

# XVII-ICSMV



**Monday, September 23, 2024 - Friday, September 27, 2024**

**Ensenada, México**

## **Scientific Program**

## Atomic Layer Deposition

The purpose of this symposium is to provide a forum for the discussion about basic issues and state the art applications of atomic layer deposition (ALD). The topics include:

- Simulation, Modeling and Theory of ALD
- Precursors and Chemistry
- Surface Functionalization
- Structural, chemical and electrical characterization.
- Growth and Nucleation in the Ultra-Thin Regime
- Novel Materials
- Plasma-Enhanced ALD
- Molecular Layer Deposition
- Others.

## Biomaterials and Polymers

Conference will be organized on themes related with: 'Emerging Technologies and Scientific Advancements in polymers and Biomaterials Engineering.

The scientific event offers a best platform with its well organized scientific program to the audience which includes interactive panel discussions, plenary talks, short presentations, short courses, invited sessions and poster sessions on the topics that cover areas of:

Polymer science, Engineering and technologies from the latest innovations in synthesis  
Processing and modeling to the advanced applications of polymers in health  
Advanced Biomaterials  
Biomaterials and Nanotechnology Applications in Biomedicine  
Use in Therapeutic and Investigative Delivery  
Biomaterials in Biological Engineering  
Biodegradable Biomaterials,  
Utility Based Biomaterials  
Energy and sustainability  
Future materials and devices

## Characterization and Metrology

Optic and electronic spectroscopy and microscopy are very important and relevant fields of knowledge when it comes to fundamental and applied research in materials science. Materials and surfaces have been widely studied and characterized by using linear optics through reflectance, transmittance, absorbance, and scattering properties. By contrast, nonlinear optics are closely related to the understanding of materials and surfaces, since such phenomena for example, second harmonic generation, wave mixing, parametric up and down conversion to mention only a few are directly related to material features, such as, crystallinity, centrosymmetry, anisotropy and quantum properties.

This symposium is dedicated to the presentation and discussion of characterization and metrology within the following topics:

- Materials
- Surfaces
- Linear and nonlinear optical properties
- Raman characterization
- Nonlinear optical microscopy
- Ultrafast light-matter interaction
- Laser processing of materials: micro and nanostructures
- Laser-tissue interactions
- Laser-induced cavitation
- Photonics
- Biophotonics
- Opticaltrapping

## **Luminescence Phenomena: Materials and Applications**

This symposium centers on the science and technology of luminescence, in its broader sense, including photo-, thermo-, electro- and mechano-luminescence. The aim is to gather international experts as well as students to discuss the recent progresses in this highly inter- and multi-disciplinary area, with particular attention to the synthesis characterization, and applications of materials exhibiting advanced luminescence properties.

The scope of the conference will cover the following areas:

- Photoluminescence
- Cathodoluminescence
- Ionoluminescence
- Bioluminescence
- Thermoluminescence
- Electroluminescence
- Mechano-, Sono- and Chemi-Luminescence
- Theoretical aspects of luminescence
- Nanophosphors: Physics and materials
- Crystalline, amorphous and glass-ceramic materials
- Polymeric and hybrid materials
- Novel Synthesis
- Materials Characterization
- Quantum cutting and up-conversion
- Combination of luminescent and plasmonic effects
- Light emitting devices
- Displays
- Solar cells

## **Microelectronics and MEMS**

Internet of Things (IoT) is providing several stand-alone internet-connected sensors that can be monitored and/or controlled from a remote location, this is an example of how silicon-related technology is changing the world for human benefit.

In this regard the mission of this Microelectronics and MEMS (MicroSystems) Symposium is to bring together scientists and technologists interested in these two interrelated fields. The program will highlight recent advances in the design and fabrication of integrated circuits (IC's), Microelectronics Technology, Materials Science for Micro and Nanoelectromechanical devices and systems (NEMS), as well as the different strategies for the integration and packaging of MEMS and NEMS.

Microelectronics; which in its widest conception includes the design, fabrication, characterization, and modeling of micro- and nano- devices, and circuits, has emerged as the fundamental technology for the fabrication of Microsystems. In this field, it is interesting to analyze the scaling laws and size regimes in which macro theories start requiring further non-linear analysis. The purpose is to obtain a deeper understanding of the physical consequences of downscaling electrostatic, electromagnetic, fluidic, optical, thermal, chemical devices, and some combinations of them. It is of great importance to study the non-linear behavior of miniaturized devices and systems, which apart from reason involving economics, volume and weight, can lead to new operating principles and even to increase the system performance. All of them is the basis for current technology trend.

Main Topics:

The Microelectronics and MEMS Symposium is focused on the integration of materials and processes for developing MEMS/NEMS devices. Invited Talks, Oral and Poster Session will include the following topics:

- Internet of things
- Design, characterization, and modeling of IC's
- Amorphous Materials and compound Semiconductors
- Characterization and Modeling of Circuits with Sensors/Actuators
- Microsystems design (MEMS/NEMS)
- Bulk and Surface Micromachining
- Radio Frequency CMOS-MEMS
- Integrated Optics
- BioMEMS and Lab on a Chip
- Aerospace Applications
- Chemical Sensors Applications
- Automotive Applications

## Multifunctional and Magnetic Materials

Materials capable of performing two or more primary functions, either simultaneously or sequentially, are called multifunctional. These can be hybrid materials, that is, a mixture or combination of two materials of different compositions or crystalline phases (alternating layers of thin films, for example) or single-phase materials that may behave multifunctionally under applied electric and/or magnetic fields. Besides, the technology around us has a fundamental basis in magnetic materials. They are one of the key materials for mechanical energy conversion to electrical power.

Between the multifunctional materials, there is a great assortment of ceramics, which are used in

electronic devices such as actuators, sensors, switches, capacitors, oscillators and may also be used to make engines. Magnetic, piezoelectric, pyroelectric, and ferroelectric materials are extensively studied in present days not only for their potential technological applications but also because the understanding of the behavior and properties involves many phenomena that are at the frontier of knowledge such as 'magnetoelectricity', a property present in some multiferroic materials. For example, the fascinating magnetic spiral and helical structures that give rise to electrical polarization in some ceramics (making them multifunctional) are a real challenge for the theoretical and experimental researchers in this field.

This symposium is a forum to present the results of theoretical and experimental research that may include synthesis routes, sintering procedures, analysis, and characterization of the properties, as well as practical applications of the Multifunctional and Magnetic Materials. Regarding the theory, we are interested in studies that allow a deep understanding of the involved phenomena, to design new materials, to predict their behavior, and as a guide to improve existing ones.

## Nanostructures

We take pleasure to invite you to participate in the Nanostructures symposium of the XV international conference on surfaces, materials and vacuum. Participants interested in presenting an oral or poster contribution are invited to submit an abstract to the following link until June 30th:

The symposium scientific program will cover a wide spectrum of topics including physical phenomena, materials sciences, and applications of nanostructures. The diversity of topics provides an opportunity to broaden the knowledge on latest developments and future perspectives in nanostructures research. Current development in the nanostructured materials includes: (i) Synthesis, functionalization, processing and self-assembly of nanoparticles, (ii) Nanotubes, nanowires, quantum dots and other low dimensional structures, (iii) Bio-active nanomaterials and nanostructured materials for bio-medical applications, (iv) Carbon nanostructured materials, Nano-structured membranes, nano-porous materials, functional coatings, (v) Nanomaterials for photo-catalysis, solar hydrogen and thermoelectric, (vi) Nano-fabrication, characterization and manipulation techniques for nanostructures, (vii) Magnetic and nano-semiconductor materials, (ix) Industrial development and application of nanomaterials and (x) Theoretical studies of nanostructured materials.

We look forward to welcoming you.

## Plasma and Vacuum

Plasma and vacuum science and technology, are widely used in a great variety of synthesis and characterization processes used in materials science, as well as in many industrial developments.

Plasmas are quasineutral distributions of particles (ions, electrons, neutral molecules and atoms), which exhibit collective effects; such as, Debye shielding, plasma oscillations, acoustic waves and sheath formation. Plasmas occur more commonly than usually considered; more than 99% of the known universe consists of plasmas. Plasma research has led, not only to a better understanding of the universe, but to many practical uses: new manufacturing techniques and consumer products.

The term "Vacuum" describes pressure conditions below standard atmospheric pressure. Vacuum

technology is applied to all processes and physical measurement carried out under vacuum conditions.

## **Renewable Energy: Materials and Devices**

The symposium Renewable Energy: Materials and Devices, has the aim to provide a forum to present and discuss the research relating to the science and technology of energy generation, storage, and managements. An important theme is the research concerning to first generation solar cells, based on mono and poly-crystalline silicon; second generation cells, including CdTe, CIGS, CZTS, amorphous silicon, micro-crystalline and polymorphous silicon; third generation cells, based on the use of quantum dots, nanowires, carbon nanotubes, photo-electrochemical cells, polymer solar cells, nano-crystalline cells, dye-sensitized cells, perovskite solar cells, etc.

## **Semiconductors**

Research on semiconductors has been an extremely important research field for most of the past century and will continue to have a central role worldwide during the twenty first century. Current technology would not exist if silicon-based electronics had not been developed. This impressive progress has been extended to other semiconductors such as gallium arsenide, group-three nitrides and related materials. The pace at which technology advances is a direct consequence of the research efforts in growth, characterization, control of properties, development of novel devices, performance improvement, new materials such as alloys and solid solutions, theoretical approaches to predict and understand semiconductor properties, and so on. The Mexican Society for Science and Technology of Surfaces and Materials (SMCTSM) has had, since its beginnings, an important tradition among its members in pursuing research in the important field of semiconductors. This Symposium has been an important forum, for many years, for the generation, discussion and exchange of ideas where stimulating and fruitful collaborations has arisen among the participants.

## **Tribology, Surfaces and Interfaces**

Tribology studies the friction and wear behavior of surfaces that are in contact and in relative motion. Materials, Lubricants and Coatings are commonly used to increase the durability and life of components in mechanical systems, as well to reduce the energy consumption through reducing friction.

## **Theory and Simulation of Materials**

The aim of this symposium is to bring together experts in the field of surfaces and interfaces to discuss recent developments in electronic and transport properties of bulk materials, surfaces, optical properties, physical properties of clusters, and 2D materials, Density Functional Theory and Time Dependent DFT.

## **Thin Films**

The purpose of this symposium is to provide an international forum for discussion and exchange of ideas on the up-to-date research and developments of processing and characterization of advanced thin films. The physical properties of thin films are critically dependent on the deposition

conditions and post-treatment details therefore discern the correlations between the experimental conditions and film properties are of great interest for the field. The participants from various universities, industries and research laboratories are welcome to submit contributions for both oral and posters presentations to discuss recent advances, developments, field applications, and future challenges for the thin film technologies.

## Science Outreach

Una labor completa en investigación científica se cumple cuando se complementa con actividades de divulgación de la ciencia. La divulgación de la ciencia tiene como finalidad proporcionar un panorama general a toda la sociedad sobre los diferentes desarrollos científicos y tecnológicos que se realizan en el país. Para los investigadores, es una herramienta útil para promover sus investigaciones y alentar, principalmente a los jóvenes, a interesarse por el quehacer científico. A partir del 2005, la SMCTSM se propuso fomentar estas actividades a través del Simposio de Divulgación de la Ciencia y Tecnología que -cada año- tiene lugar dentro del marco del Congreso anual de esta sociedad científica.