
Editorial

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Biographical notes: Dr. Lionel Vayssieres obtained a MSc in Physical Chemistry in 1991 and a PhD in Inorganic Chemistry in November 1995 from the Université Pierre et Marie Curie, Paris, France for his research work on the interfacial and thermodynamic growth control of metal oxide nanoparticles in aqueous solutions. Thereafter, he joined Uppsala University, Sweden as a postdoctoral researcher for the Swedish Materials Consortium on Clusters and Ultrafine Particles to extend his concepts and develop purpose-built metal oxide nanomaterials for photoelectrochemical applications as well as to characterise their electronic structure by X-ray spectroscopies at synchrotron radiation facilities. He has been invited as a visiting scientist at: the University of Texas at Austin; the UNESCO Centre for Macromolecules & Materials, Stellenbosch University, and iThemba LABS, South Africa; the Glenn T. Seaborg Center, Chemical Sciences Division, at Lawrence Berkeley National Laboratory; Texas Materials Institute; EPFL, Switzerland; the University of Queensland, Australia, Nanyang Technological University, Singapore. He has (co-)authored 60 refereed publications in major international journals which have already generated over 2600 citations since the year 2000; Essential Science Indicators shows 100 citations per paper for Materials Science and 65 for All Fields; five ISI highly cited papers (four as first author) for the last ten years, a single-author 2003 paper No. 1 in the Top 10 hot papers in Chemistry (July–August 05), No. 2 (September–December 05) and No. 3 (May–June 05) in the Top 3 hot papers in Materials Science and most cited paper in Materials Science for the country of Sweden for the last 10 years and 1st in core papers for vertical ZnO nanowires arrays for the last 10 years as identified by Essential Science Indicators. He has been interviewed by In-Cites and by ScienceWatch in 2006 for a single authored 2003 paper cited now over 670 times. Two other first-and-corresponding author 2001 papers have already been cited over 300 times. He has presented 200 lectures at universities, governmental and industrial research institutes and international conferences in 26 countries and acts as a chairman, executive program committee, and advisory member for major international conferences and projects worldwide. He is currently an independent scientist at the International Center for Materials NanoArchitectonics, National Institute for Materials Science, Tsukuba, Japan and a R&D consultant. He is also the founder and the editor-in-chief of the *International Journal of Nanotechnology* and a referee for 58 SCI scientific journals as well as for major funding agencies in USA, Europe, Asia, and Africa.

This special issue consists of selected invited papers presented at the 2nd International Symposium on Transparent Conducting Oxides (IS-TCO 2008): <http://www.iesl.forth.gr/conferences/tco2008/>

This symposium was a follow up of the first edition organised in 2006 in the beautiful and historic island of Crete, Greece. The great success of this event encouraged the organisers to continue this symposium with a second edition held again in Crete, Greece in 2008 chaired by Dr. G. Kiriakidis, Head of Photonic & Electronic Materials Laboratory Institute of Electronic Structure and Laser Foundation for Research and Technology – Hellas (FORTH)-Greece. This five days symposium officially endorsed by the Materials Research Society (MRS), was held from the 22nd to 26th of October 2008 in the resort town of Hersonissos, situated about 25 km east of the city of Heraklion, the main city of the Greek Island of Crete. Crete was the centre of the Minoan civilisation, which flourished at about 2000 B.C. Many archaeological sites could be found throughout the island, with the palace of Knossos being the most visited.

The Symposium was a strategic and genuine opportunity to present and discuss current academic and industry developments, achievements and trends in the growing field of transparent conductive oxides.

Despite a general strike on the day prior to the conference opening, the participation statistics were of international standard with 267 scientists (203 in 2006) and 61 graduate students from 39 different countries attending this symposium. More accurately, by continents, the presentations consisted of 164 from Europe, 67 from Asia, 29 from America, four from Africa and three from Australia. During the symposium, a total of 146 lectures were given along with 149 poster presentations. These contributions covered the fundamentals and the fabrication-processing-characterisation as well as the applications aspects of various transparent conducting oxides. The encompassed major topics in terms of S&T focus were:

- *Fundamentals*
 - Functional/multi-functional TCOs
 - Mesoporous/Nanoporous materials
 - Piezoelectric, magnetic and dielectric TCOs
 - Modelling and simulation
 - Electrical, mechanical and optical properties
 - TCO structure/defects/interfaces.
- *Fabrication, Processing, Characterisation*
 - Physical techniques (PLD, sputtering, etc)
 - Chemical techniques (CVD, PE-CVD, MOCVD, ACG, Spray pyrolysis, spin coating etc.)
 - Direct writing, printing and patterning
 - New tools and equipment.

- *Applications*
 - TCO electrodes and device fabrication
 - P-type metal oxide materials and devices
 - Flexible electronics
 - Transparent devices (TTFTs, OLEDs, AM-OLEDs)
 - TCO sensors (environmental/food/medical)
 - TCOs in photovoltaic devices
 - Protective/Photocatalytic and active coatings
 - Wavelength-selective devices based on TCOs
 - Emerging exciting applications.

As expected, the major focus of the contributions was on ZnO nanostructures and its derivatives. The corresponding distribution per materials was 38% (ZnO), 11% (TiO₂), 10% ITO, 5% SnO₂, 2% In₂O₃, 2% (IZO), 1% WO₃, 1% IZTO and 30% other oxides and nanocomposites. In addition to the regular keynote, invited, oral and poster presentations, a supplementary tutorial series was given by international experts. The attendance was remarkable in terms of the junior fellows and postgraduate students component.

George Kiriakidis, chairman of ISTCO 2008 was assisted in the scientific organisation by world experts in the field:

Lionel Vayssieres, National Institute for Materials Science, Tsukuba, Japan

Sang Yeol Lee, Korea Institute of Science and Technology, Seoul, Korea

Elvira Fortunato, Universidade Nova de Lisboa, Portugal

Clark I. Bright, 3M Corporate, USA

along with honorary past symposium chairs:

Marie-Isabelle Baraton, University of Limoges and CNRS, France

Samuel Mao, University of California and LBNL, USA

After a passionate discussion, a final agreement by the organising committee was reached to dedicate two special issues in SCI journals for the conference, one to be published in *Thin Solid Films* (Elsevier) as proceedings and the other one in this journal, for which the selected authors were requested to write full papers of their work. The symposium chairs along with members of the international advisory committee have expressed their will to re-conduct this event on a 2-year basis. The symposium will be held in Crete, Greece with Professor G. Kiriakidis as the main chairman assisted by new co-chairs.

This special issue consists of eight invited papers which cover the economics and technological challenges involved in transparent conducting oxides (Baraton), their cost-effective fabrication by sol-gel (Westin et al.), the optical transparency and conductivity of novel TCO materials (Perkins et al.), their applications in solar energy and energy efficiency (Granqvist), solar cells from an academic (Yates et al.) and an industrial (Nghiem and Le Bellac) point of view as well as for chemical (Richardson et al.) and temperature (Prades et al.) sensors.