

Green electronics: a technology for a sustainable future

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The evolution from rigid silicon-based electronics to flexible electronics requires the use of new materials with novel functionalities that allow non-conventional, low-cost and environmental friendly processing technologies. Among the alternatives, metal oxide semiconductors have brought to attention as backplane materials for the next generation of flat panel displays. After the huge success and revolution of transparent electronics and with the worldwide interest in displays where metal oxide thin films have proved to be truly semiconductors, display backplanes have already gone commercial in a very short period of time, due to the huge investment of several high profile companies: SHARP, SAMSUNG, LG and BOE. These materials have demonstrated exceptional electronic performance as active semiconductor components and can be tuned for applications where high transparency/electrical conductivity is demanded. The new paradigm of transparent electronics has attracted much interest as a novel technical solution in the field of the next generation of consumer electronics. The ultimate goal of this “see-through” device is to realize an integrated system equipped with ubiquitous functions of information storage, image display and networking, which strongly demands an embeddable transparent array of non-volatile memory. In parallel we have been observing a rapid and growing interest concerning the utilization of biological materials for a wide range

of applications. One of the most representative example is cellulose, not only in the form of raw material mainly for pulp and paper production, but also in the development of advanced materials/products with tailor-made properties, especially the ones based on nanostructures. In this presentation we will review the main applications of vegetal and bacterial cellulose in electronics, either as substrate (passive) or as a real electronic material (active), taking into account the expertise as well as the major developments already done at CENIMAT|i3N in the area of Paper Electronics.

