



**POLARIC / COSMIC Workshop 2010:
Organic Complementary Devices and Circuits
22nd & 23rd September 2010
*Final Programme***

**Department of Physics, The Blackett Laboratory,
Imperial College London, London, UK**

*(The Blackett Laboratory is located at the west end of Prince Consort Road, SW7 at
the corner with Queen's Gate – building 6 on Imperial Map)*

Workshop Locations:-

Registration – Foyer Level 3 (Blackett Level 3)

Oral Presentations – Lecture Theatre 2 (Blackett Level 1)

Lunch, Tea & Coffee – Foyer Level 3 (Blackett Level 3)

Posters – Foyer Level 3 (Blackett Level 3)

Drinks Reception - Level 8 Common Room (Blackett Level 8)

Supported by the European Commission within the Seventh Framework Programme

Wednesday 22 September 2010

10.00 Registration, coffee and tea

11.00 Opening comments by workshop chair

Alasdair Campbell
Imperial

11.10 Invited Tutorial Talk

High mobility solution processed p- & n-channel OFETs

Thomas Anthopoulos
Imperial

In this presentation I will introduce and analyse the different technologies that can be used for the design of integrated circuits based on organic semiconductors. Our recent work in the fields of high-performance semiconducting materials and novel device architectures will also be discussed.

12.30 Contributed Talk

Sheet-to-sheet printed High Mobility Organic Complementary Devices and Circuit

Romain GWOZIECKI
CEA LITEN DTNM LCI

We will present early results obtained in the frame of the COSMIC project, with sheet-to-sheet printed or direct patterning processes. Various devices and circuit have been processed with high mobility materials (small molecules based) all deposited in solution. The printed CMOS circuits are stable in air, showing good performances with mobility up to 0.2 – 0.4 cm²/V.s. Basics procedure for electrical characterization of printed organic devices developed in the frame of COSMIC will also be shown.

13.00 Lunch (& Posters)

14.00 Invited Tutorial Talk

Improving organic transistor building blocks by technology and design

Jan Genoe
IMEC

In this talk, several technology modifications for organic transistors on foil will be discussed. First, we introduce the influence of a back-gate on the transistor characteristics and we discuss how the applied backgate voltage enables to optimize for either speed or noise margin (and hence yield) of the circuit. We explain how both optimization approaches have been used to develop improved organic RFID tags. Next, we also reduce source-drain distance, dielectric thickness and contact finger width to improve

organic circuit speed. Similar improvements are applied to organic transistors in the backplane of rollable displays to increase the drive current of OLED displays.

15.30 Coffee and tea (& Posters)

16.00 Invited Talk

Bringing Organic Electronics to the Roll

Gerhard Klink
Fraunhofer IZM

One of the attractive application areas for organic electronics is high-volume production processes for inexpensive electronic products, where integrated TFT circuits are used. A well known example for such applications are RFID circuits, but also other things like flexible displays or single-use sensors can gain additional benefit from organic electronics.

Currently it has been shown that organic semiconductors are able to provide satisfactory performance, but still the development step to fabricate them on plastic films and to integrate them in a roll-to-roll manufacturing environment is still a challenge.

This presentation gives a summary on current state-of-the-art and points out the different problems coming up with roll-to-roll fabrication. On the example of polymer RFID some of the necessary development topics are indicated, which are now investigated in POLARIC and COSMIC and other research projects of the European FP7.

One of the main targets for organic integrated circuits is to introduce complementary TFT technology. The approach of the COSMIC project to achieve this goal are presented and the initial results for mixing p- and n-type TFT technology will be shown.

17.00 Drinks reception

20.00 Close of first day

Thursday 23 September 2010

9.30 Registration

10.00 Invited Tutorial Talk

Dielectrics for OFETs

This tutorial talk will focus on providing an overview on the chemistry and processing of dielectrics for OFETs. All major classes of dielectrics will be discussed (inorganic, organic, SAMs, polymers) with a particular view on transistor performance and compatibility for flexible substrates including the patterning/printing of dielectrics for integrated manufacturing processes.

Joachim Steinke

Imperial

11.30 Coffee and tea (& Posters)

12.00 Invited Tutorial Talk

p- & n- type OSCs for OFETs

This tutorial talk will give a brief overview of the molecular design and performance of state-of-the-art semiconducting materials for TFT applications. I will discuss different classes of semiconducting materials and how their performance and stability can be manipulated by chemical design.

Martin Heeney

Imperial & Flexink

13.00 Lunch (& Posters)

14.00 Invited Tutorial Talk

Organic ambipolar transistors and circuits

In this tutorial a brief overview of ambipolar OTFTs and basic integrated circuits based thereon will be provided. The general working principle of the ambipolar TFT will be presented and the different approaches how to realize ambipolar FETs from point of view of device structure and material systems will be discussed. The last part of this tutorial will focus on potential applications such as CMOS-like logic and optoelectronic devices.

Adrian von Mühlénen

CSEM

15.00 Closing comments by the meeting chair

Alasdair Campbell
Imperial

15.05 Close of meeting