Organic materials for electronics

At a glance

Organic materials have historically been used as insulators, adhesives and packaging in electronic devices. However, the realisation that conjugated organic materials may act as semiconductors or even conductors has opened up a whole new industry based on organic materials - Organic or Printed Electronics. Tremendous opportunities exist in:

- Displays
- Lighting
- Ubiquitous electronics
- Photovoltaics
- Sensors

The business opportunity is also exciting; The global market for printed electronics is currently valued at an annual US $2.2bn. – but with ten-year growth projecting to US $44bn..

Organic materials for electronics at the Organic Materials Innovation Centre (OMIC)

The considerable expertise in organic electronics at OMIC includes:

The discovery, development and characterization of new organic materials, such as conjugated oligomers, soluble oligoacenes, conjugated liquid crystals, carbons (graphene and nanotubes) and semiconducting/conducting polymers.

The processing (e.g. direct write including inkjet, nanolithography) of semiconducting and conducting organic materials, into a wide range of devices on a diverse range of substrates e.g. plastics, glasses and textiles.

The fabrication and testing of electronic devices such as:

- Transistors
- Photovoltaics
- Sensors

Research & development

There are a wide range of active R&D projects in the field of organic electronics at OMIC, involving collaborators from across the UK and beyond. They include:

- EPSRC Nanotechnology Grand Challenge – This llaborative project focuses on delivering nanoengineered organic photovoltaic devices.

- EPRSC-NSF project - A collaboration between University of Hawaii, USA and the University of Manchester, UK focussing on optimising catalyst systems for the preparation of arylamine and carbazole based polymers.

- EPSRC - IEMRC (RoVaCBE) - Roll-to-roll Vacuum processed Carbon Based Electronics. Flagship project from the Innovative Electronics Manufacturing Research Centre.

- FP7 PhastID – The PhastID project is developing an integrated multichannel 2D photonic crystal based disposable biosensor.

- FP7 COMMONSENSE - The goal of the CommonSense project is to create and demonstrate a distributed sensor network for detection of improvised explosive devices.