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Smartkem

Smartkem Announces Joint Development Agreement with Chip Foundation to Co-Develop a New Generation of MicroLED-Based Backlight Technology for Liquid Crystal Displays

MANCHESTER, England, Sept. 10, 2024 /PRNewswire/ -- Smartkem (Nasdaq: SMTK), a company that has the potential to power the next generation of displays using its disruptive organic thin-film transistors (OTFTs), today announced that it has entered into a joint development agreement with Shanghai Chip Foundation Semiconductor Technology Co., Ltd. ("Chip Foundation"), a manufacturer of semiconductor and integrated circuit devices, to co-develop a new generation of microLED-based backlight technology for Liquid Crystal Displays.

The joint development agreement provides that Smartkem will supply its proprietary organic dielectric single layer material, or Redistribution Layer (RDL), to Chip Foundation to combine with its own microLED devices, for the joint development of microLED based device structures. As part of the co-development project, Smartkem will develop insulator materials that can be used by Chip Foundation to combine its own proprietary microLED devices into a high performance miniLED package containing four microLEDs wired in series. The resulting manufactured chip is expected to have the properties of high brightness coupled with high current efficiency, reducing power losses in driving backlights and improving uniformity of illumination.

Smartkem Chairman and CEO, Ian Jenks, comments, "The JDA with Chip Foundation is expected to further demonstrate the commercial viability of our dielectric single layer materials to customers in the display industry. This JDA follows closely on the heels of our technology collaboration agreement with the Industrial Technology Research Institute (ITRI) in Taiwan to enable product prototyping on its Gen 2.5 hybrid pilot line and reflects the continuing advance of our commercialization strategy."

Dr. Maosheng Hao, Chairman of Chip Foundation, comments, "Smartkem is widely recognized as a leading provider of OTFT solutions, with deep expertise and extensive experience in organic dielectric materials, organic semiconductor materials, and related processes. Their solution coating process technology is a perfect fit with Chip Foundation's specialized processes and techniques in the Mini/MicroLED domain. We believe that this collaboration between our two companies has the potential to expedite the advancement and widespread adoption of this technology by the display industry."

Information relating to Smartkem can be found on the Nasdaq website:

<https://www.nasdaq.com/market-activity/stocks/smtk>.

About Smartkem

Smartkem is seeking to reshape the world of electronics with its disruptive organic thin-film transistors (OTFTs) that have the potential to drive the next generation of displays. Smartkem's patented TRUFLEX® semiconductor and dielectric inks, or liquid electronic polymers, can be used to make a new type of transistor that has the potential to revolutionize the display industry. Smartkem's inks enable low temperature printing processes that are compatible with existing manufacturing infrastructure to deliver low-cost displays that outperform existing models. The company's electronic polymer platform can be used in a number of display technologies including microLED, miniLED and AMOLED displays for next generation televisions, laptops, virtual reality (VR) headsets, smartwatches and smartphones.

Smartkem develops its materials at its research and development facility in Manchester, UK and its semiconductor manufacturing processes at the Centre for Process Innovation (CPI) at Sedgefield, UK. It also has a field application office in Taiwan. The company has an extensive IP portfolio including 125 granted patents across 19 patent families and 40 codified trade secrets. For more information, visit: www.smartkem.com and follow us on LinkedIn www.linkedin.com/company/smartkem-limited and Twitter [@SmartkemOTFT](https://twitter.com/SmartkemOTFT).

About Shanghai Chip Foundation Semiconductor Technology Co., Ltd.

Shanghai Chip Foundation Semiconductor Technology Co., Ltd. has developed a comprehensive Chemical Lift-off (CLO) technology for Gallium Nitride (GaN) growth substrates through years of continuous research and practice, achieving mass production. The substrate, as the core support for GaN materials and chips, plays a crucial role. Chip Foundation have successfully developed a new type of composite patterned sapphire substrate, namely Dielectric Patterned Sapphire Substrate (DPSS), which is significantly different from the industry-standard Patterned Sapphire Substrate (PSS). Utilizing precise facet controlled epitaxial lateral over growth technology, Chip Foundation can reduce the dislocation density of the GaN epitaxial layer on the DPSS substrate to the level of $10^7/\text{cm}^2$. For large-size LED chips, the effect of dislocations can be ignored, but for Micro LED chips, the negative effects of dislocations will become increasingly prominent. Relying on the DPSS substrate, Chip Foundation have further innovated the processing technology of chemical lift-off growth substrates. Compared with the traditional laser lift-off method, chemical lift-off shows superior performance in cost-effectiveness and product yield. The laser lift-off process has an adverse effect on the leakage performance of the chip, while the chemical lift-off process can effectively improve the leakage performance of the chip, a conclusion that has been experimentally verified and its physical mechanism clearly explained.

These technologies can effectively promote the mass production of Micro LED chips and can be used to produce Mini Thin-film Flip-chip LED chips. Due to the omission of substrate thinning, laser scribing, and cracking processes, and the fact that almost no scribe channels are needed between chips, the cost advantage is very significant. Chip Foundation have developed wafer-level packaging technology based on thin-film chips and Mini LED backlight technology that can fully leverage the superior performance of thin-film chips.

The advantages of GaN materials in electronic power and radio frequency chips are also unparalleled. Our core technologies (DPSS substrate, lateral epitaxial growth technology,

chemical lift-off substrate technology) can effectively solve the reliability and heat dissipation issues of electronic power and radio frequency chips, and Chip Foundation look forward to cooperating with various parties in these fields in various forms.

Forward-Looking Statements

All statements in this press release that are not historical are forward-looking statements, including, among other things, statements relating to the Smartkem's expectations regarding its market position and market opportunity, expectations and plans as to its product development, manufacturing and sales, and relations with its partners and investors. These statements are not historical facts but rather are based on Smartkem Inc.'s current expectations, estimates, and projections regarding its business, operations and other similar or related factors. Words such as "may," "will," "could," "would," "should," "anticipate," "predict," "potential," "continue," "expect," "intend," "plan," "project," "believe," "estimate," and other similar or related expressions are used to identify these forward-looking statements, although not all forward-looking statements contain these words. You should not place undue reliance on forward-looking statements because they involve known and unknown risks, uncertainties, and assumptions that are difficult or impossible to predict and, in some cases, beyond the Company's control. Actual results may differ materially from those in the forward-looking statements as a result of a number of factors, including those described in the Company's filings with the Securities and Exchange Commission. The Company undertakes no obligation to revise or update information in this release to reflect events or circumstances in the future, even if new information becomes available.

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