THE TECHNOLOGY PROGRAMME

AUTUMN 2006 COMPETITION FOR FUNDING

Plastic Electronics: Novel Materials, Deposition and Patterning Techniques

Summary

Plastic Electronics is an emerging technology that requires further research and development of most, but not necessarily all, of the following:

- Novel materials (for example, organic semiconductors, light emitting materials, printable conducting layers);
- Novel manufacturing processes, especially those viable at a smaller scale (for example, additive printing, laser transfer, micro contact); and
- Novel substrates and packages (for example plastic films, package-free electronics)

Advances in these areas would enable the manufacture of electronic components and systems with radically different price, performance and functionality characteristics from devices based on entrenched semiconductor technologies.

Plastic Electronics represents a multi-billion pound opportunity that is poised to disrupt the world of electronic circuits and display technologies. The UK is currently at the forefront of developments in this exciting new area and can assume a leading role. Following an extensive consultation with industry and academe on medium term strategies for key technology areas, there is recognition that continuing the development of the nascent plastic electronics industry in the UK will require further research and development into key areas such as the ability to deposit and pattern complex multiple thin film layers of functional electronic materials efficiently and economically.

In this competition the DTI will make available funding of £5m to support highly innovative collaborative research proposals researching and developing new materials and manufacturing processes. Additional funding from EPSRC is also available for projects where there is a significant high quality academic component and in particular for those projects that demonstrate added

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SUCCEEDING THROUGH INNOVATION

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COLLABORATIVE RESEARCH AND DEVELOPMENT

value to its existing portfolio; by building on or being complementary to existing research programmes. It is anticipated that successful projects will demonstrate proof of concept and early stage demonstrations of materials and processes. Of particular interest will be projects that aim to facilitate low cost, low temperature (<150°C) and environmentally friendly materials and processes suitable for high-resolution patterning of substrates. These new materials and processes should be suitable for use with flexible or formable substrates. The materials and processes must also be suitable for creating the device architectures that will facilitate the design of future electronic, display and lighting products.

Background

The worldwide market for Plastic Electronics is forecast to be £15 billion by 2015 and technology analysts have indicated that the opportunity for new markets could be worth up to £125Bn by 2025. This is a rapidly developing area in which the UK has an exceptionally strong academic base and a number of companies with leading positions in developing and marketing early products.

Success in this disruptive technology field is dependent on exploiting the science base, with industry pull-through. Support would act as a catalyst to bring together the key players, evolve the developing supply chain and encourage the early application of this technology in a range of application domains ranging from, but not restricted to, flexible displays (sometimes referred to as e-paper), electronic RFID labels, intelligent packaging, bio-sensors, disposable electronics and intelligent textiles. Support should also help to mitigate the substantial technical risks and uncertainties associated with the research and development of disruptive technology in the plastic electronics area.

Scope for Applications

Under this call we are interested in any proposal with innovative solutions across the whole spectrum of organic electronic materials and associated manufacturing processes but projects that demonstrate significant innovation in the following areas will be particularly welcome:

- Processes to deposit and pattern (by additive printing or other methods) single and multiple organic and/or inorganic thin film layers of conductive, semiconductive, dielectric and passivation layers.
- Novel (organic and inorganic) conductive, semiconductive, dielectric and passivation materials compatible with processes required to deliver high-resolution patterned layers on flexible substrates.
- Processes and materials to deliver pinhole free, uniform thin-film layers with controllable thickness and surface roughness, preferably with an ability to create high-density via-holes allowing interconnection between adjacent layers of polymer and inorganic materials.
- Processes and materials that deliver advanced registration of multiple layers, particularly for fine-line depositions over large area substrates.
- Processes that will improve the adhesion of subsequent (printed or deposited) layers without damaging existing layers.
- Processes to improve planarity of intermediate and final layers of patterned materials.
- Processes and materials that will lead towards deposition of multiple conductive track and gap widths of 5 microns each (or less) over large areas, with demonstration of conductivity close to that of the bulk material.

It is anticipated that successful projects will demonstrate proof of concept and early stage demonstrations of materials and processes.

Contact

The deadline for registration of intention to submit an application is **midnight 8 January 2007**. The deadline for submission of outline application form and outline industry partner finance forms is **midnight 15 January 2007**.

For information about the application process visit http://www.technologyprogramme.org.uk/ This website contains guidance for applicants, including deadlines and dates of applicant briefing sessions. Alternatively call the helpline on **01355 27215**5 or email **info@technologyprogramme.org.uk**

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