus is committed to maintaining the performance standards customers expect while driving down costs. As wearable and remote healthcare technologies expand, the need for trusted partners and innovative materials will grow.

Conclusion: Partner in innovation

Polymer Thick Film technology is reshaping the future of medical sensors. With solutions like AG-810, manufacturers can deliver smarter, more affordable healthcare devices. Explore Heraeus Electronics' PriElex portfolio and join the movement toward better, more accessible medical technology.

www.heraeus-electronics.com
Image source: Heraeus Electronics

BST

Make the invisible visible: Inline quality assurance in printed electronics

BST is a global leader in inline quality assurance systems, offering advanced optical inspection technologies for web-based production processes. With printed electronics – especially RFID tags – gaining widespread adoption across industries, BST's solutions enable scalable, defect-free manufacturing through roll-to-roll (R2R) processes, supporting the growing demand for smart, connected applications.

The global RFID market is experiencing rapid growth, driven by applications in logistics, healthcare, retail, and Industry 4.0. RFID tags are now a well-established and industrialised application of R2R production, offering high throughput and cost efficiency. BST's expertise and technologies play a critical role in ensuring quality and reliability in this high-growth sector.

Understanding the RFID production workflow

RFID label production is a multi-step process that requires precision and control at every stage. It typically begins with the insertion of RFID tags into pre-printed labels – a critical step, as both the presence and the correct positioning of the antenna within the label directly impact the tag's functionality. To ensure accuracy, inspection systems must verify the tag's presence and alignment. This is achieved using a distance monitoring module and a backlight module, which reveal elements that are invisible to the naked eye. If a tag is missing or incorrectly positioned, a defect-marking unit is triggered to neutralise the faulty label. Subsequently, on a separate machine, the antenna is tested to confirm its functionality, and the designated value is written into the RFID chip. Often, a digital print – typically a QR code – is added to the label, containing the same value programmed into the RFID tag. Both values – the one stored in the chip and the one printed on the label – must be verified and confirmed to be identical.

Technological enablers of quality assurance

BST's inline inspection systems are designed to reveal defects and inconsistencies invisible to the naked eye. Key inspection capabilities include:

- Print defect detection: Identifies flaws such as smudges, misalignments, or missing elements in printed labels.
- Colour monitoring: Ensures consistent colour reproduction across production batches, which is critical for branding and readability.
- Barcode verification and grading: Validates the readability and quality of barcodes and QR codes, ensuring they meet industry standards.
- Variable data checks: Confirms that printed data matches the encoded RFID values, preventing duplication or missing entries.
- Distance and dimension control: Monitors the spatial accuracy of printed and embedded components, to ensure proper alignment and placement and to avoid short circuits.

These capabilities are supported by intelligent lighting modules that can operate simultaneously and highlight specific features such as UV-reactive security marks, reflective varnishes, and embedded electronic components. This allows operators to inspect elements that would otherwise be invisible during high-speed production.

Defect prevention and sustainability

Inline quality assurance is not only about detecting defects – it's about preventing them before they occur. BST's systems enable real-time monitoring and closed-loop control, allowing manufacturers to adjust processes dynamically and avoid recurring issues. Defective labels are automatically marked and removed from the production line using defect-marking units, ensuring that only compliant products reach the customer. This proactive approach reduces waste, conserves resources, and minimises the need for rework, contributing to more sustainable manufacturing practices. In high-volume production environments, even small improvements in defect detection can lead to significant cost savings. By catching errors early, manufacturers can avoid downstream failures and maintain consistent product quality.

Data integration and traceability

Modern inspection systems are increasingly integrated with customer databases and enterprise resource planning (ERP) systems, enabling full traceability of each label produced. This integration allows for:

- Real-time comparison of production data with source files provided by the customer.
- Validation of variable data, ensuring correct sequencing, no duplication, and proper incrementation.

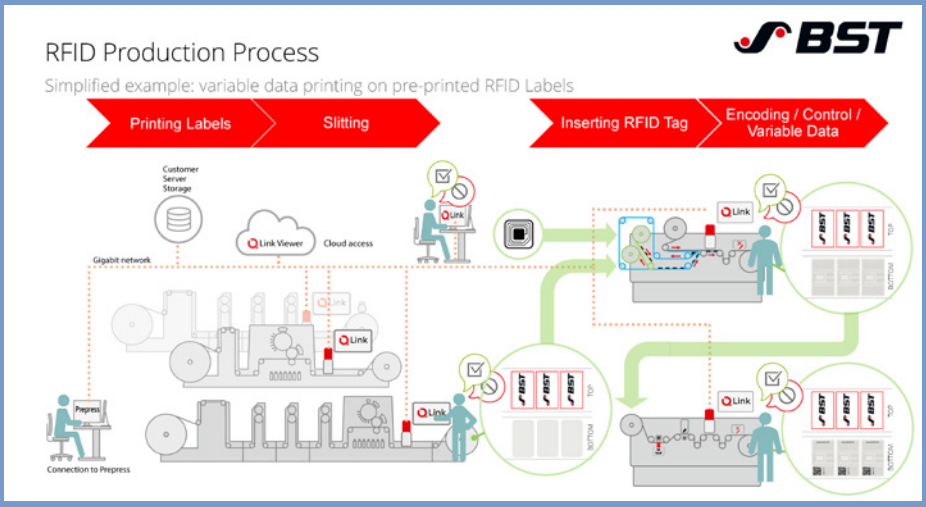


Fig. 1: RFID production process, simplified example

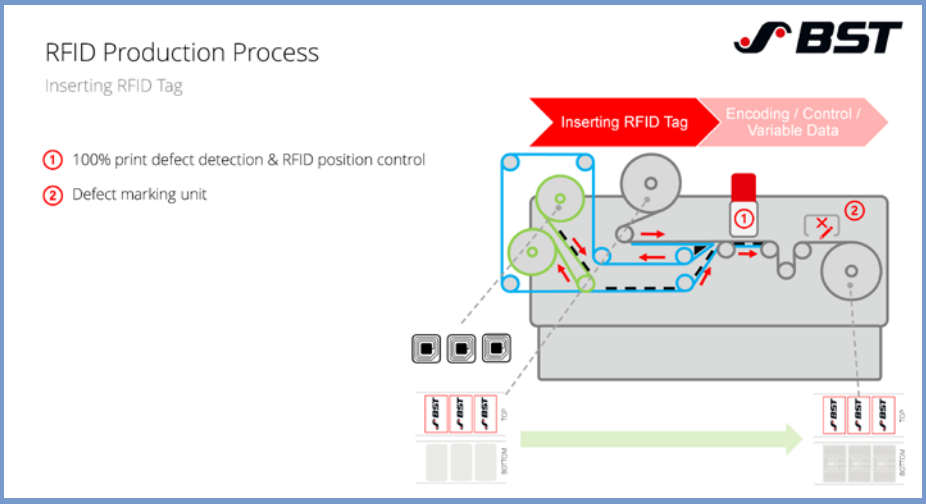


Fig. 2: Inserting RFID tag

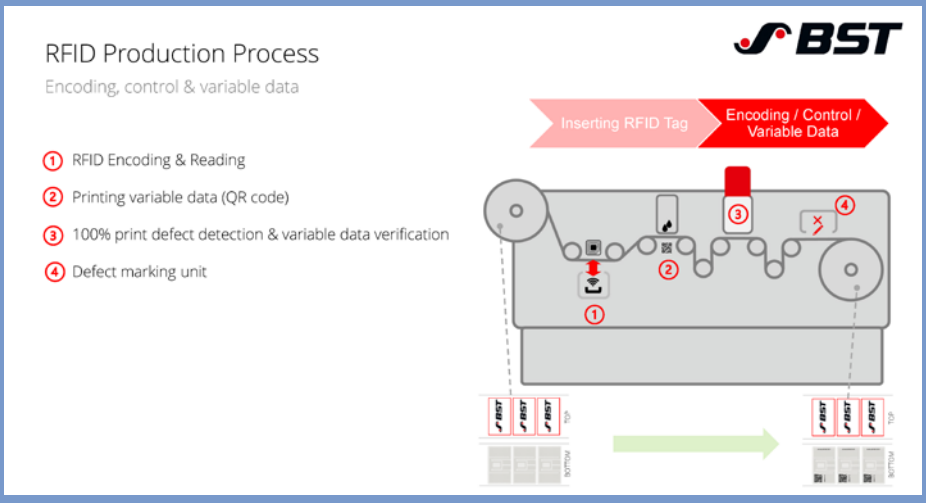


Fig. 3: Encoding, control & variable data

» Storage of inspection results, creating a digital audit trail for each product.

Such traceability is essential in sectors like healthcare and logistics, where data integrity and compliance are critical. For example, in pharmaceutical packaging, incorrect labelling can lead to serious safety risks. Inline quality assurance ensures that every label meets regulatory and functional requirements. Additionally, inspection systems can be configured to track and store sequences of variable data, linking each label to a unique identifier. This supports serialisation, anti-counterfeiting measures, and integration into IoT ecosystems.

Conclusion: The future of RFID quality assurance

Inline quality assurance is a cornerstone of reliable RFID manufacturing. By combining optical inspection, intelligent lighting, and data integration, BST's systems provide comprehensive control over complex production processes. This not only builds trust through technology but also supports sustainable manufacturing practices. As RFID continues to expand into new domains – smart cities, connected logistics, wearable tech – fault-free production will be essential. Inline quality assurance ensures that every tag meets the highest standards, enabling seamless integration into digital ecosystems. In a world increasingly reliant on data and connectivity, the ability to guarantee the quality of printed electronics is not just a technical advantage – it's a strategic necessity. BST's solutions empower manufacturers to meet this challenge with confidence, precision, and transparency.

www.bst.elexis.group
Image source: BST

Hoenle

Adhesive solutions powering the future of perovskite and organic photovoltaics

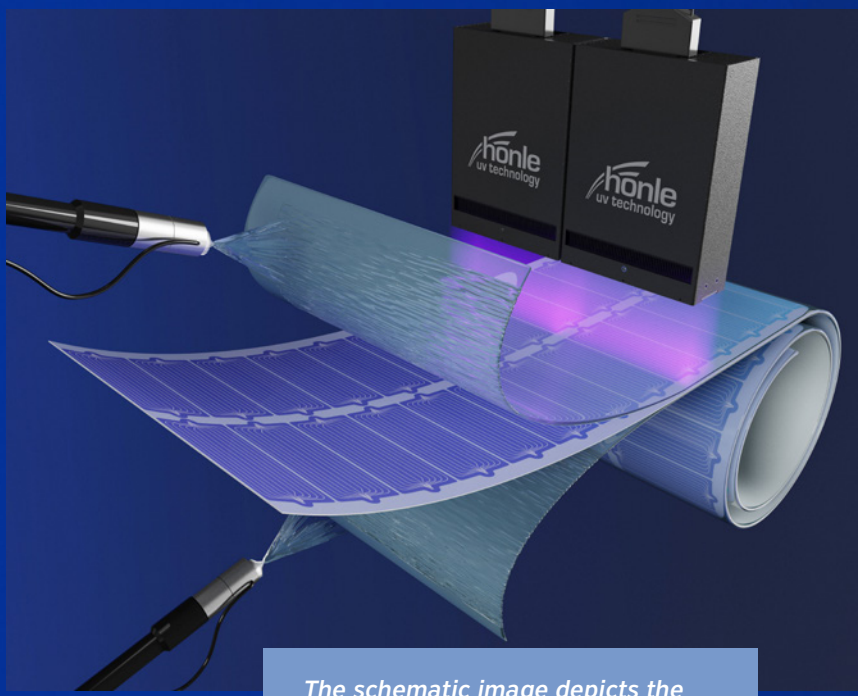
Perovskite (PSC) and organic photovoltaic (OPV) cells represent some of the most exciting advancements in solar energy technology. Their combination of low weight, flexibility, and potentially low production costs makes them ideally suited for new application fields. This can be their integration into building facades, the use in portable power systems or wearable devices. However, before these technologies can achieve broad commercial adoption, long-term stability of the sensitive cells must be ensured. A contribution by Lena Reinke.

The key to achieve robust modules is their effective encapsulation. It is essential because the cells are highly sensitive to environmental factors such as moisture, oxygen, and mechanical stress, all of which can quickly degrade their performance. Central to this encapsulation process are adhesives, which not only bond the cell layers together but also provide a protective barrier, safeguarding the delicate active materials from external influences.

Adhesive development as a balancing act

The development of such adhesives for PSC and OPV encapsulation is a balancing and therefore challenging act. The adhesives must provide excellent protection against moisture and oxygen, using either hydrophobic chemistry that block water molecules because of its polarity or dense polymer networks that form a physical barrier after curing. They must also withstand years of sunlight exposure without yellowing or becoming brittle, ensuring that the photovoltaic device retains both its performance and its aesthetic appeal. Adhesion strength is another critical parameter, as the adhesive must create a robust bond between encapsulant materials and the photovoltaic layers to maintain mechanical stability. Pretreating surfaces with corona or plasma is often used to improve adhesion by increasing surface energy, resulting in a stronger and more reliable bond. Another equally important feature is the compatibility of the liquid adhesive towards the sensitive photoactive layers. While monomeric raw materials often provide excellent adhesion to several substrates, they can be harmful to active materials, either because of their ability to migrate into the cell or specific functional groups that can interact with layers of the cell material. Chemists must therefore carefully adjust the amount of monomeric components to achieve the necessary adhesion without damaging the photovoltaic layers.

The concentration of monomers not only influences the adhesion and the compatibility towards the active layers but also the viscosity, which needs to be carefully adapted to the desired application process. Additionally, the reactivity of the adhesive formulation is affected by the monomer content and the initiator system, which should be compatible with the wavelength of the chosen light source. Upon UV irradiation, the initiator is photochemically activated, triggering radical or cationic polymerization, depending on whether an acrylate or epoxy base is used. Notably, radical polymerization typically proceeds faster than cationic polymerization. Nonetheless, for both adhesive classes, it is usually possible to cure thin layers within just a few seconds. This facilitates high throughput rates in production and helps lower manufacturing costs. Another benefit is the precise control of the curing process, particularly when UV-LED systems are used.



The schematic image depicts the application of UV-curable adhesive onto the barrier films of an OPV module, facilitating the lamination of the photovoltaic cells between two protective barrier layers.

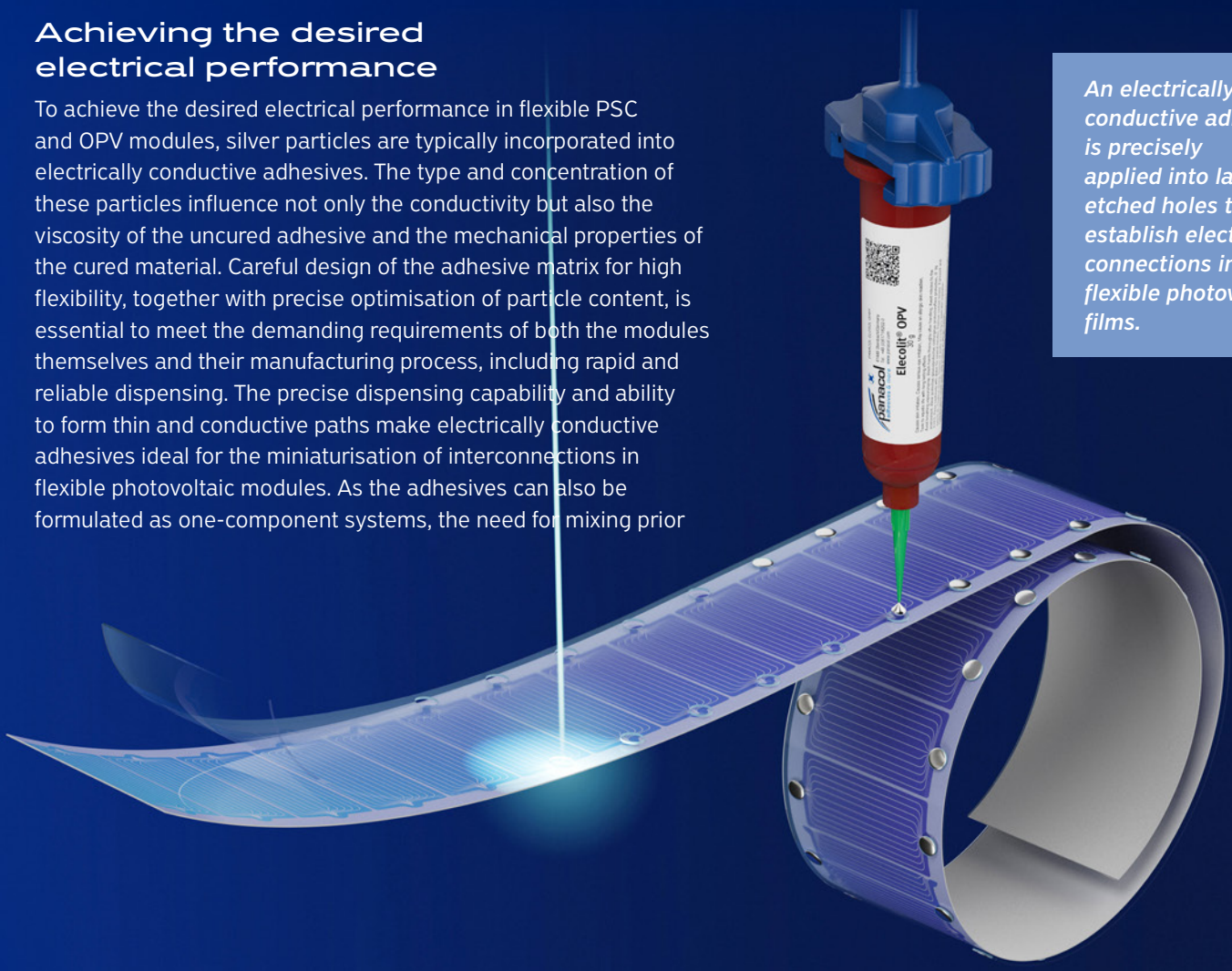
Adhesive chemistry

When it comes to the adhesive's chemistry, both epoxy- and acrylate-based formulations have proven valuable for PSC and OPV encapsulation, each offering distinct benefits. Epoxy-based adhesives provide excellent chemical resistance, thermal stability, and barrier properties, making them a preferred choice where maximum protection is required. However, they tend to be more rigid and slower to cure. Acrylate adhesives, on the other hand, are inherently more flexible and cure significantly faster, which is particularly advantageous for high-speed, roll-to-roll manufacturing processes. They also bond more effectively to PET substrates, which are commonly used in flexible solar cells. Choosing the right adhesive therefore involves finding the ideal compromise between flexibility, adhesion performance, and barrier properties. Electrically conductive adhesives (ECAs) represent another class of functionalised adhesives for flexible photovoltaic devices. They provide both mechanical bonding and electrical conductivity, making them an ideal solution for connecting components in flexible solar cells, where conventional soldering methods are often unsuitable. Once cured, these adhesives can maintain elasticity and exhibit excellent peel strength, making them particularly well suited for PSC and OPV cells that must withstand mechanical stress, vibration, or thermal cycling.

Achieving the desired electrical performance

To achieve the desired electrical performance in flexible PSC and OPV modules, silver particles are typically incorporated into electrically conductive adhesives. The type and concentration of these particles influence not only the conductivity but also the viscosity of the uncured adhesive and the mechanical properties of the cured material. Careful design of the adhesive matrix for high flexibility, together with precise optimisation of particle content, is essential to meet the demanding requirements of both the modules themselves and their manufacturing process, including rapid and reliable dispensing. The precise dispensing capability and ability to form thin and conductive paths make electrically conductive adhesives ideal for the miniaturisation of interconnections in flexible photovoltaic modules. As the adhesives can also be formulated as one-component systems, the need for mixing prior to or during application, is obsolete which simplifies handling and reduces the risk of contamination. Moreover, the ability to cure the adhesive at relatively low temperatures of typically below 100°C, minimises the risk of damaging the sensitive photoactive layers while ensuring strong, durable electrical connections on flexible substrates.
As perovskite and organic solar technologies transition from laboratory prototypes to large-scale commercial production, adhesives will play an increasingly crucial role. Advanced encapsulation and conductive adhesive solutions not only enhance the durability of the devices but also streamline manufacturing, making it faster, more efficient, and easier to scale. These invisible yet essential components, helping flexible solar technologies reach their full potential and move closer to widespread adoption in everyday applications.

www.hoenle.com
Image source: Hoenle



An electrically conductive adhesive is precisely applied into laser-etched holes to establish electrical connections in flexible photovoltaic films.

KROENERT

Growing areas of application for optically clear adhesive films in industry and electronics

Optically clear adhesive films (known as OCA) are increasingly being used in various areas – especially where maximum transparency, optical quality and adhesion without air pockets are required. A contribution by Andrea Glawe.

Design of the machine layout

Modern displays, such as those in smartphones or tablets, offer extremely high resolutions. To maintain their quality, transparent adhesive solutions are needed that do not cause optical distortion. OCA films eliminate the air gap between the display and the cover glass. This improves readability in sunlight and reduces reflections. OCA also contributes to impact and scratch resistance, especially in combination with tempered glass.

Coating onto carrier films

OCA layers are coated onto carrier films (e.g. PET release liners) and are often covered with a protective film. The coating and processing of optically clear adhesive films (OCA films) requires particularly precise and controlled conditions, as even the smallest errors can lead to visible defects. This places high demands on the coating lines that manufacture or further process these materials. OCA layers must be applied extremely evenly and thinly (often in the range of 10–200µm). As displays become larger, thicker OCA films are also required to ensure bubble-free lamination of the cover glass. These can be up to 1,000µm thick. Coating lines that offer this flexibility are in demand and are developed and manufactured by KROENERT, adapted to the customer‘s requirements.

Slot die coating and engraving rollers

Common coating technologies used for this purpose are slot dies for precise, even layer application or engraving rollers for special viscosities. OCA adhesives are often UV-curing and sensitive to temperature and humidity. High standards are the basis for optimal process and plant technology in the production of OCA films. Unique modular systems and tailor-made customer-specific solutions are necessary in order to supply the coating line for the respective required quality of OCA films.

www.kroenert.de
Image source: KROENERT

LOPEC 2026

Bringing game-changing technology to life

From 24 to 26 February 2026, the international printed electronics community will once again gather in Munich for LOPEC, the leading exhibition and conference for flexible, organic, and printed electronics. For the 17th time, the event offers a comprehensive market overview and brings together manufacturers, end-users, and researchers from around the world.

The combination of trade fair and conference delivers multiple benefits: visitors can explore the latest innovations in the exhibition hall, exchange ideas and network with decision-makers across the global printed electronics community, and gain insights from leading industry experts. With its focus on practical solutions, LOPEC demonstrates how printed electronics is set to change the world, making everyday life smarter, more sustainable, and more efficient. For example, with inexpensive and large-area photovoltaics, intelligent drug packaging, printed sensors, or building-integrated electronics.

Application sessions for Smart Living and Mobility

Building on the successful premiere of a new conference structure in 2025, LOPEC 2026 will again feature half-day application sessions dedicated to visitors from the Smart Living and Mobility industry. Moreover, special guided tours through the exhibition allow participants to experience the technology in practice. LOPEC 2026 will once again be accompanied by a comprehensive supporting programme, including an exhibitor forum, various panel discussions, the LOPEC Start-up Competition and the Design@LOPEC workshop. This workshop takes place for the second time and invites product designers from the industrial, textile, and automotive sectors to explore new applications for printed electronics in wearable technologies, smart textiles, and innovative product design.

A world-leading platform

Looking back at LOPEC 2025, the event confirmed its role as the world's leading platform for the industry: 169 exhibitors from 29 countries presented innovations to around 2,400 visitors, more than half from outside Germany. Highlights included Audi's OLED taillights with integrated safety functions, smart windows that regulate light while generating energy, and a vest with printed coils designed to simplify MRI scans for children. The three-day conference featured 150 presentations from 23 countries, with both exhibitors and visitors reporting high satisfaction.

www.lopec.com
Image source: Messe Munich

TechBlick Berlin

The full innovation spectrum on display

TechBlick's The Future of Electronics RESHAPED conference and exhibition (22 & 23 October 2025, Estrel Berlin) is just days away! It is poised to welcome over 100 invited speakers, 95 exhibitors, and 600 participants from around the world.

Impressions from TechBlick Berlin 2024

This year's agenda once again covers the state-of-the-art across the full innovation spectrum of additive, sustainable, printed, hybrid, R2R, 3D and wearable electronics.
In this article, we introduce the conference agenda, highlighting innovations that will be showcased as part of the conference programme.

The conference – an overview

Akoneer: Laser-processed multilayer glass PCBs for semi additive semiconductor packaging. Demonstrating high-density interconnections on glass substrates.

Antolin: Dynamic automotive interiors using E Ink Prism trim surfaces.

Armor Smart Films: Using piezoelectric coatings to enable sensors, haptics, heating, and medical devices.

Auburn University: Developing thermoformed IME circuits that replace wire harnesses and enable driver monitoring sensors.

Blackleaf: Enabling efficient thermal control with graphene heating inks for flexible foils and coatings.

CEA-Leti: Optimising additive PCB fabrication to replace subtractive methods and enable sustainable electronics.

CondAlign: Using particle alignment to develop anisotropic films that cut filler use and cost.

CurveSYS Sensors: Enabling security sensing with flexible pressure arrays that differentiate impacts in real time.

DELO: Using high-barrier encapsulants to extend perovskite PV lifetimes and efficiency.

Eastman Kodak: Enabling scalable printed circuits by shifting from screen printing to high-resolution flexography.

ELANTAS Europe: Developing functional pastes to enable flexible, durable in-mould automotive electronics.

Enjet: Enabling high-throughput deposition with EHD multi-nozzle printing for viscous functional inks.

Fraunhofer EMFT: Using roll-to-roll UV lithography to enable seamless, high-resolution flexible circuits.

Fraunhofer ILT: Optimising conductivity by developing selective laser sintering for stable printed sensors.

Fraunhofer ISE: Enabling sustainable perovskite PV by addressing toxic solvents and critical materials.

Fuji Corporation: Inkjet-printed silver nano-inks on UV-curable substrates for multilayer circuits with embedded components.

GE Aerospace: Enabling aerospace resilience with additive RF sensors and packaging rated to 1000°C.

Hamamatsu: Developing NIR laser sintering for greener, energy-efficient printed electronics.

Heraeus Electronics: Developing polymer thick-film conductors with improved solderability and thermal stability.

Heliatek: Enabling certified lightweight flexible PV with R2R multilayer deposition.

Henkel: Using silver/copper inks to enable hybrid integration and 3D functional electronics.

HighLine Technologies: Scalable microextrusion of silver and other materials with fine lines <20µm at >500mm/s for metallization.

Holst Centre: Enabling recyclability in IME through closed-loop recovery of plastics and metals.

Hummink: Using capillary printing to enable nanoscale (100 nm–50 µm) additively-manufactured interconnect, bumps and biosensor printing.

iGii: Developing 3D carbon nanomaterials with scalable R2R processes for POC diagnostic devices.

Intellivation: Enabling flexible PV by using R2R sputtering for barrier and conductor films.

Karlsruhe Institute of Technology: Enabling sustainable interconnections with copper busbars and low-Ag metallization pastes.

Mesoline: Microchannel particle deposition (MPD) for wafer-scale micron-precision material placement.

Myrias Optics & UMass Amherst: Enabling wafer-scale metaoptics by using nanoimprint lithography with nanoparticle inks.

NanoPrintek: Enabling inkless nanoparticle-based dry printing without sintering using laser particle generation and in-situ laser sintering.

OET Energy / Coatema: Scaling printed PV by enabling Giga Fab production with R2R and AI.

Hoenle Adhesives: Using adhesives to enable solder-free, durable encapsulation for flexible devices.

Conference Agenda 2025

Panasonic: Enabling slimmer, tougher devices with self-healing Toughtelon films.

Perovskia Solar: Scaling digitally printed PV to 1M units for IoT and consumer devices.

Prio Optics: Enabling anti-reflective and optical coatings through additive inkjet printing.

RISE: Enabling stretchable circuits with screen-printed liquid metal inks.

SATO Global: Using RFID digital twins to enable real-time manufacturing intelligence.

Signify Research: Enabling novel lighting form factors and more sustainable devices by printing LEDs on flexible foils.

Silicon Austria Labs: Optimising circularity in printed electronics with LCA-driven design strategies

Sofab Inks: Enabling scalable perovskite PV with soluble, cost-efficient formulations.

SOLRA-PV: Printing encapsulated perovskite solar modules for battery-free IoT and consumer devices.

Sonojet: Using SAW-based aerosol printing to enable clog-free, tuneable deposition.

SparkNano: Enabling gigawatt PV by scaling SnO_2 ETL deposition with R2R ALD.

Sunray Scientific: Developing UV-cured anisotropic epoxy to enable fine-pitch interconnects.

Toyota: Cross-industry innovations incl. SMA wire actuators with feedback, NIR pigments for hidden data transfer, and metamaterial vibration damping for electronics.

TracXon: Enabling additively manufactured high-density double-sided circuits with patented R2R printed VIA fabrication.

Trusscore: Using electrochromic PVC to enable colour-changing wall panels.

TU Dresden: Enabling eco-flexible electronics with biosourced leaf-based substrates.

University of Coimbra: Developing liquid metal composites to enable recyclable, repairable electronics.

University of Glasgow: Enabling sustainable monitoring with chip-free, battery-free RF sensors.

University of Manchester: Using graphene inks to enable multifunctional printed devices and heaters.

University of Rome Tor Vergata: Enabling fully printed perovskite PV with ambient processing and >1000 h lifetimes.

Valeo: Integration of printed and in-mould electronics into vehicles addressing specs, resources, and quality demands for next-gen automotive adoption.

Wiliot: Battery-free Bluetooth IoT tags produced R2R with printed sensors.

Würth Elektronik: Optimising PCB sustainability with selective solder masks and recyclable bases.

X-Fab: Enabling heterogeneous integration via micro-transfer printing of ultra-thin chiplets.

Lockheed Martin: Case study on flexible hybrid electronics (FHE) adoption, incl. copper additive manufacturing and flexible RF circuits.

Solaires Entreprises: Developing slot-die and blade-coated perovskite modules for scalable PV.

Q5D: Enabling 3D metallization by using 5-axis laser-assisted processes.

XTPL: Developing ultra-precise dispensing to enable bonding and defect repair.

AMAREA Technology: Enabling ceramic components with integrated electronics via multi-material 3D printing.

Lithoz: Co-printing dielectric ceramics with Cu/Ag for functional multi-material electronic components.

INO: Enabling smooth R&D-to-production scaling with modular screen-printing lines.

NGK Europe: Ultra-thin, semi-solid Li-ion batteries with ceramic electrodes to enable safe wearables and IoT.

NRC Canada: Using volumetric additive electronics manufacturing to enable rapid 3D overprinting of conductors.

Notion Systems: Enabling high-viscosity deposition by advancing EHD printing beyond inkjet.

ImageXpert: Optimising inkjet adoption by enabling structured printhead evaluation.

Printed Electronics Limited: Viscous-jet deposition for highly loaded functional inks (>5k cP) enabling digital drop-on-demand printing of inks previously restricted to screen processes.

NextFlex: Enabling commercialisation of AME through a 200+ partner ecosystem.

Helmholtz-Zentrum Berlin: Enabling scale up of solution-processed perovskite PV with standardised data handling and metrology.

CEA: Low-T printing, interface advances and long-term encapsulation for upscaling Si-perovskite tandems

Ceradrop (MGI Digital Technology): Enabling agile PCB and etching production with digital additive manufacturing.

DR Utilight: Developing laser pattern transfer printing to enable 10µm PV lines or 20µm solder bumps.

Conductive Technologies: Enabling high-performance sensors by optimising material stack-ups.

GraphEnergyTech: Using carbon inks to enable scalable, low-resistance printed electronics.

www.techblick.com
Image source: Martin Hirschmann

"3 Questions For..." – Voices from the OE-A Community

Welcome to our regular feature, where we highlight key voices from the OE-A community. In each issue, we'll share insights from members on the 3 questions about our community.

Eisuke Tsuyuzaki –
Vice Chair North America
Chief Executive, Bayflex
Solutions, LLC, United
States of America

1. You are the OE-A vice chair North America. What drives your engagement on the OE-A board?

Eisuke: As the incoming OE-A vice chair for North America, I am driven by a two-part mandate for the board: to simply create new opportunities for our members in North America and to build efficient pathways for our European and Asian colleagues to access the North American market. We go further when we go together.

2. What do you think the PE industry (worldwide or with regard to US) needs the most at the moment?

Based on conversations with our membership industry leaders this summer, the printed electronics (PE) industry needs to focus on commercialization. With unpredictable market conditions and long-term planning being more challenging than ever, the industry must take a pragmatic and collaborative approach. The immediate priorities are aligning shared goals with other industry associations, leveraging the OE-A's collective power to heighten awareness in key application markets, and reinvigorating the OE-A/NA regional block to engage with new partners. I am encouraged by the initial feedback.

3. What is the Printed Electronics superpower in your opinion?

The superpower of the printed electronics industry is its collective might. The industry's future will be built by the combined talent of materials scientists, chemists, engineers, sales and marketing teams, administration and (even) legal professionals. The most valuable resource is not the product, technology, or financing, but the time and talent that each professional is willing to solve these challenges. I would want every participant to commit and contribute some of their creativity and effort towards our common cause.

productronica

Flexible and Printed Electronics in focus at productronica 2025

From November 18–21, 2025, Munich will once again host productronica, the world's leading trade fair for electronics development and production. A special spotlight will be on flexible, organic, and printed electronics, with the OE-A hosting two PE sessions, November 19 and 20.

OE-A & VDMA Booth – Hall B2.453

Visitors are invited to the OE-A & VDMA joint booth (B2.453) to learn more about OE-A's international network, services, the OE-A Roadmap and the printed electronics demonstrators from the OE-A Competition series providing tangible insights into how these technologies are entering everyday applications.

Highlights in hall B2 include the OE-A seminars on November 19 and 20 at the Innovation Forum. With expert talks, live innovations, and networking opportunities, the OE-A program at productronica promises to be a highlight for everyone interested in the future of electronics.

OE-A Seminars on Printed Electronics – Innovation Forum, Hall B2.441

Wednesday, November 19, 2025, 14:15
Flexible and Printed Electronics: Applications and Technologies
Moderator: Dr. Klaus Hecker, Managing Director, OE-A (DE)

» *Introduction to Printed Electronics*
Dr. Klaus Hecker, OE-A (DE)

» *Printed Electronics – Current Applications and Future Trends*
Dr. Alain Schumacher, IEE (LU)

» *Manufacturing and Applications of Large-Area LED Foils*
Dr. Ashok Sridhar, TracXon (NL)

» *Hybrid Electronics Compared to Conventional PCBs: Their Advantages and Challenges*
Jonas Deitschun, Fraunhofer IFAM (DE)

» *Pilot Services for Supporting and Accelerating Flexible Electronics R&D*
Prof. Jukka Hast, VTT (FI)

» *Debonding on Demand Tapes for Rework, Repair, and Recycling in Electronics*
Tom Schümchen, Lohmann (DE)

» *Empowering Scalable Innovation in Functional Surfaces*
Fabien Resweber, Armor Smart Films (FR)

» *Summary & Adjourn*
Dr. Klaus Hecker, OE-A (DE)

Mark your calendar: November 19 and 20, 2025. With expert talks, live innovations, and networking opportunities, the OE-A program at productronica promises to be a highlight for everyone interested in the future of electronics.

Thursday, November 20, 2025, 14:15
Flexible and Printed Electronics: Materials, Processes and Reliability
Moderator: Raswanth Sendhil Sasikala, Project Manager, OE-A (DE)

» *Introduction to Printed Electronics*
Raswanth Sendhil Sasikala, OE-A (DE)

» *Functionalizing 3D Parts with Precision: Pad Printing as a Scalable Alternative Manufacturing Technology*
Anna Ryzhova, Henkel (DE)

» *Rebuilding the EU PCB Industry by Moving from Chemical Etching to Additive Printing of Copper Inks*
Dr. Ofer Shochet, Copprint (IL)

» *Recent Developments on Soluble Materials for Printed OLEDs*
Dr. Junyou Pan, Zhejiang Brilliant Optoelectronic (CN)

» *tbd*
tba, XTPL (PL)

» *Developments in AI to Enhance FHE Reliability and Manufacturing at Scale*
Wolfgang Mildner, Bayflex (US)

» *Continuous Laser Assisted Deposition (CLAD) – Enabling Digital PCB Manufacturing*
Herve Javice, I-O-Tech (IL)

» *Printing Electronics on Paper – How Can This Be Used to Manufacture Sustainable Multilayer Printed Circuit Boards?*
Gerhard Domann, Fraunhofer ISC (DE)

» *Summary & Adjourn*
Raswanth Sendhil Sasikala, OE-A (DE)

Alongside the seminars, the Printed Electronics Pavilion powered by LOPEC will bring together companies and research institutes to present the latest in printed and flexible electronics. Located on the east side of Hall B2, it will also showcase Industry 4.0 solutions, additive manufacturing, battery and energy storage technologies.

Dai Nippon Printing was the host of the OE-A Meeting Asia 2025

At Dai Nippon Printing the group visited the showroom and printing & information lab

OE-A was partner of ICFPE 2025 in Tokyo

Networking and Innovation in Tokyo: OE-A Asia Meeting and ICFPE 2025

From September 16-19, Tokyo became the meeting point for the international flexible and printed electronics community. Two events – the OE-A Meeting Asia and the International Conference on Flexible and Printed Electronics (ICFPE 2025) – brought together experts, innovators, and companies from around the globe to exchange ideas, showcase advancements, and reconnect with colleagues.

OE-A Meeting Asia – September 16, 2025

On September 16, one day before ICFPE started, the OE-A Meeting Asia took place, hosted by Dai Nippon Printing (DNP) in Tokyo. More than 40 experts from the PE industry participated. The program offered participants a unique chance to meet with Japanese companies and institutions at the forefront of flexible and printed electronics.

Highlights of the day included visits to DNP, the University of Tokyo (Prof. Someya's group), Murata and – later that week – Mitsubishi Chemical Group. Beyond the insights into cutting-edge research and applications, the meeting was also a true networking hub. The day ended with a lively networking evening, where participants enjoyed the opportunity to meet new partners and reconnect with old friends.

Inspiring technology and food for thought offered the company visits at Dai Nippon Printing, University of Tokyo, Murata and at Mitsubishi.

Great attendance at the OE-A Meeting Asia 2025 hosted by DNP.

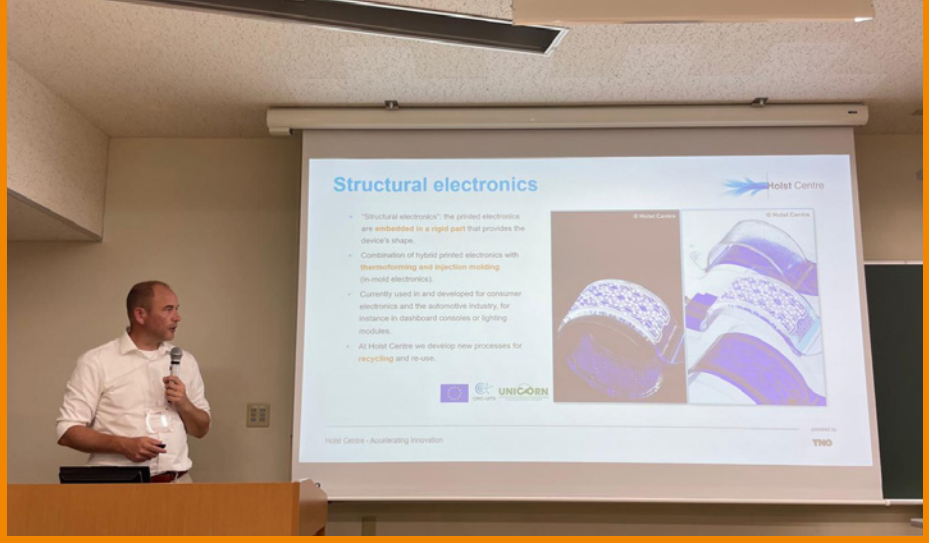
ICFPE 2025 – September 17–19, 2025

From September 17–19, the Institute of Science Tokyo hosted ICFPE 2025, one of the leading international conferences in the field. As a proud partner, OE-A organized a dedicated session on the afternoon of September 17, addressing key topics such as:

» Artificial Intelligence for Printing
» Display Technology
» Printing Process and Equipment
» Flexible Electronic Materials
» Green Energy Applications

Speakers from OE-A member companies – including Arkema, Bayflex, Dracula Technologies, Holst Centre, IEE, Interlink Electronics, MSWtech, TracXon, and many more – shared their expertise and sparked engaging discussions.

Both events highlighted what makes this community so special: innovation, collaboration, and personal exchange.



OE-A hosted a session on Printed Electronics materials and technology at ICFPE 2025.

OE-A chair Dr Alain Schumacher, CTO at IEE, emphasized in his keynote that PE is essential for next generation of cars.

ICFPE 2026 will take place in Korea. Details will be announced soon.

The group was able to explore the Mitsubishi Chemical Corporation, Science Innovation Center, and Functional Design Laboratory.

OE-A Meeting at LC Elektronik in Warsaw: Building and advancing Printed Electronics markets

From September 30 to October 02 the latest OE-A Meeting took place in Warsaw, Poland, kindly hosted by LC Elektronik. Over two days, members of the global printed electronics community came together to share insights, discuss industry developments, and explore new pathways for innovation.

The agenda was as diverse as it was inspiring, we learned and discussed about:

- Next generation Healthcare devices powered by Printed Electronics
- Wearables for early detection of lifestyle diseases
- How to get a proper value proposition for your business
- Barrier testing for encapsulation materials
- “Artificial Pain” as a smart sensing system for diabetic foot ulcer care
- Industrial production of hybrid stretchable electronics: sensor integration for wearables and care
- Printed Electronics in aerospace and defense
- And many more hot topics …







Beyond the meeting room, participants enjoyed exclusive company tours at LC Elektronik, Trumpf Hüttinger and XTPL (visited on October 02). These visits offered a closer look at cutting-edge technologies and sparked conversations about future opportunities and collaborations.

What made the gathering truly special was not only the high-quality content, but also the spirit of openness and community. It’s always impressive to see how the shared passion for printed electronics brings people together across borders, disciplines, and industries.

OE-A gives a big shout-out to LC Elektronik for their warm hospitality, as well as to all members who contributed to the rich program.

Save the date: The next OE-A Meeting will take place on **February 23 in Munich** – we look forward to seeing you there!

Image source: OE-A

OE-A Events

OE-A Meeting 23 February 2026	Munich, DE A day before LOPEC 2026
OE-A Meeting America June 2026	Silicon Valley, US Exact date and venue to be determined
OE-A Meeting Europe 13-14 October 2026	Düsseldorf, DE Hosted by Henkel
OE-A Delegation Asia 2026 14-18 September 2026	Bangalore, IN Delegation Trip India One week incl. company visits and symposium at electronica/ productronica India

Trade fairs and conferences where you can meet the OE-A

Members benefit from reduced fees at several conferences.

productronica 18-21 November 2025	Munich, DE OE-A will be a co-exhibitor with VDMA Productronic
LOPEC 2026 24-26 February 2026	Munich, DE Messe München and OE-A jointly host the leading international trade fair and conference. The event offers a high-quality platform to all manufacturers, industrial customers and research institutions engaged in the field of organic and printed electronics. Messe München, Germany lopec.de
VDMA European Summit 12-13 March 2026	Look forward to interesting topics and excellent networking opportunities and don't miss THE meeting of the European machinery and equipment manufacturing industry.
eletronica/productronica India 16-18 September 2026	Bangalore, IN OE-A Symposium: Flexible and printed electronics (part of the OE-A delegation trip India)
electronica 10-13 November 2026	Munich, DE OE-A and LOPEC will host a two-day Printed Electronics Forum

OE-A Web-Seminars Printed Electronics

OE-A Web-Seminar | Printed Electronics Insights: OE-A Competition 2026 – The Winners April 2026	Exact date to be determined As a part of OE-A's web-seminar series 'Printed Electronics Insights' this web-seminar introduces the winning demonstrators of the OE-A Competition 2026

The latest information regarding the events can be found at **https://oe-a.org/events**

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Flextronics Family

Nepalese talent for the German economy

For many years, Bert Overlack has been working with his foundation to promote education and training for socially disadvantaged children and young people in Nepal. His programme also enables German companies such as the Schulz Flexgroup to access young people from the Central Asian mountain state – and train them to become skilled workers.

PRO Flextronics: Mr Overlack, what exactly does your work in Nepal involve?

Bert Overlack: One of our main activities is financing school fees, school uniforms, books and meals for children from the poorest backgrounds. The foundation invests specifically in the expansion of school buildings and their equipment. In addition, those responsible are involved in various special projects, such as the construction of new houses after earthquakes or targeted aid during the Covid pandemic. Through close monitoring and control, we guarantee that 100% of the donations go directly to the target groups in Nepal, as the administrative costs are covered privately. A key component of our commitment is the targeted support of young adults, in particular through the Nepal Secretariat of Skills and Training (NSST). The NSST selects, prepares and supports young people for training programmes in Germany.

PRO Flextronics: Schulz Flexgroup, a converting company, has also worked with you. What is your assessment today?

B. Overlack: That's right, our foundation and the NSST are cooperating with this southern German company, which took on two trainees from Nepal in 2024! Schulz Flexgroup is one of around 50 companies already using this proven model. Managing Director Cordula Schulz is

Bert Overlack at the M2N Converting Gipfel 2025

enthusiastic about the programme. The two trainees already stood out during the interview thanks to their excellent language skills and in-depth industry knowledge. The onboarding phase was successful, especially as the new trainees were quickly supported by experienced colleagues and rapidly developed into fully-fledged team members. Targeted mentoring and collegial exchange created a German-Nepalese bond on an equal footing. After just a few months, the young Nepalese were able to operate a printing machine independently under supervision – a success based on intensive preparation and support both before and after their arrival in Germany. Ms Schulz particularly praised the combination of preparatory qualifications, language and intercultural training, and early social integration.

PRO Flextronics: What are the hurdles to integrating young Nepalese people in Germany?

B. Overlack: The integration of young Nepalese people into training and everyday life in German companies poses few or no challenges for German companies. After the training contract has been signed, NSST takes care of the visa and travel arrangements in Nepal. The training company must arrange accommodation (flat or room), as this cannot be done from Nepal. In addition, it has proven useful to assign 1-2 'mentors' to the new trainees, who can also help with local integration.

PRO Flextronics: What would be the first step for an interested company – and how high are the financial requirements?

B. Overlack: Interested companies should first actively contact the NSST and provide information about the desired apprenticeship occupations. This can be done directly by email or social media. Interested companies are provided with comprehensive information about the programme in regular information webinars and personal meetings. The following steps – selection, language acquisition, matching, visas – are coordinated and implemented together with the NSST. A fee of €3,500 plus VAT is payable for each training placement arranged (2025 cohort). These costs cover services such as language courses, examination fees, preparation and mentoring programmes, intercultural training and administrative support from selection to completion.

www.nepal-kinder-overlack.com
Image source: M2N Media

Preview PRO Flextronics No 6 - Feb 2026

Advertising deadline: 20.01.2026
Publication date: 17.02.2026

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PRO flextronics
MEDIA HUB FOR ORGANIC, FLEXIBLE AND PRINTED ELECTRONICS

Imprint

PRO Flextronics No 5
October 2025 | 2nd Edition

Published by

M2N Media GmbH
Walter-Meindl-Siedlung 4
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GERMANY

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Magazine Specifications

Front cover picture: FLEXOO
Printed by: Pinsker Druck und Medien GmbH
Frequency of publication: 3 issues per year
ISSN 2943-8616

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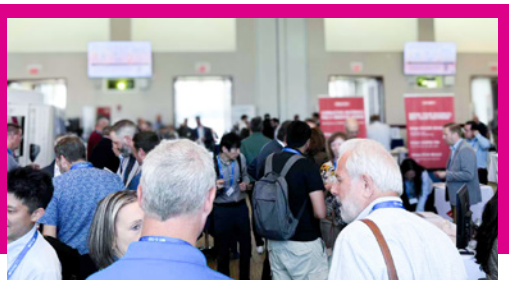

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