A bright future for plastics -- robot 'skin,' flexible laptops and electric posters

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WITH market analysts predicting a ten fold increase in the value of the organic light emitting display industry, from £1.5 billion to £15.5 billion, by 2014, it is no wonder that scientists and governments alike are keen to advance research into "plastic electronics".

July's edition of *Physics World* includes an in-depth feature by three Israeli researchers, Marianna Khorzov and David Andelman, from the School of Physics and Astronomy at Tel Aviv University, and Rafi Shikler, from the Electrical and Computer Engineering Department at Ben Gurion University, about exciting developments in the field.

For a long time, plastic was thought of as an insulating material that could not conduct electricity, but ground-breaking research in the 1970s proved that some plastics could do so. Now, more than thirty years later some of the potential applications of these breakthrough materials – electronic billboards, flexible laptops, high-definition television screens only one centimetre thick – are coming to light.

Plastic-based transistors and organic light-emitting displays are set to shake the electronics market. Transistors, the fundamental building block in modern electronic devices, are traditionally made of silicon. Plastic-based transistors however are easier and cheaper to manufacture than their silicon equivalent. And because plastic is flexible, we could soon see ultrathin, flexible laptops, for example, that would be impossible to make from silicon.

Conventional light-emitting displays, used in televisions, iPods and digital watches, are rigid, expensive and complex to manufacture. Organic light-emitting displays, based on plastic electronics engineering, are easier to manufacture, more flexible and, as an added bonus, also consume less energy. This is why Sony, Samsung and Kodak are all devoting time and money to developing them.

Other exciting developments are likely to be in the field of bionics, including the development of materials sensitive but flexible enough to replicate skin, which could be used by robots in situations where a sense of touch is crucial.

The researchers write, "We expect that, for many applications, these materials will gradually replace silicon and metals, and they may even make possible entirely new technologies, particularly in the field of bionics, which seeks to link up technology with biological systems."

Source: Institute of Physics