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Large area flexible OLED lighting – Manufacturing technologies and applications

OLED lighting technology offers huge possibilities for novel lighting products, especially for automotive applications. OLED design starts where LED lighting tiles are at the design limits. OLED modules exhibit unique characteristics like bendability, segmentation, transparency, color tunability, ultra-low thickness and a nearly unlimited range of shapes. The strength of the OLED technology are the amazing design possibilities. Pilot manufacturing facilities have existed in Europe and Asia for several years. The introduction of OLED taillights in 2016 marked its entry into automotive applications.

Large volume commercial success can only be achieved if unique design possibilities are consequently employed in novel application scenarios and cost effective roll-to-roll production technology. Flexible substrates made primarily of barrier-coated polymer film but also metal foils or ultra-thin glass have been investigated for use in OLED manufacturing. Each has advantages and disadvantages. OLED prototypes on polymer substrates as well as ultrathin glass have been realized at Fraunhofer FEP. Major development topics are the improvement of device stability and brightness. This includes intensive work on encapsulation as well as the development of stacked OLED architectures on flexible substrates. Fraunhofer FEP has shown OLED processing along the entire value chain for the fabrication of flexible OLEDs in both sheet-to-sheet and roll-to-roll processes.

Furthermore, the talk gives insights to enhance the transfer from basic research to industrialization using attractive funding opportunities for industry and scientist as realized in projects like ACTPHAST4R and PhotonHub Europe.