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Flexible organic electronics for wearables

Fraunhofer Institute for Organic Electronics, Electron Beam and Plasma Technology, a provider of research and development services in the field of organic electronics, presents first wearable OLED bracelet at Wearable Europe 2018, from April 11th to 12th in Berlin, Germany at booth no. P12 together with VTT Technical Research Centre of Finland and Holst Centre from Netherlands.

Organic light emitting diodes (OLED) as novel and elegant or stylish light source have already found their way to the common furniture stores and can be purchased as pendants from the shelf by style-conscious customers. At the same time OLED is already on the daily agenda of light- and product designers in automotive industry. However they are not merely famous for their comfortable luminous color or their wide range of possibilities in the design of shape, color and size. Also the research focus in the field of medical applications and light therapy is more and more taking OLED into account for various scenarios. The advantage, to be able to create OLED light sources, which emit the light in special wave lengths helps to use OLED even for wound healing or for therapy of depressions.

Since 2016 partners within the European joint project PI-SCALE are working on the introduction of a joint pilot line in order to give access for the manufacturing of flexible OLED for SMEs in Europe. At Wearable Europe 2018 the Holst Centre from the Netherlands, VTT Technical Research Centre of Finland and Fraunhofer FEP will introduce a novel OLED wristband. This bracelet is representing one of the first wearable products with flexible organic electronics from the European pilot line.

Fraunhofer FEP was responsible for the anode deposition on barrier web, which has been produced by the project partner Holst Centre as well as for the OLED-deposition by using evaporation processes. The OLED-deposition at Fraunhofer FEP can be done in Roll-to-Roll (R2R) and Sheet-to-Sheet (S2S) processes.

The Finnish experts of VTT integrated the ready-made OLED into a bracelet and developed the compact power supply for the whole system. The successful integration of the flexible OLED components into 3D injection molded structures was challenging. Markus Tuomikoski from VTT is explaining: "We used injection molded structural electronics for the integration of the OLED. To meet the demands of a wearable device,

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the conception and realization of a compact power supply system was necessary. In the end we realized a combination of flexible electronics and flexible OLED within our plastic molded bracelet uncomplicated thanks to the positive joint work of the partners." VTT's hybrid integration line is constructed with commercially available manufacturing equipment, making it possible to adapt the developed process for industrial use fast without the need to develop totally new production machinery or process control systems. Injection molding of electronics with thermoplastics enables cost-efficient, fully integrated and seamless manufacturing of highly functional 3D structures that are ideal for e.g. the fast growing wearables and healthcare product markets.

Claudia Keibler-Willner, head of department S2S Organic Technology at Fraunhofer FEP, explains: "We are proud about the ability to produce first ready-made products like the wristband together with our partners now. The applied OLEDs have been produced in sheet-to-sheet process at Fraunhofer FEP and Holst Centre. The way gone so far within PI-SCALE shows that we are in a position now to offer stable OLEDs from the open access pilot line with our joint know-how and according to the customers needs."

The result is nothing to sneeze at - a lightweight bracelet with flexible OLED. It can be used as fashion jewelry and is lighting for several days thanks to the low power consumption of the OLED. Equipped with red or yellow OLED the wristband could act as security device for people working at night-time outside or in dark environment. The OLED could also be realized emitting light in a special wavelength. Using this advantage, such a bracelet could help for wound healing while wearing it at hands or legs. Also the extension of the concept for a head-up device is imaginable. Using the positive effect of the warm OLED light, it is useful e.g. for the therapy of depressions.

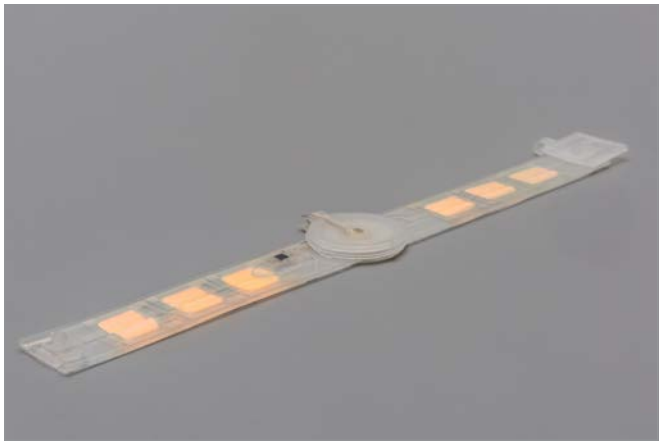
The partners of the Pi-Scale consortium are still available for interested partners and customers after the project time of Pi-Scale. Under the name of LYTEUS the activities of the pilot line service and the realization of concrete products will be pushed further on in future.

Fraunhofer FEP at Wearable Europe 2018:

Exhibition booth:
Estrel Convention Center, Berlin, booth no. P12

Masterclass: OLED & QLED Displays:
Analyst-led sessions providing impartial market and technology insights
Tuesday, 10th April 2018, 09:00 to 11:30 am
Dr. Uwe Vogel, Deputy Director, Fraunhofer FEP
Dr. Xiaoxi He, Senior Technology Analyst, IDTechEx

Talk:
Session: AR/MR/VR: Headsets and Applications
"Advanced OLED microdisplays for virtual and augmented reality applications",
Dr. Uwe Vogel,
Wednesday, 11th April 2018, 5:40 to 6:00 pm, Estrel Hall A



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