

i-FLEXIS NEWSLETTER

2.



september 2014

i-FLEXIS

Integrated flexible photonic sensor
system for a large spectrum of
applications: from health to security

www.iflexis.eu



The project is co-funded by the European
Community under the Information and
Communication Technologies (ICT)

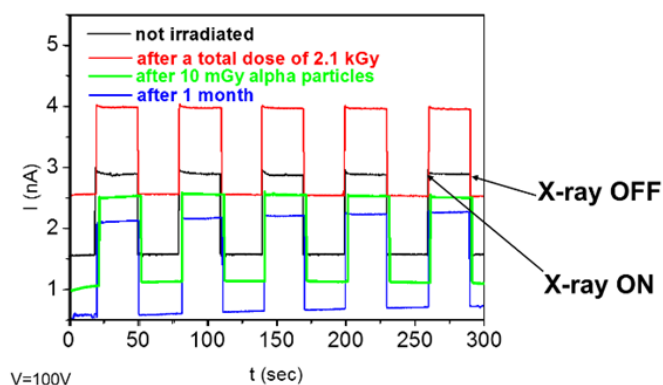


1. SCIENTIFIC CORNER

1.1 Scientific Results

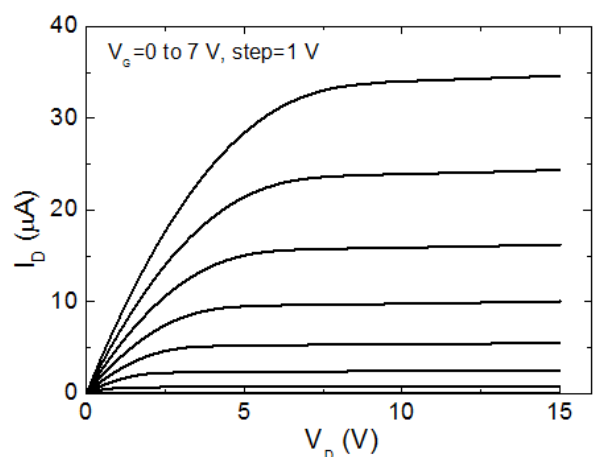
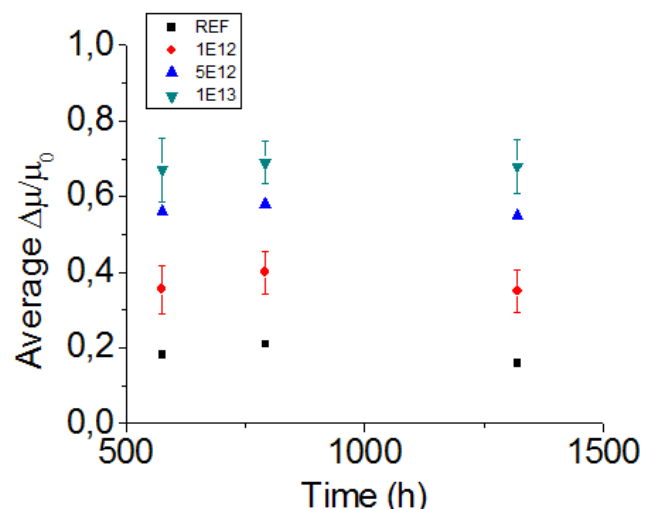
Initial set of publications including major scientific achievements of i-FLEXIS until this stage are currently under preparation. Still, this section provides a glimpse on some relevant results achieved so far.

- **X-ray detecting performance of OSSCs** not degraded after up to 2kGy on X-ray radiation and up to 10mGy of alpha particle radiation. Stable and reliable X-ray response after 1 month of aging (storage in air).



- **Indium-free oxide TFTs** on flexible substrates with $\mu_{FE} > 5 \text{ cm}^2/\text{Vs}$ and maximum processing temperature of 175 °C

- **Organic TFTs** on flexible substrates stable under irradiation with 3 MeV protons (fluences up to 10^{13} cm^{-2})



1.2 Deliverables

Four deliverables were submitted between month 6 and 12:

- **D1.2 – Interim Management Report (M9)**

This report provides a detailed overview regarding the initial 9 months of the project, focusing the project objectives, the work progress and achievements divided by WPs, deliverables and milestones tables, project management and explanation of the use of resources.

- **D4.1 – CEA TDK for Organic CMOS technology (M9)**

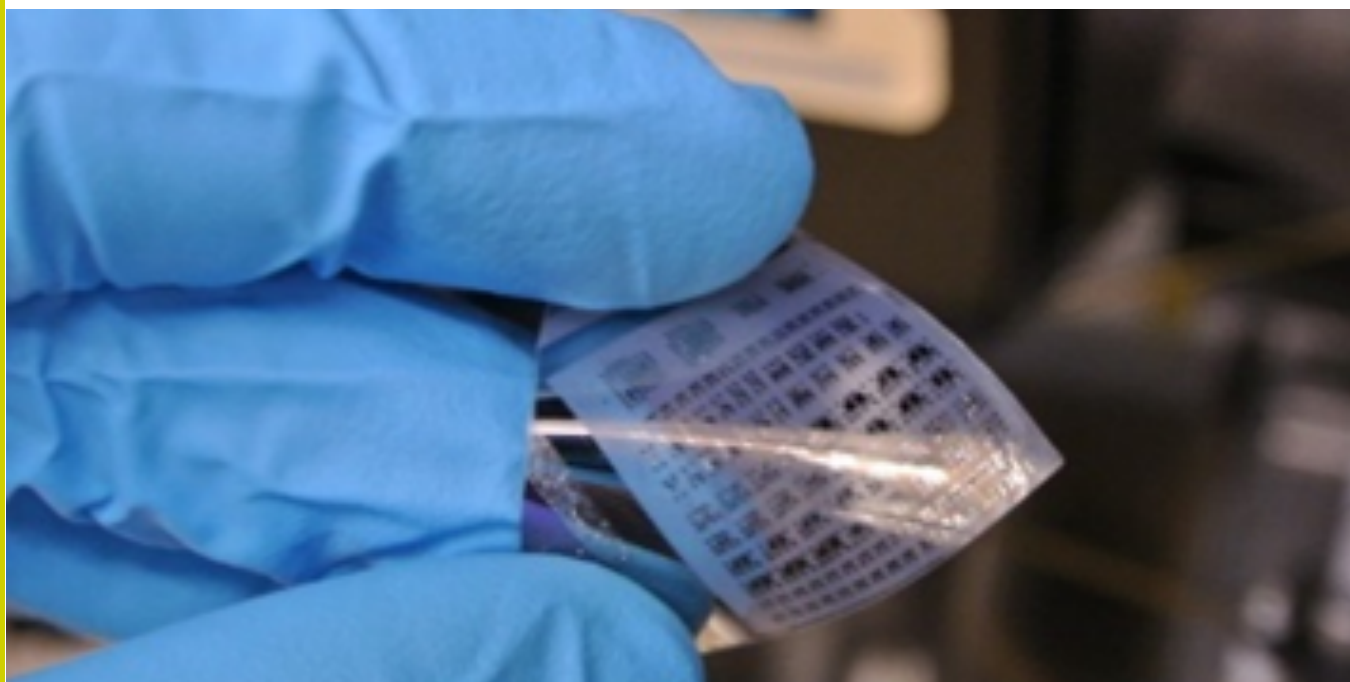
The technology design kit (TDK) for the organic CMOS technology developed by the CEA is explained. The design kit contains the design rule manual, the technology layers files and the simulation models enabling the designers to create a schematic of the circuit, simulate the design with the Eldo simulator and create the layout of the design with Virtuoso.

- **D7.3 – Plan for using and disseminating foreground (M9)**

Being the first version of the plan for using and disseminating foreground (updated in M18 and M36), it includes a conceived template, with tables listing for each result or product the responsible partners, the development status of the result and the interest of the partners in the ownership and exploitation of the result. Then, a table summarizing IPR development, i.e., analysis of patent possibility and opportunities for IPR is also included. Finally, a table lists further details per partner for each of the identified results.

- **D7.8 – Plan for the exploitation of the results and its upgrade (M9)**

As with D7.3, this deliverable will be updated through the whole project. At this stage, it includes as a main contribution the view from ERAD regarding patent analysis, competitive comparison and exploitation plan. A final section includes a detailed description of all the dissemination actions performed by all partners during this initial period.



2. MEETINGS

2.1 2nd General Assembly

2nd general assembly was held in Almada, Portugal, a few minutes to the south of Lisbon, during April 14th and 15th. It was hosted in UNINOVA, inside the Campus of Universidade Nova de Lisboa.

The meeting had the participation of 15 researchers from UNIBO, UNINOVA, UNICA, UNITS, CEA, Nanograde and Eurorad. First day was devoted to the presentation of the work carried out by each partner until M6, while the second day was devoted to planning future activities in each WP.

Results on the growth of self-standing crystals and preliminary tests on crystal inkjet printing were presented. Discussion was carried out on how they should be grown on PLA and STA structures. PLA structures are already available at this stage for OSSC growth, with electrode gaps between 5 and 50 μm . Organic and indium-free oxide TFTs were demonstrated on flexible substrates. A 2D pixelized organic transistor matrix with 14x14 pixels, 2.3 mm pitch and accessible through standard flex connectors was created, as well as dynamic models for transistors. Strategies to implement models for oxide TFT technology were discussed.

Results were presented regarding organic transistor stability under different radiation doses, revealing to be quite stable. Oxide TFTs will be tested in the following months. A comprehensive analysis regarding existing patents related with i-FLEXIS targeted application areas revealed that none of the existing patents are in

competition with the technology developed in the framework of this project.

Regarding implementation of the test vehicles, following months will be focused on the identification of the target performances both of the radiation sensor and of the single pixel unit.



2.2 1st Review Meeting, september 2014

In order to evaluate the work carried out during the first 9 months of i-FLEXIS a review meeting took place in **Brussels, on September 4th**. The review panel was composed by the project officer, Dr. Rüdiger von der Heyden, and by two expert reviewers, Dr. Torbjörn Ericsson (Vice President of Engineering Operations, Thinfilm Electronics AB, Sweden) and Dr. Celeste Fleta (Micro- and Nano-systems Department at the Instituto de Microelectrónica de Barcelona, Spain). This interim review was mainly focusing on the technical progress made in i-FLEXIS and the panel was pleased to see the good progress that the consortium has made in the project since its start in October 2013. Particular noteworthy is the proof of crystal sensitivity to X-Ray radiation. **It was recommended that the project continues.**

2.3 3rd General Assembly, October 2014

The 3rd general assembly of i-FLEXIS will be held in Cagliari, Italy, during October 23rd and 24th.

It will be hosted by the Department of Electrical and Electronic Engineering of the University of Cagliari.



3. CALL FOR SCHOOLS AND WORKSHOPS

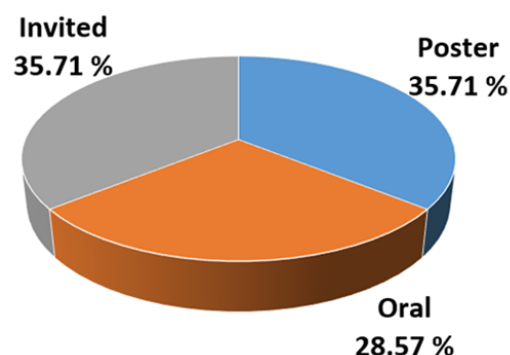
The 1st i-FLEXIS Workshop will be organized in Lille during the next E-MRS spring meeting (May 2015) and will be a Symposium titled “**Organic Semiconducting Single Crystals: from fundamentals to advanced devices**”. In parallel, roots have been established with E-MRS to organize the 1st summer school of i-FLEXIS titled “**Flexible electronic sensors**” during the same spring meeting. Details for these two events will be published soon in the project website.



4. DISSEMINATION ACTIVITIES

4.1 Participation in conferences

i-FLEXIS partners have been **very active disseminating project results**, with a total of 14 contributions as invited and regular (oral/poster) presentations in international scientific conferences since the beginning of the project. i-FLEXIS partners have been very active disseminating project results, with a total of 14 contributions as invited and regular (oral/poster) presentations in international scientific conferences since the beginning of the project.



Topics range from **OSSCs processing and characterization** (e.g., Solution growth and inkjet printing of 4-hydroxycyanobenzene crystals, at the 10th International Conference on Organic Electronics, by UNITS), **oxide TFTs** (e.g., Sputtered amorphous zinc-tin oxide TFTs and circuits on flexible substrates, at International Thin-Film Transistor Conference 2014, by UNOVA) to **radiation detectors** (e.g., Organic semiconducting single crystals for a novel generation of low-cost, room temperature ionizing radiation detectors, at CMOS Emerging Technologies Symposium 2014, by UNIBO).

4.2 Training Activities

In order to promote a multidisciplinary vision and education within EU-funded projects, i-FLEXIS consortium encourages exchange programs between researchers and students from the different partners. This already started to be implemented, bringing fruitful educative and scientific results.

- **UNOVA to UNIBO (June-July 2014):** Radiation hardness tests of sputtered oxide semiconductors and TFTs. Scientific publication being currently prepared based on this work.
- **UNICA to UNIBO (July-August 2014):** Study of STA structure under radiation. Scientific publication being currently prepared based on this work.
- **UNICA to UNOVA (planned Nov-Dec 2014):** High performance TFT fabrication, comprising pentacene dielectric and oxide semiconductor
- **UNIBO to UNOVA (planned Oct-Dec 2014):** Complementary characterization on the irradiated oxide thin films and devices.