

A new era of semiconductors: metal oxides

Elvira Fortunato *, Emanuel Carlos, Rita Branquinho, Pedro Barquinha and Rodrigo Martins

*CENIMAT/i3N, Department of Materials Science, NOVA School of Science and Technology (FCT-NOVA) and
CEMOP/UNINOVA, NOVA University Lisbon, Campus de Caparica, 2829-516 Caparica, Portugal*

** emf@fct.unl.pt*

Oxide electronic materials is one of the most promising technologies for electronic devices, as distinct from the traditional silicon technology. The fact that circuits based on conventional semiconductors such as silicon and conductors such as copper can be made transparent by using different materials, the so-called transparent semiconducting and conducting oxides (TSOs and TCOs, respectively), is of great importance and allows for the definition of innovative fields of application with high added value.

Oxide electronic materials are becoming increasingly important in a wide range of applications including transparent electronics, optoelectronics, magnetoelectronics, photonics, spintronics, thermoelectrics, piezoelectrics, power harvesting, hydrogen storage and environmental waste management. Synthesis and fabrication of these materials, as well as processing into particular device structures to suit a specific application is still a challenge. Further, characterization of these materials to understand the tunability of their properties and the novel properties that evolve due to their nanostructured nature is another facet of the challenge.

In this presentation we will present the most important landmarks achieved by these stimulating scientific area as well as some insights to emerging applications.