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Dr Martin Heeney received his PhD from the University of East Anglia (1999) under the supervision of Prof. Mike Cook. Following a postdoctoral position with a start-up company in the area of photodynamic therapy, he joined Merck Chemicals in 2000. During his time at Merck he was project leader for the organic electronics team, which was awarded three prestigious international R&D awards (2006 Organic Semiconductor Industry R&D award, 2006 Japanese Organotechno Award, 2007 IDtechEX Industry semiconductor award). He has recently joined Queen Mary University of London in October 2007 as a senior lecturer in the materials department.

The research group of Dr Heeney has expertise with the design, synthesis and characterisation of a range of conjugated organic materials and polymers for use as both active and passive components in variety of organic electronic applications. They have particular interest in the development of p- and n-type organic semiconductors for use in organic field effect transistors, in the preparation of small band gap donor materials for organic solar cells and in the design of novel crosslinkable dielectric materials for transistor applications.

Current projects related to photovoltaics include:

- *Low band gap polymers and co-polymers based upon selenophene.* One approach in order to improve the performance of P3HT/PCBM blends is to develop P3HT analogues that capture more of the photon flux from the solar spectra. In order not to offset these gains by a loss in open circuit voltage of the cell, it is important that the reduction in band gap does not result from an increase in the HOMO energy level of the polymer. The incorporation of selenophene into the backbone stabilises the polymer LUMO, reducing band gap, without significantly affecting the HOMO level, and therefore open circuit voltage. A range of stable selenophene polymers have been synthesised and their physical characteristics are under investigation.
- *P-type polymers of increased ionisation potential.* This project is developing a range of thiophene based semi-crystalline co-polymers with increased ionisation potential compared to P3HT, with the aim of improving the open circuit voltage of the cell. Energy levels are manipulated by the control of the degree of delocalisation along the polymer backbone, in addition to the use of more electronegative substituents.
- *Novel n-type polymers as electron acceptors in polymer-polymer blend cells.* This project is aimed at the generation of soluble, high electron mobility polymers, by the polymerisation of fused, highly electronegative monomers.