

Electronique
Moléculaire

Micro Nano Systems
for Biology

Matériaux et composants
pour l'Optique

Nanoparticules, nanomatériaux:
Effets sur la santé et
l'environnement

NanoConstruction

Nanotechnologies
Bio-inspirées

Energie

NanoComposants

Electronique
Organique

N E M S

Observatoire des Micro et NanoTechnologies



**EOOE : European Observatory
on Organic Electronic**

<http://www.noe-polynet.eu>

Odile BERTOLDI – CEA/OMNT, FRANCE



EOOE mission

A European Observatory of Organic (and Large area) Electronics

- **Based on shared analysis by experts**
- **To perform a continuous scientific and technological watch in Organic and Large Area Electronics**
- **To support guidelines for European and national research agencies**

EOOE Organisation

■ EOOE is a group of experts that share their scientific watch (during EOOE meeting)

Max 20 experts coming from different European institutes and universities:

- PolyNet (and from now on FlexNet) partners
- French OMNT "organic electronic" pre-existing group (since 2005)
- Other european research centers and universities

■ Expert' s Role

- **monitoring** of its domain of expertise,
- **selection** of a few relevant informations (!) not its own papers (!)
- **comment** of them,
- **writing** of a short text (10-20 lines) including:
 - summary of the interesting part of the selected information
 - and **ADD** of a comment on the information

■ Gain

- Benefit from other EOOE experts' expertise!
- Discussions during EOOE meeting
- Invited talk during the meeting
- EOOE & OMNT reports

Extract of EOOE report

Organisation and title

Tokyo Inst. of Technology:
Probing and visualization of charge carrier motion in channels of OFETs

Expert name

J. Ulanski

Summary of the document

Visualisation of real charge carrier motion by Second Harmonic Generation technique



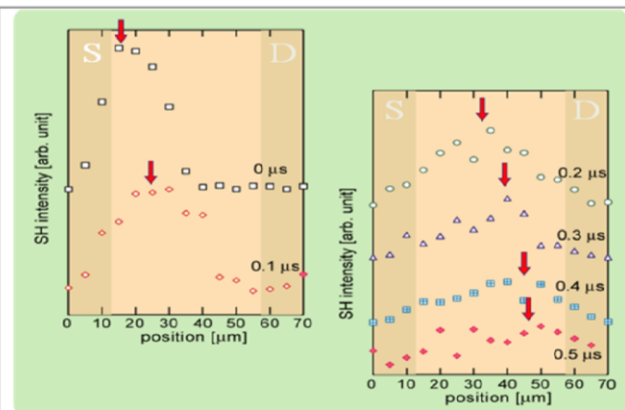
EOOE Top3 name

M. Iwamoto and coworkers (Tokyo Institute of Technology) have elaborated in last years a new method to probe the electric field distribution in channel of organic field effect transistors (OFETs) by microscopic optical second-harmonic generation (SHG) observation [1,2,3,4]. Microspot SHG signals were acquired at various points in the channel with scanning a spot position along source-drain direction.

Recently they have extended this approach, by using advanced SHG technique to probe and visualize real charge carrier motion in organic materials [5]. This is a time-resolved microscopic optical SHG technique that allows direct and selective probing of dynamic carrier motion in organic materials. Experiments making use of this technique and using pentacene OFETs have revealed dynamic changes of second-harmonic-generation intensity profiles arising from pentacene. Carrier velocity in organic solids is thus determined from the visualized carrier motion.

Illustration

Figure 15: Transient response of SH profile (hole injection, negative voltage pulse is applied to gate).
Reprinted with permission from Mitsumasa Iwamoto, Tokyo Institute of technology.



Expert comment and analysis of the paper novelty

The time-resolved SHG technique enables to evaluate carrier velocity by tracing motion of the SHG peak. Such in situ visualization technique can find several applications in investigations of space-charge field formation in organic and inorganic materials, including biomaterials and polymers.

Direct observation of the space charge formation, electric field distribution and tracking of the moving charges in OFET channel in situ, during the device operation, will allow understanding the influence of charge carrier injection, mobility and trapping phenomena on OFETs performances.

Reference and links to document

[1] "Direct imaging of carrier motion in organic transistors by optical second harmonic generation"; T. Manaka, E. Lim, R. Tamura, M. Iwamoto; *Nature Photonics* 1, 581 (2007).

Contents of previous EOOE report

	EOOE 1 15/10/2008	EOOE 2 30/09/2009	EOOE 3 30/09/2009	EOOE 4 16/03/2010
Invited Talk(s)	A. Pron: Semiconductors for p and n drawn organic transistors: synthesis, electrochemical and structural characterization J.-M. Verilhac: Materials and devices for organic n-channel field effect transistors	D. Bode: Modelling and design of organic CMOS circuitry B. Eccleston: Modelling ordered and disordered organics	R. Janssen: Current status of organic photovoltaics	X. Chu: Vitex systems encapsulation processes
Conferences report	5: E-MRS SpringMeeting, ICOE, ISFOE, ERPOS, MRE Fall Meeting	2: Printed Electronics Europe & PV beyond conventionnal Si Europe, ITC'09	3: LOPE-C, ICOE, ISFOE	6: OSC 2009, Int. Conf. on Frontiers of Polymers and Advanced Materials , OPV Summit, Printing Future Days, NNT'09, 1st Polish - French Workshop on Organic Electronics and Nanophotonics
	EOOE 5 13/10/2010	EOOE 6 03/2011	EOOE 7 09/2011	
Invited Talk(s)	OTFT Based sensors	Organic CMOS	Manufacturing, Processes	
Conferences report	3: LOPE-C, ICOE, ISFOE			

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Next EOOE meeting:

October, 13 – Berlin, Germany