

Printed and Flexible Electronics: Global Markets and Trends 2009-2019

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IDTechEx finds that the market for printed and potentially printed electronics, including organics, inorganics and composites, will rise from \$1.92 billion in 2009 to \$57.16 billion in 2019. The majority of the market in 2009 - 71% - is for electronics which are relatively mature - conductive inks (for membrane keyboards, flex connectors etc), sensors (disposable blood glucose sensors) and Organic Light Emitting Displays (OLEDs) which are on glass substrates and not printed as yet.

In the last twelve months there have been many significant developments, such as:

- Work on thin film transistors is shifting increasingly from mostly organic based materials to a more even balance between organics and inorganics, due to the high performance that inorganics can achieve.
- East Asia significantly broadens scope of work in printed electronics, most notably in Japan followed by Korea. For example, the display giants in East Asia are researching the full gamut of printed electronics chemistries for transistors for display backplanes.
- Photovoltaics such as CIGS, DSSC and OPV account for a market of \$0.41 Billion in 2009, but this is not the full picture. CdTe and aSi photovoltaics, which are not printed today, are now a substantial market in rigid form and both have been demonstrated to be printed and/or flexible.
- The number of new companies getting involved is quickly increasing. At least 2250 organizations are working on the topic. This includes academic institutes as well as companies - roughly a 50-50 split.

Of the total market in 2009, 35% of these electronics will be predominately printed. Initially photovoltaics, OLEDs (on glass) and e-paper displays grow rapidly, followed by thin film transistor circuits, flexible OLEDs, sensors and batteries. By 2019 the market will be worth \$57.2 Billion, with 76% printed and 73% on flexible substrates.

The market for e-paper displays will be \$80 million this year for the front plane material, but the value of the products that use the technology is much higher - to date displays have been used in over \$1 billion worth of products. With over 20 e-readers now available and successes such as the display on Esquire magazine in 2008, interest in this technology is booming.

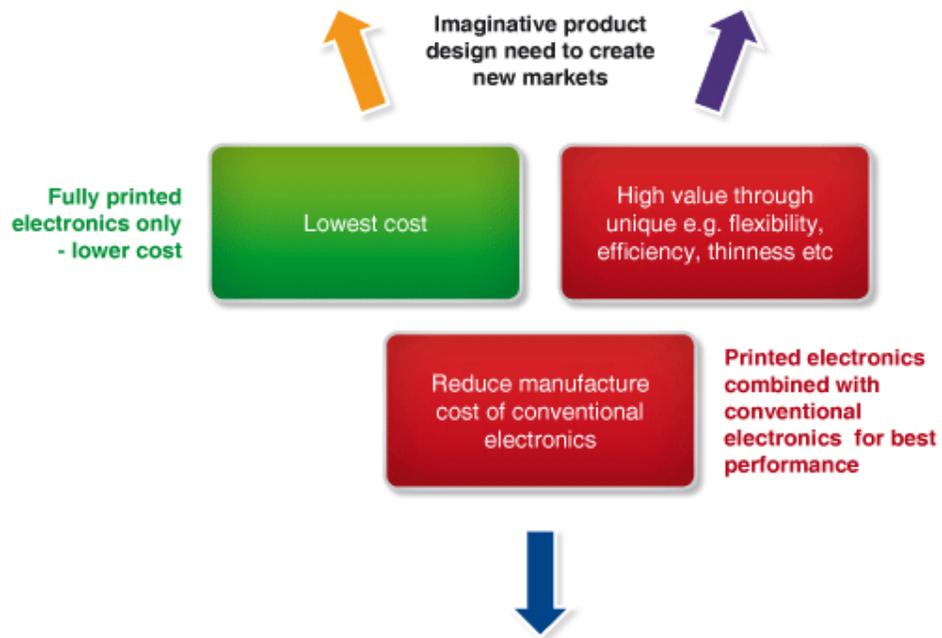
In some sectors commercialization is still embryonic. More applications are sought for thin film batteries to repeat the success of the Estee Lauder skin patch, which incorporated a battery and sells millions yearly. Here the selling point is flexibility, the price is still one magnitude higher than the more powerful ubiquitous coin cell batteries, but as other thin film components commercialize the ease of integration is changing this prospect.

Most developers of thin film transistors have slipped target commercialization dates, but this year we see the first products being sold from Kovio launching RFID tags using a printed inorganic semiconductor.

Markets in 2009

Currently there are three main ways the technology is being applied, as shown in the following image. There are applications where companies intend to compete on cost, such as replacing the silicon chip in an RFID tag to reach lower price points enabling much higher numbers of items that can be tagged; those that compete on other benefits such as flexibility or robustness, such as those involved in flexible e-book readers that intend to sell these as a premium over rigid versions. In both cases, creative product design is needed. We also see that printed electronics know-how is being used in conventional electronics manufacture to reduce the cost, such as the move to inkjet printing of conductors enabling smaller circuits compared to etched versions.

How printed electronics is being applied to products



Source IDTechEx: www.IDTechEx.com/research

What is the future of organic transistors compared to inorganic ones? What are the products? What are the needs? What are the challenges? It is answered in this presentation

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