

Conference Report

**International Thin Film Transistors Conference:
March 5 – 6, 2009 – Paris, France**

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General summary

The transistors in thin layer (or TFT) are one of the key elements of electronics on large substrate. The applications resulting from this field of multidisciplinary research are increasingly widespread in our company: flexible flat panel displays, screens, OLEDs screens, sensors, etc...

The creation of an International Conference focused on this research orientation thus appeared a need so that researchers of the whole world can exchange ideas and information. The first meeting took place at the University of Kyung Hee in Seoul in 2005. The conference ITC'09 was unrolled for the first time in France, at the Polytechnic school on March 5th and 6th 2009 organized by laboratory LPICM.

During these two days, 115 researcher and industrialists were accommodated of which 40 from South-East Asia (Japan, Korea, Taiwan), 6 from the United States and about 30 from Europe.

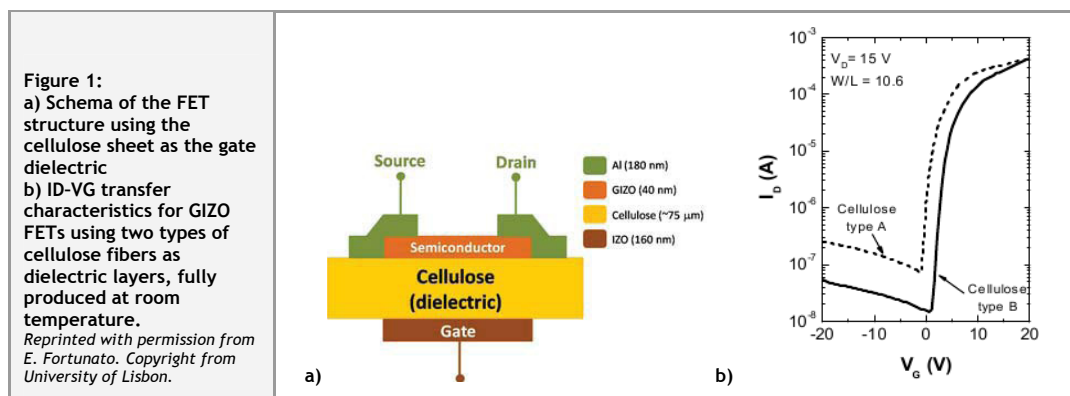
Congress ITC'09 organized of 14 parallel sessions gave place on the whole to 60 oral presentations, including 11 guests and to 26 posters. The scientific sets of themes approached covered the whole of various technologies for the design of transistors TFT and their applications in electronics in large area. In manner exhaustive were approached:

- Transistors TFT containing amorphous, microcrystalline and polycrystalline silicon at low temperature (40% of the presentations)
- Organic transistors OTFT (21%)
- Applications of electronics on large the surfaces (13%)
- Transistors TFT containing transparent oxides (10%)
- Transistors TFT containing nanotubes of carbon and graphen (8%)
- Transistor TFT at base Germanium and of Silicon-Germanium (8%)

Most relevant talks

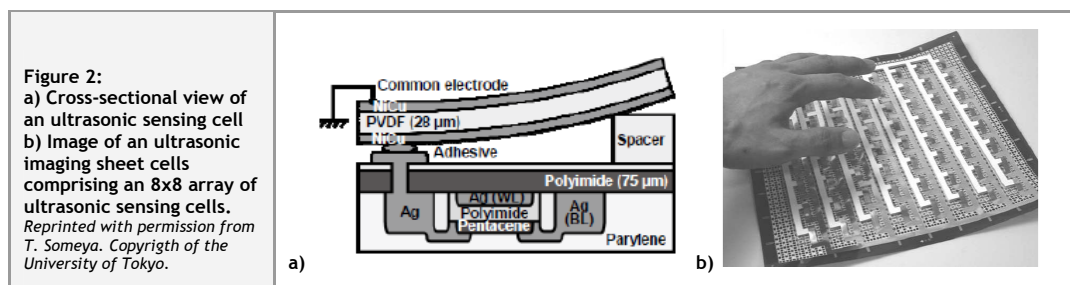
From e-paper to paper-e

This paper report the use of a sheet of cellulose fiber-based paper as the dielectric layer used in oxide based semiconductor thin film field-effect transistors (FETs). In this new approach the cellulose fiber-based paper was used in an "interstrate" structure since the device is build on both sides of the cellulose sheet. Such hybrid FETs present excellent operating characteristics such as high channel saturation mobility ($>30 \text{ cm}^2/\text{Vs}$), drain-source current on/off modulation ratio of approximately 104, near-zero threshold voltage, enhancement n-type operation and sub-threshold gate voltage swing of 0.8 V/decade. The compatibility of these devices with large-scale/large-area deposition techniques and low cost substrates as well as their very low operating bias delineates this as a promising approach to attain high performance disposable electronics like paper displays, smart labels, smart packaging, RFID and point-of-care systems for self analysis in bio-applications, among others.



A sheet-type broad-area, flexible, ultrasonic imaging sensors with printed organic transistors

A large area flexible, ultrasonic system has been successfully fabricated by integrating a two-dimensional polymeric ultrasonic sensing array with a printed organic transistor active matrix. The newsheet-sensors can offer a cost-effective solution for a real-time three-dimensional imaging in free space and/or a large-area proximity sensor for robot skins.



Sub-threshold regime and charge-carrier injection in organic thin-film transistors

This paper presents two recent aspects of research on organic field-effect transistors. In the first part, a model is developed to account for the sub-threshold regime of the device. The model is based on a multiple trapping and thermal release mechanism with a single trap level. It is found that the mobility drastically increases when the gate voltage passes through a value where traps are filled. The calculated transfer curves are in good qualitative agreement with data obtained at very low drain voltage on devices made of rubrene single crystals. In the second part of the paper, a new technique is developed to control charge injection at the source and drain electrodes of the transistor with bottom-gate bottom-contact configuration. The technique consists of modifying the electrode with a self-assembled monolayer made of molecules bearing a dipole moment prior to semiconductor deposition. It is shown that, depending on the type of the semiconductor (n or p-type), the direction of the dipole that favour charge injection is reversed. This result is interpreted in terms of an interface dipole that shifts the work function of the electrode.