LYON, France – November 15, 2016: “Displays could be the first killer application for OTFT!”, announces the “More than Moore” market research and strategy consulting company, Yole Développement (Yole). “The OSC industry is at a turning point and the next 18 months are going to be critical”, confirm Yole’s analysts.

Multiple panel makers are currently attempting to unroll OTFT into older fabs. If successful, this would boost the credibility of the technology and the willingness of panel makers to invest and scale up. On the other hand, failure in the current attempts could be a fatal blow for the industry or at least, push back adoption by another 5 years. Indeed panel makers would temporarily pull the plug on their industrialization effort and send OTFT back to the lab until all the technology bricks are ready for true flexibility or other, non-display applications emerge…

Yole releases today a new technology and market analysis dedicated to OTFT technologies for flexible display applications and more. Are OTFT technologies ready for display applications? Can they enable fully-flexible devices? The “Organic Thin Film Transistor (OTFT) 2016: Flexible Displays & Other Applications” report from Yole presents a detailed review of flexible displays, including an analysis of technical challenges, manufacturing status, key players, and technologies.

Yole’s analysts propose a detailed analysis of OTFT, including benefits, challenges, performance status, and roadmaps. Additionally, this report provides an analysis of cost of ownership and competitive landscape including company profiles for key players. It focuses on OTFT display applications and the associated market volume for the period 2016 – 2022, broken down in 13 segments and provides additional insights for other applications such as sensors, smart tags etc.

1 OTFT: Organic Thin Film Transistor
2 OSC: Organic Semiconductor
Most panel makers are intrigued by the unique OTFTs features. Some players are cautiously committing CAPEX\(^3\) and resources to adopt OTFT technologies…OTFTs are entering the fab by the back door.

OSC suppliers and OTFT makers have made significant advances in term of molecule performance, ink formulations and accompanying materials. Progresses have also been made in TFT\(^4\) design, processes and manufacturing technologies. This has led to improved OTFT performance and manufacturability and compatibility with existing equipment. Plastic Logic was the first to enter mass production of flexible EPD\(^5\) based on OTFT backplanes in 2009.

A wide variety of OTFT-based devices have been demonstrated: AMOLED\(^6\), EPD, LCD\(^7\) displays as well as X-Ray imagers, fingerprint readers, and various types of sensors have been fabricated. In addition, multiple bricks of technology have been demonstrated for various types of electronics: inverters, ring oscillators, gate arrays, NANDs… Moreover most of the leading display makers are working on OTFT: LG, Sony, BOE, AUO, Chunghwa Picture Tube, etc. Many display makers have demonstrated a wide range of prototypes but none have released any commercial, mass produced products. The only notable exception is Plastic Logic, but the commercial success of its flexible EPD displays has so far remained fairly limited.

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\(^3\) CAPEX: Capital Expenditure  
\(^4\) TFT: Thin Film Transistor  
\(^5\) EPD: Electrophoretic Displays  
\(^6\) AMOLED: Matrix Organic Light Emitting Diode  
\(^7\) LCD: Liquid Crystal Display
In order to enable this market, OSC/OTFT makers business model and marketing efforts have evolved from focusing on the commercialization of OSC molecules to offering full material packages and complete, fab-ready technology and process toolboxes. Full toolkits are now available that include all essential materials and processes to enable OTFT manufacturing with existing equipment.

“We estimate that the global demand for TFT display panels across all technologies will reach 188 million of m² in 2016 and increase to 238 million of m² by 2022”, explains Dr Eric Virey, Senior Technology & Market Analyst at Yole. Indeed the market demand is strongly dominated by large displays such as television and computer monitors. Smartphones come third despite their smaller area thanks to very high volumes. “Together, those 3 segments represent more than 90% of the total”, comments Dr Eric Virey.

Wearables mostly represented by the categories “smartwatches” and “other wearable” as well as embedded displays automotive and more, are expected to experience fast growth but remain a small fraction of about 1% of the total TFT market in term of surface.

OTFT first commercial products could emerge in the following applications:

- E-papers (e-readers and other applications such as signage, smart tags, etc.)
- Embedded displays: automotive, industrial, etc.
- Wearable

In this OTFT report, Yole’s analysts developed two scenarios based on OTFT adoption rates in each of the major display segments. Under Yole’s base scenario, there is limited to no adoption in larger displays such as laptops, monitors and TV. Because those large display applications are strongly dominating the market in term of total TFT area, the global OTFT adoption rate across all applications comes to slightly above 1.3% in term of total TFT backplane surface.

In an aggressive scenario enabled by various OTFT technology breakthroughs detailed in the report, TV would become the single largest OTFT backplane segment as organic semiconductors would compete efficiently against a-Si.

Due to the sheer size of the TV market, even a low OTFT penetration rate would significantly increase the size of the OSC and OGI markets. “Our aggressive scenario illustrates how commitment from both panel makers and materials suppliers could unlock the full potential of the technology”, analyzes Dr Eric Virey.

All results of this technology & market analysis are presented in the OTFT report. More information about this report is available on i-micronews.com, LED reports section.
About Organic Thin Film Transistor (OTFT) 2016: Flexible Displays & Other Applications report

Author:
Dr Eric Virey serves as a Senior Market and Technology Analyst and has contributed to the development of sapphire & LED activities at Yole Développement (Yole), the “More than Moore” market research and strategy consulting company. Eric has a broad knowledge of the sapphire, solid state lighting and display industries: Since 2009, he authored multiple Yole’s reports, he also contributed to multiple custom projects with Yole Finance. Before that, he’s held various R&D, engineering, manufacturing and marketing positions with Fortune 500 Company Saint-Gobain in France and the United States. Those included a 5 year tenure as Market Manager in charge of Sapphire substrates and materials for optical telecoms and displays, a 3-year cross functional corporate position where he acted across multiple business units as a market and technology evangelist to identify and develop new business opportunities in solid state lighting (LED/OLEDs). Dr Eric Virey holds a Ph-D in Optoelectronics from the National Polytechnic Institute of Grenoble.

Companies cited in the report:

Founded in 1998, Yole Développement has grown to become a group of companies providing marketing, technology and strategy consulting, media and corporate finance services. With a strong focus on emerging applications using silicon and/or micro manufacturing, the Yole Développement group has expanded to include more than 50 collaborators worldwide covering MEMS, Compound Semiconductors, LED, Image Sensors, Optoelectronics, Microfluidics & Medical, Advanced Packaging, Manufacturing, Nanomaterials, Power Electronics and Batteries & Energy Management.
The “More than Moore” company Yole, along with its partners System Plus Consulting, Blumorpho and KnowMade, support industrial companies, investors and R&D organizations worldwide to help them understand markets and follow technology trends to grow their business.

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