



European Materials Research Society

Spring Meeting 2017

From May 22nd to 26th
Strasbourg Convention Center - France

Call for papers

deadline for abstract submission:

18 January 2017



European Materials Research Society

Spring Meeting 2017

Announcement for 2017 Spring Meeting

It is our great pleasure to announce the 2017 Spring Meeting of the European Materials Research Society (E-MRS) to be held in the extended and modernized Convention Centre of the beautiful city of Strasbourg ("Palais de la Musique et des Congrès").

In line with the previous conferences, it is expected that this event will be the largest in Europe in the field of Materials Science and Technology. Indeed, the E-MRS Spring Meeting is a major conference with over 2500 attendees coming from all over the world every year.

The 2017 Spring Meeting will consist of 26 parallel symposia with invited speakers, oral and poster presentations, as well as a plenary session. In parallel with the technical sessions, approximately 80 international exhibitors will display a large variety of equipment, instrumentation, products, software, publications and services from May 23 to 25 at the Strasbourg Convention Centre.





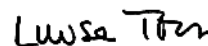
The high quality scientific program will address different topics covering the fields of Energy, Biomaterials, Semiconductors, Nanomaterials and Functional Materials. The latest scientific results will be presented and authors are invited to submit papers in the selected journals that fit the scope of each symposium. It is worth noting that the papers are peer-reviewed at a high scientific level, according to a process and timetable that are at the discretion of the symposia organizers.

The focus of the scientific program will be both on fundamental investigations and technological applications, providing an international forum for discussing recent advances related to the different aspects to be considered to promote innovation.

This very exciting program is complemented by the plenary session on Wednesday afternoon. Two outstanding speakers, Prof. Zhenan Bao, of Stanford University, USA, and Prof. Patrice Simon of Université Paul Sabatier, Toulouse, France, will address the "hot" topics "Synthesis and applications of functional organic and polymer materials" and "Electrochemical energy storage – supercapacitors", respectively.

This central session will continue with the EU-40 Materials Prize, a prestigious award presented to researchers under 40 that demonstrate exceptional promise for leadership and have made outstanding and innovative contributions to Materials Research in Europe. Everyone who complies with such a profile is encouraged to apply by January 31, 2017. The presentation of Graduate Students Awards, delivered for each one of the 26 symposia, will conclude the plenary session. We encourage these junior researchers to apply to these awards.

It is our great pleasure to welcome everyone to Strasbourg. We look forward to seeing all of you there in May. Please note the deadline for abstract submission is January 18, 2017!

				
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PLENARY SESSION

(Wednesday afternoon-May 24th)

Symposium organizers, Graduate Student Award, EU-40 Materials Prize, Award winners will be honored at the end of the plenary session on Wednesday afternoon, May 24

E-MRS AWARDS

E-MRS strives to acknowledge outstanding contributors to the progress of materials research, and to recognize their exciting and profound accomplishments. We seek to honor those whose work has already had a major impact in the field, and those young researchers whose work already shows to great expectations for future leadership.

EU-40 MATERIALS PRIZE

The award is reserved to researchers showing exceptional promise as leaders in the materials science having performed the research for which this prize is awarded while working in Europe.

The award consists of a 5,000 Euro cash prize, a certificate, waiver of the meeting registration fee and a plenary talk at the 2017 Spring Meeting of the European Materials Research Society where the award will be presented.

Nominations should include:

1. Curriculum Vitae including birth date
2. List of key publications (including citations and impact factors)
3. Letters of support from two well established scientists
4. Any additional supporting information relevant to the award

The nomination package should not exceed 10 pages (excluding the list of key publications) and should be sent by email at emrs@european-mrs.com (subject: eu40materials) before January 31, 2017.

The nominee shall not have reached his/her 40th birthday in the year in which the nomination is submitted (2016). They will be evaluated shortly after and the proposers will be informed end of March 2017.

GRADUATE STUDENT AWARDS

E-MRS announces the availability of awards (up to 2 per symposium) for graduate students conducting research on a topic to be addressed in the symposia planned for the E-MRS 2017 Spring Meeting. Each award will consist of a cash grant of 450 Euro, that will be offered during the plenary session jointly with a diploma.

Criteria for selection are:

- Participation at the E-MRS 2017 Spring Meeting as an attendee and author or co-author of a symposium paper.
- Outstanding performance in the conduct of this project and promise for future substantial achievement in materials research as judged by the faculty advisor.
- Significant and timely research results.

Application materials required:

- Application form under www.european-mrs.com

- Abstract of paper to be presented at the meeting
- Letter of support from research supervisor.

Submit the complete application to the E-MRS Secretariat. Deadline for complete application is April 26, 2017. Winners will be notified directly by the concerned symposium organizer. E-MRS Graduate Student Award Winners must be present during the plenary session to get their prizes.

EXHIBITION

Around 80 international exhibitors will display a full spectrum of equipment, instrumentation, products, software, publications and services.

To be held on May 23 – 25 in the Convention Centre of Strasbourg, the exhibit will be convenient to the technical session rooms and scheduled to coincide with the technical program. For exhibitors, it will mean an excellent opportunity to meet just the right customers and disseminate information effectively.

For meeting attendees, the E-MRS exhibition will offer the convenience of visiting with multiple vendors all under one roof. So, pick up some literature, enjoy a hands-on product demonstration or meet face-to-face with company representatives.

See more at: www.european-mrs.com

E-MRS sponsorship can help you raise awareness for your company, promote brand image and visibility, publicize a new product or generate quality sales leads. Be sure to plan early for the best availability and exposure.

Companies interested in exhibiting should contact:

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SOCIAL EVENT CONFERENCE RECEPTION

All participants are invited to attend the conference reception on Wednesday May 24, 2017 at 19:00. Enjoy drinks and food while listening to live music! It is a chance to meet and renew relationships with colleagues. The participation is free of charge.

Programme

ENERGY

- A** Processing, characterization, modelling and applications of nano energetic materials
- B** Advanced materials and systems for electrochemical energy storage
- C** Organic photovoltaics: material synthesis and characterization, device engineering, device physics and upscaling
- D** Next generation of earth-abundant materials for solar energy
- E** Advanced inorganic materials and structures for photovoltaics
- F** Photocatalytic materials for energy and environment
- G** Materials for improving energy storage battery technologies
- H** Inorganic thermoelectrics - linking material properties and systems engineering for XXI century applications

BIOMATERIALS

- I** Organic bioelectronics
- J** Electronic textiles
- K** Bioinspired and biointegrated materials as new frontiers nanomaterials VII

SEMICONDUCTORS

- L** New materials for organic electronics: from synthesis to processing, characterization and device physics
- M** Novel transport phenomena in organic electronic devices: heat, spin and thermoelectricity
- N** Semiconductor nanostructures towards electronic and opto-electronic device applications – VI
- O** Wide bandgap semiconductor for LEDs, solar and related energy technology
- P** Silicon & Silicon nanostructures: from recent fundamental research to novel applications

NANOMATERIALS

- Q** Nano-engineering coatings and thin films
- R** Nanoparticles in dielectric matrix: from synthesis to device applications for photonics, electronics, and bio sensing
- S** ALTECH 2017 - Analytical techniques for precise characterization of nano materials
- T** Synthesis, processing and characterization of nanoscale multi functional oxide films VI
- U** Computer modeling of thermal transport at the nanoscale
- V** Design and hierarchical assemblies of nanomaterials (nanoparticles, carbon materials, molecules) towards energy, sensing, electronic, catalysis and detection applications

FUNCTIONAL MATERIALS

- W** Small scale mechanical behaviour of interfaces: bridging experimental and computational modelling methods
- X** New frontiers in laser interaction: from hard coatings to smart materials
- Y** Paper electronics: from materials to applications
- Z** Metamaterials: from waves to matter

ENERGY

Symposium A

Processing, characterization, modelling and applications of nano energetic materials

Nano Energetic Materials Structures include nanothermite mixtures, bi-metallics, multilayered composite films, foils, new carbon-based reactive substances, and structures obtained by compaction of micro or nano particles that enable energetic, thermite reactions... This symposium will highlight "Advanced Energetic Material Technologies and Diagnostics", including the synthesis of new materials with targeted and enhanced performances, advanced and in-situ experimental techniques, and new theoretical and computational models to simulate the behavior of energetic materials under a wide variety of conditions. This symposium will bring together scientists and engineers interested in fundamental materials science issues that need to be addressed to develop advanced and novel reactive materials systems for next-generation pyrotechnic-based applications and products (e.g., components for traditional gas generating materials or new energetic compounds).

Abstracts

Abstracts are solicited in, but not necessarily limited to, the following areas:

- New fuels and/or oxidizers
- Fundamentals of metallic and bi-metallic particle combustion
- Advanced Processing of reactive materials (mechanical milling, vapour or liquid phase deposition, mixing, consolidation, assembling, printing)
- Reactive thin films or reactive MEMs (porous silicon)
- Carbon based reactive materials
- Advanced Characterization techniques (nanocalorimetry, structural characterization, mechanical testing, molecular structures)
- in situ advanced characterization methods
- Modeling of ignition and reaction mechanisms (analytical, numerical, DFT and MD simulations)
- Multiscale modelling and diagnostics
- Applications and devices

Invited Speakers:

Prof. Edward L. Dreizin, New Jersey Institute of Technology, Newark, USA
Prof. Christoph Schick, University of Rostock, Germany
Prof. Tom LaGrange, EPFL, Belgium
Prof. Timothy P. Weihs, John Hopkins University, Baltimore, USA
Dr. Vanessa Coulet, Aix Marseille Université, Marseille, France

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Symposium B

Advanced materials and systems for electrochemical energy storage

Efficient renewable energy management is required for a sustainable development and the electrochemical energy storage is expected to play a key role in this process. This symposium will cover the state of developments in the field of electrochemical energy storage, with a focus on novel chemistries, advanced materials and design considerations of batteries and supercapacitors for current and future applications in transportation, commercial, electronics, aerospace, biomedical, and other promising sectors.

Scope:

To reduce the dependence on conventional resources and develop a new energy landscape, renewable energy generation must be complemented by efficient energy storage systems with robust operation and at low costs. Electrochemical energy storage systems hold great promises as they operate with high efficiency, are scalable, can be implemented with various chemistries and can be based on cheap, sustainable and recyclable materials.

The intent of this symposium is to provide a forum for scientists worldwide to present the state of the art developments and discuss the strategies to improve the performance metrics, safety attributes and reduce the cost of the electrochemical energy storage systems. The discussions will cover the chemistry, materials and engineering aspects for current and emerging concepts in Lithium-ion batteries and beyond, improved capacitive energy storage, hybrid systems, but also cell design towards system level considerations. This symposium will be also the right place to debate on horizons in multifunctional energy storage designs that go beyond the current system performances.

Hot topics to be covered by the symposium:

- The symposium will cover a wide range of topics relating to electrochemical energy storage science and technology including, but not limited to:
- High-energy Li-ion materials: intercalation, conversion and alloying electrode materials.
 - Materials for non-Li battery chemistries (Na+, K+, Ca2+, Mg2+, Al3+, etc.)
 - Organic materials and polymers for lithium batteries.
 - Novel redox couples and materials for flow batteries.
 - Supercapacitors, Li-ion capacitors and hybrid configurations.
 - Ionic liquids, solid and liquid electrolytes.
 - Electrode/electrolyte interface processes.
 - Binders, separators, electrolytes and additives.
 - Safety, reliability, cell design and system integration.
 - View on production for P/H-EVs, stationary storage and others.
 - Characterization, modeling and theoretical advances.

List of invited speakers:

- Andrea Balducci (HIU-KIT, Germany)
- Renaud Bouchet (LEMPI/INP, France)
- Dominic Bresser (CEA, France)
- Peter Bruce (Oxford University, UK)
- Robert Dominko (NIC, Slovenia)
- Bruce Dunn (UCLA, USA)
- Yurii Gogotsi (Drexel University, USA)
- Jusef Hassoun (University of Ferrara, Italy)
- Mathieu Morcrette (UPJV/LRCS, France)
- Huisheng Peng (Fudan University, China)
- Philippe Poizat (IMN/IUF, France)
- Gary Rubloff (University of Maryland, USA)
- Patrice Simon (UPS Toulouse, France)
- Ulrich Schubert (FS-Universität Jena, Germany)
- Jean-Marie Tarascon (Collège de France, France)

List of scientific committee members:

- Michel Armand (CIC, Vitoria, Spain)
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- Miran Gaberscek (NIC, Slovenia)
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- Paolo Samori (Université de Strasbourg, France)
- Frederic Sauvage (LRCS, Amiens, France)
- Bruno Scrosati (IIT, Rome, Italy)
- Bao-Lian Su (UNamur, Belgium)
- Herman Terryn (VUB, Belgium)

Publication:

The topics to be covered by the symposium are firmly consistent with the Electrochemica Acta (Elsevier) scope. The selected papers of this symposium will have the opportunity to be published in a special issue of this journal upon peer-reviewed submission open to all the symposium contributors and attendees.

Awards:

Graduate Student Poster and Oral Presentation Awards sponsored by International Society of Electrochemistry (ISE): «ISE Best Poster Award/s» and «ISE Best Oral Presentation Award/s»

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Symposium C

Organic photovoltaics: material synthesis and characterization, device engineering, device physics and upscaling

Organic photovoltaics (OPVs), a blend of donor and acceptor materials, have shown certificated power conversion efficiencies over 10%, demonstrating great potential for low-cost, light-weight, and flexible power generation sources. This symposium focuses on recent developments in the field of OPVs.

Scope:

Rapid developments of novel materials have resulted in OPVs with high power conversion efficiencies over 10%. Though high-efficiency devices are traditionally dominated by fullerene-based cells, the efficiencies of non-fullerene devices have improved very quickly during the past several years. These recent developments have sparked new investigations on charge generation, charge transport, and charge recombination in OPVs, from both experimental and theoretical aspects. In addition, with these materials developments, tandem cells with complementary absorption and high efficiencies have been developed. Along with these recent developments in donor / acceptor materials, novel green-processing conditions are also quickly developed, paving the way for future large-scale production of OPVs. Another critical issue which is closely related with large-scale application of OPVs is stability and degradation mechanisms.

This symposium will bring scientists and engineers in both academia and industry to discuss these recent developments in OPVs, including materials and device design strategies, novel interface and electrode, fabrication process, device physics, strategies of improving lifetime, etc. Therefore, submissions are encouraged covering a wide range of topics in existing and emerging areas of OPVs.

Hot topics to be covered by the symposium:

- Materials development for OPVs, including polymers, small molecules, and non-fullerene acceptors;
- Green processing conditions for synthesizing materials and fabricating devices;
- Device engineering, including both interfacial materials and active layers;
- Device physics, including charge transport, charge generation, charge recombination;
- Critical issues concerning large-scale production of OPVs, including stability and degradation mechanisms, tandem cells.

Symposium organizers

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Symposium D

Next generation of earth-abundant materials for solar energy

Concerns about climate change and the growing demand on energy are motivating research in sustainable energy production. The sun provides free and abundant energy and its transformation through photovoltaics or solar fuel is a very important part of materials research. More specifically, the understanding and control of key materials properties such as optical absorption, carrier mobility etc... are essential to the design and development of new solar-based energy technologies.

Scope:

This symposium will address fundamental and applied aspects of emerging solar absorbers and related materials and will highlight recent developments in both experimental and theoretical/computational approaches. The scope of this symposium is to provide a discussion forum for researchers working on the early stages of development of earth abundant and newly emerging materials for thin film photovoltaics and solar fuel production. The focus will be on issues that are relevant to development of solar cell and solar fuel technologies outside of those already well developed industrially. Novel experimental techniques for synthesis and characterization as well as theoretical, computational and modeling methods are of interest. Presentations will focus on relevant materials, nanomaterials, interfaces and devices. The symposium will target all the material layers of importance for solar devices: solar cell absorbers, water splitting, photoelectrodes, transparent conductors, electrocatalysts for oxygen and hydrogen evolution, buffer, interface layers as well as other components of importance to thin film photovoltaics and solar fuel devices will be considered. Materials will include (but will not be limited to) sulfides/selenides (Cu2S, WSe2, SnS,Se, FeS2, CZTS,), nitrides (Zn(Ge, Si,Sn)N2, Cu3N) phosphides (ZnSnP2, Zn3P2), oxides (ZnVO, ZnSnO, Cu2O), and related multinary compounds and devices. We are also interested in submissions around inorganic-organic halide perovskites and related materials.

Hot topics to be covered by the symposium:

- Halide perovskites solar cells;
- Emerging earth abundant solar absorbers and solar fuel materials and nanomaterials;
- Novel p-type transparent conducting oxides;
- Computational design for photoactive materials (photovoltaics, water splitting...);
- Defects analysis of materials;
- Interface and surface properties;
- Novel solar cell devices;
- Integrated solar fuel devices;
- Metal oxide photoelectrodes.

Symposium organizers

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Symposium E

Advanced inorganic materials and structures for photovoltaics

Continuous progress in R&D in the field of innovative materials and device concepts used in photovoltaics (PV) requires a symposium dedicated to the use of wide range of existing and emerging inorganic materials for PV. It is expected that such a symposium would liaise and interact well with other PV and energy related symposia (organic, perovskite) at the E-MRS conference, just like in previous years.

Scope:

Photovoltaic electricity is one of the renewable energy technology with the largest scope for cost reduction and efficiency gains. It consists of a long value chain starting from materials to structures and devices and the final PV system installations. In 2014 and 2015 the PV industry saw clear signs of further growth of the global PV market after a few difficult years. This growth has been and will be due to the innovative market mechanisms in Europe, China, Japan, US and other PV emerging countries. Growing awareness of energy security and greenhouse abatement imperatives and other measures stimulate the PV market and industry to push towards grid parity in more and more countries. The Terrawatt initiative was launched in 2015 and announced plans for trillion USD investments to meet the objective of 1TW of additional solar capacity planned by 2030.

In the PV value chain innovative materials and device structures are essential to increase efficiencies and reduce the costs. The work on a wide range of complex ternary, quaternary inorganic materials among others is carried out by many scientists. Nanostructures and structures with quantum confinement, which allow extra degrees of freedom in tailoring material properties are gaining on importance. Moreover, new exotic inorganic materials, such as new forms of silicon, will be one of the focuses of the proposed symposium.

Hot topics to be covered by the symposium:

- Exotic forms of silicon for photovoltaic applications
- Kerfless and kerf-free crystalline silicon material
- Tandem devices (e.g. perovskite on c-Si)
- Advanced nanotextures and surface passivation methods
- Recent progress in chalcogenide, chalcopyrite and kesterite materials for solar cells
- Advanced thin film multi-junction cells
- Innovative single junction thin-film solar cells
- Flexible inorganic cells
- Light confinement in (ultra-)thin solar cells
- Quantum dots and nanostructures
- Multiple carrier generation
- Up- and Down-conversion
- Intermediate band solar cells
- Hot carrier cells
- Advanced modelling and characterization techniques
- Novel technologies and designs for solar cells

Symposium organizers

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Symposium F

Photocatalytic materials for energy and environment

Following on the successful symposium on this topic in May 2015, this symposium wants to attract once again experienced researchers in the field of advanced materials for photocatalytic applications in energy and environment, so as to continue to encourage the cohesion of this large community. In order to build on the research of the first symposium, research on pilot studies, prototypes and small scale applications of the technology will be greatly encouraged.

Scope:

- As has been the case for a number of years, the top global issues today are those concerned with ensuring a clean supply of water and a guaranteed supply of clean energy at reasonable cost. For these reasons many researchers are studying advanced materials and processes for water purification, efficiently, at low cost and with less energy, and advanced materials and processes for the production of clean and renewable hydrogen fuel by photocatalytic and photoelectrocatalytic water splitting, and the photocatalytic reduction of carbon dioxide to fuels. Therefore, the focus of this symposium is on photocatalytic materials for i) solar water splitting for hydrogen or conversion of CO₂ to fuels and ii) environmental applications including water treatment and disinfection, air purification, self-cleaning surfaces for the built environment, and the disinfection of surfaces for healthcare applications:
- Material/nanomaterial growth and assembly techniques, advanced characterization (physical, chemical and biological), modeling, and reactor fabrication for mineralization and disinfection and depollution of water or air, by heterogeneous photocatalysis.
 - Surface functionalization for self-decontamination (photocatalytic elimination of chemical pollutant, disinfection) and photosensitization for solar energy applications.
 - Material/nanomaterial growth techniques, advanced characterization, modeling, and device fabrication for the production of hydrogen or fuels by photocatalytic and photoelectrochemical water splitting or CO₂ reduction. Important challenges are extension of photocatalytic activity in the visible region of the solar spectrum (band gap engineering) and improvement of the electronic properties (conductivity and band position engineering).
 - Pilot studies, prototypes and small scale applications of the use of these materials in water and air remediation, water splitting and CO₂ reduction. All colleagues interested photocatalytic materials energy and environmental applications are encouraged to participate and submit their contributions. The papers will be published in Catalysis Today (Elsevier) as a special issue.
- Hot topics to be covered by the symposium:**
- Nanostructured photocatalytic semiconducting oxides (e.g. TiO₂, ZnO, Cu₂O, Fe₂O₃, CdS, GaP, ZnS)
 - Photocatalyst modification (e.g. by noble metal, C nanotubes, graphene, molecular clusters, novel materials etc..) and doping
 - The application of photocatalysis for water treatment and disinfection
 - Innovative synthesis and characterization methodologies
 - Air Treatment
 - Self-cleaning surfaces for the built environment
 - Self-cleaning/disinfecting surfaces for healthcare applications
 - Photoelectrolytic and photocatalytic splitting of water to yield H₂.
 - Energy recovery from wastewater by reforming of pollutants to yield H₂
 - Carbon Dioxide reduction/artificial photosynthesis
 - New technology trends and applications
 - Kinetics and modeling

List of invited speakers (confirmed):

- M. Nolan (Tyndall National Research Centre, Ireland) "Novel photocatalytic materials by design (computational modelling)"
- K. Sivula (EPFL) "Photoelectrochemical water splitting"
- V. Keller-Spitzer (University of Strasbourg, France) "Photocatalytic self-decontaminating functionalized textiles for chemical and biological agents' elimination"
- L. Sun (KTH, Stockholm and Dalian technological Univ) "Molecular approaches for photoelectrocatalytic water splitting."
- S. Hernandez (Politecnico di Torino, Italy) "Semiconductor photocatalysts for a sun-driven water-splitting device"
- P. Fernández-Ibáñez, (Plataforma Solar de Almeria, Spain) "Solar photocatalysis for water disinfection"
- Y. Paz (Israel Institute of Technology, Israel) "Transient phenomena in photocatalysis, as studied by ultrafast FTIR measurements"
- S. Pillai (Institute of Technology, Sligo, Ireland) "New insights into solar and visible light active photocatalysis"
- V. Privitera (CNR-IMM, Italy) "Photocatalytic nanomaterials for water purification"
- B. Ohtani (Catalysis Research Center, University of Hokkaido, Japan), "Identification and Characterization of Particulate Metal-Oxide Photocatalysts by Energy-resolved Distribution of Electron Traps"

List of scientific committee members (confirmed):

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Symposium G

Materials for improving energy storage battery technologies

One of the most relevant issues on energy for our society is how to store electrical energy. In this context, electrochemical based devices have offered worthy solutions based in different solid state ionic processes as well as flow redox procedures. Nevertheless, beyond the standard lithium ion battery technology, there are still rooms for developing alternative materials, electrolytes, membranes as well as new geometries and storage system technologies based on new nanoionic improvements and/or flow cells approaches.

Scope:

Nowadays one of the most relevant issues on energy for our society is how to storage electrical energy such as for steady as mobile applications. In this context, electrochemical based systems have offered worthy solutions. Nevertheless, beyond the standard lithium ion battery technology, there are still rooms for using alternative materials, electrolytes, membrane as well as new geometries and strategies that must allow enhancing the battery performances. Different ions like sodium or novel strategies like redox flow batteries, RFB, or semi-solid batteries, SSB, or fully organic batteries, FOB, or lithium sulfide, LiSB, or metal air batteries, MAB, etc., become as promising options for the next future need for energy storage. Likewise, the industrial implementation and the required low cost industrial policy arise many requirements to the materials, the fabrication procedures, packaging and stack control.

All these targets require a deeper knowledge of all involved mechanisms taking place at the electrodes and their surfaces including their simulation and modeling. On the other hand, all chemical reactions happen in the electrolyte and membrane functionality must be understood and used materials and components must be morphological, structural, physicochemical, optical, electrical and electrochemically characterized in order to optimize the correlation between material properties and battery performances.

Nowadays, special attention is paid to redox flow redox batteries and semi-solid ones, as they have full independence between the energy capacity and power values. Furthermore, these concepts offer option for using advances materials as electrodes avoiding negative effect of SEI formation or improving the electrolyte characteristics changing from aqueous based solutions to fully organics or ionic liquids. Degradation mechanisms analysis and their modelization constitute an essential knowledge for estimating the battery life time and efficiency decay. It is basic to determine the effective cost of the stored kilowatt- hour of electrical energy.

For these cases, the use of a specific catalyst can contribute to enhancement of the battery characteristics. In parallel, stacking of individual cells define the scale up options of different electrochemical approaches as energy storage solution.

Hot topics to be covered by the symposium:

- Materials for anode and cathode battery electrodes;
- Electrolytes;
- Membranes;
- Catalyst;
- Chemical redox;
- Characterization and electrochemical analysis procedures;
- Electrodes degradation mechanisms;
- Aging procedures and test;
- Battery cell and battery system testing and evaluation;
- Electrochemical mechanisms modeling;
- Li and Na based batteries;
- Redox flow batteries;
- Semi-solid batteries;
- Metal-air based batteries;
- Full organic batteries;
- Photo based batteries;
- New approaches beyond Lithium ion technology;
- Replacement of scarce material;
- Life Cycle Analysis of store system.

List of invited speakers:

- Tom Jarvi, Energy storage store, Lockheed Martin, Boston, USA - Degradation mechanisms in batteries
- Baris Key, Argonne National Lab (ANL) - Solid state NMR (Multivalent)
- Alan Aspuru-Guzik, Harvard University - Organic redox molecules (DFT)
- Kevin Zavadil, Sandia National Lab (SNL) - JCESR thrust lead on Li/S and Mg metal deposition
- Brett Helms, Lawrence Berkeley National Lab (LBNL) - Membranes and other nano-tech (Li/S and flow)
- Sri Narayan, University of Southern California (USC) - Flow batteries (Fe, organic)
- Nitash Balsara, University of California, Berkeley (UCB) - Polymer solid state electrolytes
- Fik Brushett, Massachusetts Institute of Technology (MIT) - Flow batteries (non-aqueous)
- Kristin Persson, Lawrence Berkeley National Lab (LBNL) - Materials genome calculations for batteries (DFT MD)
- Michael Aziz, Harvard University - Flow batteries (organic redox)
- Jordi Cabana Jimenez, University of Illinois at Chicago (UIC) - Multivalent batteries
- Joaquin Rodriguez Lopez, University of Illinois (UI) - Polymer redox for flow batteries
- Melanie Sanford, University of Michigan (UM) - Redox molecules
- Gerd Ceder, Lawrence Berkeley National Lab (LBNL) - Multivalent batteries (DFT, MD)
- Yet-Ming Chiang, Massachusetts Institute of Technology (MIT) - Aqueous and Nonaqueous sulfur batteries
- Robert Savinell, Case Western Reserve University (CWRU) - Flow batteries (all Fe)
- Jens Burfeind, Fraunhofer UMSICHT, (Germany) - Scale-up studies of Vanadium Redox Flow Batteries
- Carlos Ponce de Leon, University of Southampton. (United Kingdom) - 3D-Printing of Redox Flow Batteries
- Juhan Lee, INM Leibniz Institute for NewMaterials (Germany) - Flowable electrodes applied to supercap's
- Michel Duits, University of Twente (The Netherlands) - Rheology aspect of flowable electrodes
- Grietus Mulder, VITO (Belgium) - Standarization of flow batteries

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Symposium H

Inorganic thermoelectrics - linking material properties and systems engineering for XXI century applications

With the increasing concern over environmental protection and the growing need for clean energy, thermoelectricity is being explored as an energy conversion technology that might be very useful in a number of applications. For instance, the thermoelectric technology can harvest waste industrial heat or provide active cooling of electronic devices. The development of efficient inorganic thermoelectric generators or coolers require to solve several key challenges related to the development of materials, module design and assembly.

Scope:

The Symposium is intended to highlight the most recent advances on materials, properties measurement, module fabrication, and device applications. Emphasis will be given to discuss the main aspects involved in the fabrication of thermoelectric devices, such as:

- Improving the efficiency of inorganic thermoelectrics by novel design, synthesis methods, nanostructuration, processing, implementation, and study their performance.
- Theoretical principles: such as the ability to tune densities of states through the design of molecular subunits or to tune electronic and thermal transport phenomena through interfacial effects at composite grain boundaries, etc.
- Metrology: to highlight the importance of developing optimal thermoelectric metrology protocols and standards. Also, novel or improve measurement system.
- Device and system fabrication: the challenges at system-level/components such as expansion coefficients, thermal interface materials, diffusion, heat exchangers, system form factors will be also covered. Manufacturing processes and total system cost components are evaluated to provide product development and commercial feasibility contexts. And,
- novel ideas in the field for novel thermoelectric based devices.

Hot topics to be covered by the symposium:

- Design, synthesis, nanostructuration effects, etc. in inorganic thermoelectrics;
- Implementation and performance of thermoelectric materials;
- Measurements and metrology as well as standardization;
- Theoretical principles that lead to improving performance of the materials;
- Device architectures for evaluation and application of these materials as thermoelectrics;
- Upscaling approaches of material synthesis and device fabrication;
- System engineering: Thermal interface materials, encapsulation, heat exchangers, etc;
- Applications for waste heat recovery and thermoelectric cooling.

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Symposium I

Organic bioelectronics

"The electronics surrounding us in our daily lives rely almost exclusively on electrons as the dominant charge carrier. In contrast, biological systems rarely use electrons, but rather ions and molecules of varying size. Due to the unique combination of both electronic and ionic/molecular conductivity in organic electronic materials (conducting polymers and polyelectrolytes), these materials have emerged in the last decade as an excellent tool for translating signals between these two realms, and therefore providing a means to effectively interface biology with conventional electronics – thus the field of organic bioelectronics" (quote from Prof. Daniel Simon, Linköping University).

Scope:

Bioelectronics deals with the coupling of the worlds of electronics and biology, and this coupling can go both ways. The natural ability for "recognition" in the biological world, such as between two complementary DNA strands, or between a ligand and its receptor, can be combined with the nearly unlimited power of microelectronics to process signals to build powerful new biosensors. At the same time, electronic devices can help "guide" biological events, for example cell growth, thereby creating new tools for biomedical research. This cross-fertilization between the two disciplines improves our understanding of life processes and forms the basis for advanced disease detection and treatment. Tools generated in this arena, such as medical diagnostics and brain implants, will dominate the future of healthcare and help increase the span and quality of our lives. They will also play a dominant role in modernizing agriculture and in protecting animal health, our food supply, and the environment.

Key to these new technologies is a fundamental understanding of the interface between electronic materials and biology. Organic electronics – an emerging technology that relies on carbon-based semiconductors and promises to deliver devices with unique properties – seems to be ideally suited for the interface with biology. The "soft" nature of organic materials offers better mechanical compatibility with tissue than traditional electronic materials, while their natural compatibility with mechanically flexible substrates suits the non-planar form factors often required for biomedical implants. More importantly, their ability to conduct ions in addition to electrons and holes opens up a new communication channel with biology. It is the aim of this proposed symposium to bring together expertise in organic electronics and biology. We aim at elucidating the fundamentals of the electronic materials/biology interface and to present and discuss new bioelectronic technologies and applications.

Hot topics to be covered by the symposium:

- Flexible, stretchable electronics
- Bioelectronic textiles
- Wearable sensors
- Electronic skin
- Printed paper electronics
- In vivo and in vitro diagnostics
- Novel concepts in biorecognition, transduction, signal amplification, recording
- Electrochemical, electrical, electronical
- Label-free
- Application to clinical, food, feed, environmental and process monitoring
- Cell and tissue actuating and manipulating
- Neuroengineering
- Surfaces & interfaces, sample preparation, lab-on-a-chip, microTAS

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Electronic textiles

With their numerous technological applications, fiber based structures, like those found on clothes and furniture, are steadily making their way into high technological areas like the car industry, and medical and healthcare sectors. Advances in material science and nanotechnology have made it now feasible to build electronic devices directly on the surface or inside single fibers, thereby providing a unique opportunity to create smart and functional electronic textiles. At present, electronic textiles are becoming a very hot topic attracting a great interest of academic and industrial researchers. European research groups have produced a growing amount of publications combining electronics devices and materials with textiles. We consider that the MRS conference is highly positioned to disseminate such results.

Scope:

This symposium will represent a unique opportunity to gather together experts from different research and industrial field working on electronic textiles. This research field has a strongly multidisciplinary character as it requires an extremely wide range of expertise and skills, spanning from materials, physics, chemistry, engineering, medicine and social issues. The focus is on fiber-based structures with novel smart functionalities that allow to envisage innovative and breakthrough applications in wearable and textile related technologies. The attention is not limited to the characterization, design, and development of novel materials, smart textiles and sensing devices, but it also targets technologies related to the interconnection of textile electronics functionalities leading to smart networks and to the development of hybrid approaches integrating flexible devices with traditional solid state electronics.

Technology transfer issues are particularly relevant for new classes of high-tech materials and products and this symposium is very keen on devoting a special session on this topic, addressing the challenges and the opportunities faced by start-ups and small high tech companies interested in investing in this exciting and fast growing research field.

Hot topics to be covered by the symposium:

- Materials for functional fibers
- Smart Fabrics and Interactive Textiles
- Hybrid structures inspired from organic and solid state electronics
- Flexible embedded systems in wearable technologies
- Innovative interconnect technologies for textiles
- Textile sensors, systems, circuits
- Wearable computing and communication systems
- Textile energy harvesting and storage
- Technology transfer: From the fiber to the garment to the market

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Bioinspired and biointegrated materials as new frontiers nanomaterials VII

Following the success of the symposia I - VI due to the reports and discussions on rapidly development bioinspired, biomimetic technologies for next generation biomedical nano – materials, - systems, - robotic devices, the symposium VII is aimed to give overview of recent development for fundamentals of nanotechnologies for biomedical engineering multifunctional materials in biomedical healthcare field, environmental control and security. Newest nanotechnologies and bio - materials, - systems, - robotic devices fields which determine developing biomimetic cells and skin, bone tissue engineering, remodeling ones and adaptation to a regeneration of neural systems using created implantable bionic systems.

Scope:

The symposium will cover the frontiers on the engineering, researching, molecular scale characterization multifunctional biomolecular biosensor systems in medical and environmental researches and bio - photonics, - electronics, - magnetic molecular systems, bioimmobilized NPs as nanorobots in vivo applications using bio – inspired, mimetic, templated by biomolecules (virus, marine plants proteins, pigments) inorganic nanoparticles for the quantum dots nanosystems, bioinspired composite materials.

The design, engineering of these materials are aimed to obtain the properties which respond to external, biologically compatible stimuli (physical, chemical, biological) and to electronic, photonic, magnetic nanosystems. And next step is transferring from nano to macro materials for regenerative medicine of bones and teeth (stem cells regenerative orthopedic and dental medicine), for example, and engineering of multifunctional biointerfaces and biotemplating.

The symposium will bring together researchers from chemical, physical sciences and bio - science and – nanotechnology biomaterials for nanomedicine and engineering bio - electronic, - photonic, - magnetic nanosystems to discuss the latest advancements.

Proposed subjects for discussions at this event have actuality for Investigators of the EU MPNS COST Actions on 2013 – 2017, for example, the Action MP 1301 "New Generation of Biomimetic and Customized Implants for Bone Engineering (NEWGEN) and the Action MP 1005 "From nano to macro biomaterials (design, processing, characterization, modeling and applications to stem cells regenerative orthopedic and dental medicine (NAMABIO).

Hot topics to be covered by the symposium:

- from biological materials to bio – inspired and - mimetic material synthesis;
- bioinspired synthesis of inorganic nanoparticles (NPs), systems;
- bio-hybrid biomedical nanomaterials: biosynthesized, bioimmobilized and biointegrated inorganic nanoparticles, NANOCARBON molecules;
- 3D molecular imprinting biological cell structures and biomimetics ones as scaffolds in tissue engineering;
- electronic, photonic and magnetic functions of biosupramolecules (nucleic acids, virus, marine plants proteins, pigments) and mimetic analogs: adaptation to human systems functions for biomedical nano – systems, - robotic devices designing, for example, molecular robot - DNA motor "robotic" molecule into living cell; Special – Neuroelectronics;
- biosensing characterization for medical and environmental biotechnologies;
- biomimetic analogs functions in compare to bionic functions for natural systems.

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Symposium L

New materials for organic electronics: from synthesis to processing, characterization and device physics

Organic semiconductors enable a wide range of applications such as solar cells, thin-film, transistors, sensors and thermoelectrics. The molecular design, nanostructure and device performance are intimately linked. This symposium aims to bring together key researchers in thisfield to discuss the main challenges towards the widespread application of organic electronics.

Scope:

New materials are being added to the plethora of already existing organic semiconductors every day. Their use in opto-electronic devices such as solar cells, thin-film transistors, sensors and thermoelectric generators continuously adds to our understanding of relevant structure-property relationships. This insight then provides critical feedback for the design of the next generation of organic semiconductors. As a result, the performance of organic electronic devices is rapidly improving and has reached a point where first applications have reached the verge of commercialization. Despite this progress, great challenges still have to be faced, mainly regarding:

Synthesis

- The impact of defects on structure formation and opto-electronic properties is poorly understood.
- Many synthesis schemes are not scalable to larger volumes.

Processing

- Device optimization is typically done by a trial-and-error approach. General processing schemes that lead to reproducible nanostructures must be developed.
- New materials are first tested with lab-scale devices. The transfer of lab-scale to large-area processing routines has proven difficult.

Characterisation of nanostructures

- Many opto-electronic processes occur on length-scales that are only difficult to access with traditional X-ray diffraction and microscopy techniques.
- Characterization of nanostructure formation must be carried out in-situ and in real time during drying of the processing solution.

Devices

- The environmental stability must be improved in order to pave the way for real products.
- Theoretical models that describe device operation do not capture the complexity of poorly ordered organic semiconductors.

Hot topics to be covered by the symposium:

- synthesis of small molecular and polymer semiconductors;
- organic semiconductor blends and (nano)composites;
- processing additives, dopants, binder polymers;
- thin-film processing schemes for e.g. patterning, orientation and anisotropic textures;
- structure-processing-property relationships of organic semiconductors;
- in-situ and real-time characterization tools;
- device physics of organic solar cells, field-effect transistors, sensors, thermoelectrics etc.;
- long-term stability and lifetime of materials and devices;
- large-area processing and production;
- improvement of performances of all-printed micro- and opto-electronics devices and circuits

List of invited speakers:

- T. Anthopoulos (Imperial College London)
- A. Bakulin (Cambridge)
- P. Blom (MPI Mainz, Germany)
- M. Brinkmann (ICS Strasbourg)
- M. Campoy-Quiles (ICMAB-CSIC)
- E. Da Como (University of Bath)
- C. Deibel (Chemnitz University)
- S. Fabiano (Linköping University)
- E. Gomez (Penn State)
- M. Heeney (Imperial College London)
- R. A. Janssen (TU Eindhoven)
- H. Klauk (Max Planck, Stuttgart)
- C. Luscombe (University of Washington)
- W. Maes (University of Hasselt)
- Q. Nguyen (UC Santa Barbara)
- Y.-Y. Noh (Donggul University)
- A. Salleo (Stanford University)
- V. Subramanian (University of California, Berkeley)
- J. Zaumseil (University of Heidelberg)
- Feng Gao (Linköping University)
- Daniele Fazzi (Max Planck Institut für Kohlenforschung, MPI-KOFO)

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Symposium M

Novel transport phenomena in organic electronic devices: heat, spin and thermoelectricity

Organic semiconductors are very attractive for many electronic applications which require functionality beyond charge transport: namely magnetoresistance, spin transport and thermoelectricity. The symposium will review our physical understanding of such processes and the state-of-the-art for devices.

Scope:

Research in organic electronic materials is increasingly focussing on more exotic transport properties driving a new generation of organic electronic devices. This symposium will focus on the most prominent of these: spin transport, magnetoresistance and thermoelectricity. Each requires additional material properties beyond their ability to transport charge: for example a large resistive response to a magnetic field, spin-dependent injection or in the case of thermoelectrics a large Seebeck coefficient combined with low thermal conductivity.

This research field is still young, but there are already a number of good research articles which are beginning to unravel the underlying mechanisms in these materials and devices. Nonetheless, there is still a knowledge deficit that must be addressed in order that physical understanding of the devices and their materials may direct synthetic efforts towards improving the state of the art. It is therefore a great moment to take a perspective on the current state of knowledge and discuss future research directions.

Exploiting these phenomena in future devices requires the combined efforts of physicists, synthetic chemists, materials scientists and engineers. This symposium will bring together the research communities in these related disciplines to exchange perspectives and to explore the current state of the art.

Hot topics to be covered by the symposium:

- Magnetoresistive and multifunctional devices for organic spintronics;
- Organic thermoelectric devices;
- Phononics in organic materials and devices;
- Modelling and simulation of spin and heat transport in organic devices;
- Materials for organic spintronics and thermoelectrics;
- Charge transport in organic two- and three-terminal devices;
- Interfaces and nanostructures in devices;
- Heat transport in organic devices;
- Spin engineering in exciton recombination processes.

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Symposium N

Semiconductor nanostructures towards electronic and opto-electronic device applications – VI

This symposium is the sixth installment of a highly successful biennial series that began in 2007. It presents the latest research in semiconductor nanostructures and their applications to electronic, optoelectronic and photonic devices. It covers all aspects from fundamental nanostructure fabrication and material development, to device integration and performance evaluation. We also strive for a balance between experimental work and theoretical research.

Scope:

Semiconductor nanostructures are part of a high-profile class of materials that provide unprecedented levels of functionality by tuning their composition and size. This has already led to ground-breaking applications in electronics and opto-electronics, and enables a route for the development of new technologies in key areas, such as telecommunication, information processing, sensing, renewable energy, and biomedicine. In addition, nanoscale devices are also well suited to study new physics in low dimensional systems.

This symposium will provide a platform to discuss new nanodevice structures and novel nano-materials at different stages on their way towards applications. The topics will include the latest developments of novel organic, hybrid and inorganic nanostructures used in lasers, photodetectors, optical amplifiers, optical switches, waveguides and optoelectronic devices as well as new device applications based on such nanostructures, for instance relevant for quantum information technology (single photon and entangled photon pair sources). It will bring insight into the relevant materials and interface parameters that play a key role in device functionality, as well as the overall device design and resulting physics.

The symposium will bring together researchers working in academia and industry (see also Scientific Committee composition) to stimulate interactions among scientists, engineers, students working on various aspects of semiconductor nanostructures and their applications. Targeting this outcome, each session will be organized to combine experimental, computational modeling and theoretical presentations, providing complementary views and creating long-lasting opportunities of scientific interaction between attendees. Overall this symposium will favor informal interactions and will help to strengthen this community to unravel new directions of research which is the key for the ultimate success of semiconductor nanostructures towards electronic and optoelectronic device applications.

Hot topics to be covered by the symposium:

- Fabrication and characterization of novel nanostructures and hetero-nanostructures using chemical or solid-state techniques;
- Carrier dynamics and photophysics in semiconductor nanostructures and -devices;
- Applications in nano-electronics, -photonics, -plasmonics, and -optoelectronics;
- Novel devices based on semiconductor nanostructures: stretchable or liquid devices, lasers, detectors, amplifiers, LEDs, light-converters and quantum emitters;
- Quantum-dot, -rod, -wire, and -well based devices;
- Quantum-cascade devices;
- Organic and hybrid devices;
- Novel devices based on metamaterials.

List of invited speakers:

- Jean-Luc Duvail (University of Nantes, France)
- Sasan Fathpour (University of Central Florida, USA)
- Jeong Weon Wu (Ewha Womans University, South Korea)
- Jang-Joo Kim (Seoul National University, South Korea)
- Bernard Kippelen (Georgia Institute of Technology, USA)
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Symposium O

Wide bandgap semiconductor for LEDs, solar and related energy technology

Focus is on new emerging material technologies using wide bandgap semiconductors as active material in LEDs, solar cells and related technologies. Novel growth concepts, surface engineering, technology implementation approaches, and conceptual materials combinations are of primary importance.

Scope:

Traditional materials used for light emitting diodes and solar cells are driving these markets. However, there are profound challenges in energy and environmental savings. New materials approaches will provide complementary technologies to the conventional ones. Novel approaches using wide bandgap semiconductors is an attractive field now when epitaxial and bulk growth is sufficiently developed. Thereby base materials such as SiC and nitrides have matured enough to allow new concepts.

The symposium topic is around SiC and nitrides in LEDs and solar cells, but also addressed to include related wide bandgap materials and applications. The main contributions expected is from research where SiC is an active material (such as optoelectronic and solar devices) beyond traditional substrate or transistor function, and nitrides in deep UV, LD concepts beyond the blue LED.

Hot topics to be covered by the symposium:

Fluorescent SiC for white LED and solar SiC is a growing field which has emerged strongly since 2010. The organizers of this proposed symposium have conducted several national and international projects on these topics. Other research groups now join this exciting arena. The studies in which SiC is a direct active material are in LEDs and solar cells, but also water splitting, CO2 splitting, nanocrystals and other energy and environmental technologies. The combination of SiC and nitrides is of specific relevance since that has shown to successfully introduce high brightness white LEDs in general lighting. Therefore innovative nitride approaches is included as a topic, such as deep UV LEDs, laser diodes, VCSELs.

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Symposium P

Silicon & Silicon nanostructures: from recent fundamental research to novel applications

Silicon and its nanostructures are a well-established material system that represents the backbone of modern electronics, optics, and photovoltaics. Despite widespread activities in fundamental and applied research, many physical aspects are still not understood in detail or are a matter of debate. Unraveling presently unknown properties of silicon by exploring the underlying phenomena in theory and experiment, both in the bulk and on the nanoscale, creates unique opportunities for enhanced performance or even novel applications in CMOS, PV, optics, and sensor applications.

Scope:

This symposium intends to cover the full range from theory/modelling to synthesis/fabrication and device characterization in silicon and Si-nanostructure research.

In recent years, massive advancements were made in fabricating, measuring, modelling and understanding silicon nanostructures. However, the focal point of interest shifted from nanostructure-volume properties (like quantum confinement) to surface-/interface-related effects and the interaction with impurity atoms or ligands. Several interesting effects were discovered (e.g. surface functionalization that switches the bandgap type to direct, interface charge transfer depending on the dielectric matrix material, to name a few). Whereas the inability to utilize classical electronic dopants in Si nanostructures is gradually revealed, very high doping levels give rise to plasmonic effects in Si QDs as investigated in e.g. biomarkers. Si nanocrystal based LEDs are envisaged for all-Si based optical communication but efficient hole injection and long-term stability require further research. In analogy to graphene, 2D-monolayers of silicene are currently investigated with unforeseeable opportunities for fundamental research and application. Silicon nanostructures are also an emerging material in gas- and biomedical-sensing, where thorough understanding of interface and surface effects is mandatory to identify and quantify target chemicals.

While Si nanostructure researchers increasingly gain a more comprehensive understanding, CMOS technology continues to decrease feature sizes below 10 nm where all those effects mentioned above come into play. Currently, this causes mainly deteriorations of performance and reliability (e.g. statistical distribution of discrete dopant numbers). On the bright side, deep insight into nanoscale Si-interface physics holds potential to discover alternatives to conventional Si doping (e.g. undoped reconfigurable Si NW FETs).

From a macroscopic viewpoint, findings at the nanoscale can also help to improve bulk-Si devices such as photovoltaic devices. Heterojunction with intrinsic thin layer (HIT) solar cells require passivating tunneling contacts where thorough understanding of surface/interface effects at the nanoscale offers promising routes for optimization.

Hot topics to be covered by the symposium:

- Si quantum dots (QDs), nanocrystals (NCs), nanowires (NWs): theory, synthesis, properties, applications
- Doping of Si nanostructures: conventional and alternative concepts
- Plasmonic Si nanostructures
- Si surface functionalization: impact of strain and ligands
- Si-based light emitting devices (LEDs)
- Si nanostructures for gas- and bio-sensors
- Silicene: fabrication, properties, theory
- Ultra-small Fin-FET fabrication and performance: problems and solutions
- Novel Si-CMOS devices: dopant-free FETs, NW-FETs, etc.
- Photovoltaics: HIT solar cells & passivating tunneling contacts

Symposium organizers

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Symposium Q

Nano-engineering coatings and thin films

"Nano-engineered coatings and thin films symposium" will be the proposed new title of the former 2015 symposium EE on "Protective Coatings and Thin Films" one. Emphasis will be given to the development of new thin films for mechanical, tribological, optical, biological and energy-based applications.

Scope:

For almost 40 years, hard and wear-resistant thin-films and coatings played vital roles in improving the performance of a variety of tools, machine parts, and innumerable devices. Moreover, the concept and practice of tailoring the structure and morphology of a given coating or thin film system to modify its properties has been long used to add new functionalities and improved behavior to several materials and devices. However, the development of new products and the need to enhance materials functionalities requires the optimization of the coating or thin film system to respond to the increasing demands of a targeted application. Nano-engineering of surfaces is playing a fundamental role in this particular area of research, either in the case of new materials development or in their modification. This symposium will be dedicated to advanced methods of vapor deposition and surface nano-engineering, as well as to nanoscale methods of materials characterization. Areas of particular interest will include, but not limited to, the following topics:

- Fundamentals of vapor-based deposition processes, growth modeling, plasma-surface interactions and in situ diagnostics;
- New deposition processes, including HIPIMS technology, liquid-based deposition, thermochemical heat treatments like plasma nitriding + PVD, PACVD deposition, or on the use of hybrid methods combining for instance arc evaporation and magnetron sputtering or PVD and CVD, atmospheric plasma, and related approaches;
- Nanostructured coatings or nano-engineered thin film architectures, including nanocomposites, multilayers, nanolayers and glancing angle deposition;
- Correlation between micro- and nanostructure and functional properties such as optical, electrical, mechanical, tribological, thermoelectrical, thermochromic, magnetic, etc.;
- Hard, wear and corrosion/oxidation resistant coatings;
- Characterization methods to determine the properties of thin films and coatings in their in-service severe conditions;
- In-situ characterization;
- Microstructural multiscale: advanced modes of characterization (EELS, tomography, etc.);
- Thin films for smart application: (bio)sensors; biocompatibility; energy; etc.;
- New trends in thin film materials: metallic glasses; high entropy alloys, oxynitrides, intermetallics, plasmonics, etc.;

We call for communications giving the latest information on research and development in topics corresponding to one or more of the above-mentioned areas.

Hot topics to be covered by the symposium:

- Fundamentals of thin film growth: diagnostics, analysis and modeling; in situ film growth characterization;
- Surface modification/functionalization;
- High Power Impulse Magnetron Sputtering processes;
- Atmospheric processes - organic synthesis and surface functionalization;
- Characterization methods at the nanoscale of nano-engineered thin films;
- Corrosion and oxidation resistant coatings;
- Low-friction, self-healing, self-lubricant and wear resistant coatings;
- Design of novel thin films for energy conversion, saving and storage;
- Coatings with surface Plasmon resonance behavior;
- Coatings for biological applications;
- New energetic plasma processes and related advanced hard coatings.

The proceedings will be published in the journal «Surface and Coatings Technology» (Elsevier).

Symposium organizers

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Symposium R

Nanoparticles in dielectric matrix: from synthesis to device applications for photonics, electronics, and bio sensing

The symposium on “Nanoparticles in Dielectric Matrix for electronics and optics” was organized for the first time at the E-MRS Spring 2015 with a great success (140 submitted abstracts and >100 persons for each the 4 day sessions). For this reason, we decided to organize it again in 2017 and to extend it to new applications as biosensors and memristors.

Scope:

The interest in nanomaterials has rapidly increased in the recent past decades from both theoretical and technological points of view. Novel remarkable electronic, magnetic and optical properties are observed in these laterally quantum-confined structures that are not exhibited in the corresponding bulky materials. In particular, among these nanostructured systems, semiconductor and metallic nanoparticles embedded in dielectric host matrix have received a great interest from the scientific community since they offer a wide range of applications spanning from electronics and optics, to biosensing: from resistive memories to non linear optics, from light emitting diodes to enhanced photovoltaic sensors, from optical amplifiers to plasmonic substrates, etc. This research requires a large range of skills in different fields from chemistry, physics, material science and biology.

This symposium will bring together scientists and industrial partners from these different fields who are currently involved in the fabrication and the study of such nanostructured systems and related applications. Attendees will be encouraged to share and discuss the recent advances achieved in fabrication, doping, optical and/or electrical properties, biosensing, photovoltaic, plasmonics, fundamental mechanisms of growth or excitation, with particular emphasis on devices that incorporate those properties and relevant applications of such materials systems. During each session, experimental and theoretical presentations will be combined in order to give a general overview of the topics covered in the symposium.

Hot topics to be covered by the symposium:

- This symposium will include:
- Synthesis of metal or semiconductor nanoparticles in dielectrics (SiO₂, SiN, Al₂O₃, polymers...) using chemical or physical routes;
 - Structure at the nanoscale by TEM, EELS, EDX, APT, among others;
 - Optical properties: emission, absorption, scattering, luminescence, waveguiding, light confinement, plasmonics, plasmoelectronics;
 - Electronic properties: injection, transport, charge trapping, capacitance, memristance, photocurrent, electroluminescence, single electron effects;
 - Modeling of precipitation, transport, quantum confinement, doping, electronic structure;
 - Devices: LEDs, optical amplifiers, waveguides, memristors, biosensors.

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Symposium S

ALTECH 2017 - Analytical techniques for precise characterization of nano materials

Metrology is a prerequisite for the development of novel materials on the nanoscale. It supports the correlation of material properties and functionalities. The expected contributions should demonstrate how innovative analytical techniques enable a deep understanding of new materials. This symposium organized by the major European National Metrology Institutes is a networking platform for scientist and engineers from metrology and research institutes, academia and industry.

Scope:

Nanomaterials can have unique properties associated with their small dimensionality. Recently functional nanomaterials are rapidly finding wider use in modern technological products in many areas, such as displays, energy conversion, energy storage, sensors and biosensors. Accurate characterization of nanoscale materials is essential for the development of innovative products. Additionally, properly engineered nanomaterials are currently seen as one of the most promising tool for superresolution optical microscopy.

Metrology for nanoscaled materials relies on the ability to measure, with nm or even atomic resolution, in three dimensions over large areas and traceable to e.g. SI units. Often, additional 'dimensions' of importance are chemical states and composition. As the structures and dimensions are 'nano' or even at atomic scale the analytical techniques are pushed to their limits requiring new innovative approaches to face state of the art problems.

This Symposium will cover recent and innovative developments in analytical techniques that can provide precise characterization of materials and devices with nanoscale and/or atomic resolution. The objective of this symposium is both to highlight the capabilities of precise techniques for the determination of the key structural and material parameters and for a better understanding of the functional properties of challenging new materials. One major focus will be on application of these techniques to new and complex materials systems with high potential of industrial application which includes, nanoscale objects (nanowires, quantum dots...) and nanostructured thin films of organic, hybrid or inorganic semiconductors, functionalized surfaces (e.g. for detection of molecules for biosensing) and others. Demonstration of in situ capabilities for a deeper understanding of the structure formation is expected. A special focus will be on complementary metrology, where different analytical techniques support each other to solve analytical problems. Complementary analytical techniques are crucial for the analysis of complex materials, where often a single measurement method is not sufficient to ensure metrological precision, traceability and a well-described uncertainty budget. Often, a combination of optical methods, X-ray methods, ion beam methods, surface probing and advanced surface preparation is required to ensure sufficiently accurate, traceable results. Also, for optoelectronic devices, the ability of electrical characterization at the nanoscale is becoming crucial. As many of these techniques depend on modeling for gaining results, effective material analysis and computational optical analysis of materials and thin layers will be a central subject.

Hot topics to be covered by the symposium:

- Combined metrology for complex thin films and nanomaterials (e.g. new multiple-method approaches and combined data analysis)
- X-Ray diffraction, tomography, scattering and spectrometry based applications on advanced materials and in nanoscience
- Nanometrology: Measurement, modelling, inspection, metrology of nanostructured photovoltaic devices
- Recent developments of ion beam techniques for characterization of lateral and vertical thin films (e.g. MEIS, RBS, TOFSIMS, SIMS)
- Advanced optical spectroscopic techniques, ultramicroscopy and interferometric or non-interferometric methods
- Techniques for thermal characterization of thin films and nanomaterials
- Scanning probe techniques for high resolution characterization of organic, hybrid and inorganic semiconductors (SNOM, AFM, Kelvin Probe, tip-enhanced spectroscopy ...)
- Analytical techniques for characterization of surface chemistry (e.g. XPS, NEXAFS, EELS...) and of functionalized surfaces.
- Novel instrumentation for e.g. nanoanalysis, next generation of highest resolution microscopy including near-field methods, characterization of metallic and dielectric based superlenses
- Reference and calibration samples for nanometrology
- Methodologies for thin films, nanostructure, interfacial and nanostrain characterizations of semiconductor and advanced material systems
- Bioanalysis, biomedical and pharmaceutical characterisation

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Symposium T

Synthesis, processing and characterization of nanoscale multi functional oxide films VI

Oxides offer unique opportunities to combine in a single system various optical, electrical, magnetic, mechanical or chemical properties, suitable for a wide range of applications. Advances in oxide-based films and nanostructures growth or synthesis provide routes to the improvement of material performances or to the design of new devices.

Scope:

Innovation in many technological and industrial fields is dependent upon sustained research on novel materials and devices. Improved performance is demanded, alongside reduced energy consumption, and environmentally friendly production and disposal. Multifunctional and tunable oxides, offering a range of new applications, can contribute to these requirements. Oxides can be smart materials, with a vast range of controllable properties, such as electrical conductivity, superconductivity, piezoelectricity, magnetism, multiferroic behavior, thermoelectricity, optical transparency, catalytic behavior, etc. Such properties will contribute to the development of oxide-based advanced multifunctional thin films, heterostructures and nanostructures which are key factors for the advancement of science and technology. The control of oxide thin films by various physical or chemical methods, coupled with advanced characterization tools, modelling, and theoretical understanding of properties, are prerequisites for further development of new high performance oxide-based materials. A special focus on the relationship between the structure and the properties of oxide thin films whatever the growth method will be addressed for the development of materials with novel or substantially improved properties. Applications related to renewable energy, spin-electronics, multiferroic and transparent electronics are meaningful illustrations of what can be expected from research on oxides. At the same time, for a sustainable development, low cost / easy use deposition methods are required, with reduced processing temperatures, solvent use and the avoidance of polluting and toxic agents. Moreover, the substitution or reduction of critical raw elements in oxides will be emphasized in this edition of symposium. Miniaturization or integration is known to strongly influence the intrinsic properties of oxides. In this respect, the effects of strains, interfaces, defects, composition and doping must be fully understood at the local scale as well as at the macroscopic level. The emerging new class of materials, self-assembled epitaxial oxide composite films in which very high-quality mesoscopic structures can be created, will be addressed together with already established synthesis and structuring of oxide nanotubes, nanopillars, clusters, nanoparticles for nanoscience and nanotechnology. Following previous five very successful symposia on this topic organized in 2006, 2009, 2011, 2013 and 2015 (more than 200 selected abstracts) this symposium intends to draw on previous positive experience and continue the established tradition of an interdisciplinary forum that will bring together scientists and engineers involved in various aspects of the growth, characterization and theoretical modelling of multi-functional oxide-based thin films, multilayers and nanostructures to review the latest developments and future trends.

Hot topics to be covered by the symposium:

- Growth of oxide thin films by physical or chemical methods;
 - Focus on the relationship between the structure and the properties of oxide thin films whatever the growth method;
 - Oxide thin films for renewable energy: photovoltaics (up- and down-conversion), water splitting, solid oxide fuel cells, advanced batteries, thermoelectrics, etc ...
 - Oxide thin films for spin-electronics, multiferroic and transparent electronics;
 - Transparent conducting oxides;
 - Multifunctionality, interfaces, defects in oxide films and nanostructures leading to novel properties and applications;
 - Advanced characterization, simulation and modelling of oxide materials for understanding the properties;
 - Synthesis, structuring and manipulation of oxides for nanoscience and nanotechnology: nanotubes, nanopillars, clusters, nanoparticles, etc ...
 - Nanocomposite (Mesoscopic) oxide thin films, growth and novel properties;
 - Substitution or reduction of critical raw elements in oxides.
 - 2D oxide materials
- One or two invited talk will be selected from submitted oral contributions.

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Symposium U

Computer modeling of thermal transport at the nanoscale

Demands on engineered thermal transport properties are ever increasing for a wide range of devices and materials-based solutions. However, gaps between the fundamental understanding and technological demands still remain, particularly in our understanding of phonon interactions at the nanoscale. This symposium aims at addressing fundamental issues related to thermal transport, in particular phonon behavior, phonon interactions and manipulation in nanoscale materials.

Scope:

Rapid progress in the synthesis and processing of materials with characteristic length of structures on the nanometer scales has created a demand for greater scientific understanding of thermal transport at the nanoscale. Despite methods for precisely controlling the electronic transport properties are presently available, less attention has been paid to the control of lattice vibration - the phonons. However, as the size of electronic devices turned to be smaller and smaller in the past decade, thermal management has become a bottleneck to the development of nanoelectronic devices because of the rapid decrease in phonon transport lengths. Moreover, phonons play critical role in the functionality of many other classes of devices including thermoelectrics, thermal rectification, etc. In fundamental research over the past few years significant progress has been made in our knowledge of phonon transport across and along arbitrary interfaces, scattering of phonons by crystal defects, collective phonons, and solid acoustic vibrations when these occur in structures with small physical dimensions. Phonon interactions generally strongly depend on the length scale, and phonons in nanoscale material show complex behavior. This symposium aims to uncover the ensemble behavior of scale-dependent phonon behavior and deepen our understanding in the complex mechanisms determining the thermal transport properties of a variety of nanoscale materials. This includes, in particular from atomistic point of view, modeling of phonon transport, phonon-phonon interactions, and robust manipulation with tailored nanoscale materials.

Hot topics to be covered by the symposium:

- Phonon transport and phonon interactions in complex materials;
- Electron-phonon coupling in energy materials;
- Phononics;
- Coherent phonons, characterization and manipulation;
- Collective phonon transport;
- Nanoscale heat transfer around nanoparticles for biomedical use;
- Heat transport in lipid bilayers;
- Thermal conductivity of single cells;
- Thermophoresis and Soret effect in biological media;
- New methodology to quantify phonon behaviors at the nanoscale;
- Novel simulation protocols and methods.

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Symposium V

Design and hierarchical assemblies of nanomaterials (nanoparticles, carbon materials, molecules) towards energy, sensing, electronic, catalysis and detection applications

The fast growing research in nanoscale science and nanotechnology has brought many potential opportunities as well as challenges in the fields of nanostructured materials and their incorporation into functional devices. The objective is to discuss innovative researches and recent developments in novel multifunctional nanomaterials for energy, sensing, electronic, catalysis and detection technologies. Such a symposium would be a good opportunity to bring together researchers from different communities (chemists, physicists and engineers) and see the latest developments in the synthesis and the processing of nanomaterials, as well as the properties resulting of their assembling in devices.

Scope

Nanomaterials exhibit unique properties, by comparison with their bulk counterpart, mainly due to their high surface to volume ratio and to quantum size effects. Moreover self-assembled nanostructures showed remarkable collective properties, useful for engineering nanoarchitectures. Therefore in the field of nanotechnologies, nanomaterials rapidly appeared to be essential building blocks for the fabrication of new nanodevices for catalysis, spintronic, optical, magnetic and electronic applications. Tailoring the properties of materials at the nanoscale offers thus the potential for improvement in device performance for broad applications across the entire range of human activity. Intensive research activities have been devoted to the synthesis of nanomaterials and to the characterization of their properties during the last years. The study of their collective properties when they are assembled in nanostructures has merged new or enhanced properties. The challenges for nanomaterials lie now in the design and tailoring of complex hybrid nanoparticles and 'intelligent' or 'smart' nanomaterials (nanotubes, functionalized surfaces, multi-layers, novel thin films and interfaces) with multiple functions and in their integration in devices. Among processing integration methods, hierarchical assembly arranges nanostructures at different length scales and becomes now an effective method of fabricating artificial metamaterials from composite nanostructures tailored for a particular response. With this in view, a considerable effort of research is developing this last decade to integrate multifunctional nanomaterials in devices through hierarchical assemblies approaches towards catalysis, spintronic, optical, magnetic and electronic applications

The symposium will focus on state-of-the-art recent developments in the design of novel multifunctional nanomaterials based devices for energy, sensing, electronic, catalysis and biomedical technologies. The objective is to discuss innovative researches in the fields of nanostructured materials and their incorporation into functional devices. A special concern is also the design of the new devices and the study of their corresponding macroscopic properties. Such a symposium would be a good opportunity to bring together researchers from different communities (chemists, physicists and engineers) and see the latest developments in the synthesis and the processing of nanomaterials, as well as the properties resulting of their hierarchical assembling in devices. .

Hot topics to be covered by the symposium

- Synthesis of molecular and hybrid nanomaterials (nanoparticles, carbon nanotubes, graphene, molecules).
- Assembling strategies in hierarchically superstructures
- Processing methods towards nano-devices
- Intelligent soft matter systems
- Devices for energy storage (supercapacitors and batteries), catalysis, energy, sensing, electronic, catalysis and detection applications

List of invited speakers (confirmed) :

- Robert E. Cohen, MIT, Chemical Engineering, Cambridge, USA
- Dr Cuong Pham Huu, CNRS-University of Strasbourg, France
- Pr Paolo Morais, University of Brasilia, Bresil
- Prof. R. Ziolo, RESEARCH CENTRE FOR APPLIED CHEMISTRY, CIQA, Mexico, Mexique
- Dr. O. Azzaroni, INIFTA – CONICET – Universidad Nacional de La Plata, Argentina
- Prof Andre-Jean Athias, Université Pierre et Marie Curie, France
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Symposium W

Small scale mechanical behaviour of interfaces: bridging experimental and computational modelling methods

Recent advances in fabrication processes with precise control of microstructures down to the nanometer level catalyzed the emergence of new materials with extreme mechanical performances. This requires the development of advanced experimental characterization and computational methods for the prediction of material properties at small scales.

Scope:

The overall objective of this symposium is to improve our understanding of the fundamental mechanisms controlling the mechanical properties involving the strength, ductility, fracture, creep and wear resistance at small scales in advanced inorganic 3D bulk and small dimension systems with microstructures dominated by interfaces. The core questions concern the competing deformation and failure mechanisms, involving grain, twin and phase boundaries processes, dislocations/interface interactions, diffusion, shear transformation zones and shear bands in metallic glasses, cavitation and fracture or local decohesion. Special attention will be paid to the importance of rate dependent behaviour and back stresses originating from the abundance of the interfaces, the stress/strain driven formation and mobility of these interfaces, their interactions with fracture mechanisms, and the resulting size effects. Investigations dedicated to new hybrid material systems combining crystalline and amorphous metals, oxides and graphene are also welcome. Of particular interest are enhancements of mechanical properties of such systems by proper tuning of internal/external dimensions and constituents. Advanced micro/nanocharacterization methods (ex-situ and in-situ TEM and SEM micro/nanomechanical testing, residual stress measurement, aberration corrected HR(S)TEM and EELS, automated orientation, phase and nanostrain mapping in SEM and TEM, etc) as well as simulation methods on the corresponding scales (ab-initio, DD, MD, etc) will be in the core of the present symposium in order to reveal the fundamental plasticity mechanisms, the competition or synergy between these mechanisms and their impact on the macroscopic property level.

Hot topics to be covered by the symposium:

- Advances in processing and fabrication of nanostructured materials;
- Nano- and microscale characterization of interfaces;
- Contributions of interface glide and migration to deformation of nanoscale structures;
- Fundamental aspects of dislocation-interface interactions;
- Role of interfaces in rate dependent deformation and back stress;
- Influence of interfaces on damage and fracture;
- Intrinsic and extrinsic size effects on mechanical properties;
- Advances in ex-situ and in-situ micro/nanomechanical testing;
- Advances in numerical technical methods;
- Bridging scales: from small scale mechanics to bulk behavior.

Symposium organizers

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Symposium X

New frontiers in laser interaction: from hard coatings to smart materials

This laser symposium aims to bring together leading academic scientists, researchers and laser users and manufacturers to exchange and share their experiences on recent progress in Laser Science and Technology. It also provides the chance to present and discuss the most recent innovations, trends, and concerns, practical challenges from nanoenergy to biomedecine.

Scope:

This symposium will cover all new advances in laser-matter interaction coupled to recent applications of emerging materials. The main objective is to revisit the basic phenomena involved in the interaction of wide range of laser systems still new and efficient devices including smart optics, high and low repetition rate processing as well as high and low beam fluences. The symposium will consider recent progress in laser-assisted additive fabrication, nano-LIPSS formation, laser lift of biological materials and systems and more emerging techniques, and will offer a unique opportunity for researchers from Europe and worldwide areas to discuss their results in a friendly and engaging atmosphere. Laser techniques will facilitate environmental and eco-design through the useful processing of photovoltaic cells, thermoelectricity materials and devices, micro and nanosystems for energy storage and conversion; a special focus will be given for those 'hot' topics. All contributions on laser interaction with hard, soft and smart materials, targeting future applications from nanoenergy to biomedicine as well as recent progress on the fundamental mechanisms are welcome. The symposium 'New frontiers in Laser interaction from hard coatings to smart materials' will provide a platform to establish interdisciplinary international research collaborations tween scientists working in the field of laser-matter interaction.

The symposium will consist of invited presentations by leading scientists in their respective fields of research and contributed papers for oral and poster presentations. Special emphasis will be made for presentations by young scientists presenting high quality research papers. The contributions should concern, but are not limited to the topics listed below.

Hot topics to be covered by the symposium:

- Lasers in nanotechnology and environmental technology;
- Laser hybrid processing;
- Laser manufacturing for alternative energy sources;
- Laser 3D micro-structuring for MEMS, MOEMS, photonic crystals and photonic applications;
- Laser Induced Forward Transfer of functional materials for organic electronics and sensing applications;
- Laser assisted fabrication for sensors (bio-, chemical- and environmental-);
- Ultra-short, ultra-high power laser interaction with matter: fundamentals and applications in biology and materials science;
- Laser processing of materials: thin films growth and particle production; Subwavelength laser produced structures for smart optical, electro-optical, electronic and biological devices; Laser-induced nanostructures: from theory to applications;
- Time-resolved diagnostics for laser processing; Multiphoton based processing techniques;
- Diode lasers for processing and pumping;
- Laser process monitoring and control, laser processing of biological materials.

Symposium organizers

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Symposium Y

Paper electronics: from materials to applications

Paper electronics represents a new concept, which combines the use of paper as a functional part of electronic components or devices. Typical applications include packaging, graphics, novel diagnostic systems and hygiene products for indicating product safety or freshness, support logistics, health-care and safety for example.

Scope:

As far eco-materials are concerned, besides natural cellulose, nanocellulose is the basis of novel sustainable area to produce cellulose categorized as arenewable source of materials that displays remarkable physical properties, such as transparency, together with low toxicity and cost production, earth-abundance and biocompatibility, besides being able to be integrated in other systems acting as a composite.

Paper-based electronics shows promising technical, economic, and environmental advantages which will allow new recyclable electronics devices like paper displays, smart labels, smart packaging, bio-and medical applications, PoC devices, RFID tags, disposable electrochemical sensors, solar cells, among others. Paper-based electronics represents a promising source of innovation and growth for sectors such as packaging industry which develops smart solutions able to interact with the end users or classic paper publishing industry which are facing challenges from electronic books and journals, healthcare industry which intensify the development of quantitative biosensing, microfluidic and lab-on-chip devices.

The symposium aims at giving an overview on recent advances of cellulose materials, as well as other biopolymers and composites, together with the large range of applications where the optimized materials can be incorporated. Furthermore, all extraction or production routes of nano-cellulose/biopolymers (plants, animals, and bacteria) will be considered.

Hot topics to be covered by the symposium:

- Cellulose, biopolymers and composites
- Nanocellulose/biopolymers extraction and production emerging routes together with nanomanufacturing options.
- Structural and physical property characterization of nanocellulose, biopolymers and composites.
- Biodevices such as biosensors, microfluidics and related devices.
- Electronic and energy devices such as flexible electronics, solar cells, batteries,

Symposium organizers

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Symposium Z

Metamaterials:
from waves to matter

Metamaterials are artificial media whose effective properties, whether they be of electromagnetic, acoustic or mechanical nature, can in principle be tailored at will. The interaction between these different fields is a key point of next generation of metamaterials. The aim of the symposium is to bring together researchers working on these various aspects of metamaterials from fundamental physics to applications.

Scope:

The possibility of designing matter properties at one's will is a technological dream that has led to a tremendous research activity. Metamaterials are such artificial structures whose effective properties are not found in natural materials. The term metamaterials was originally coined for artificial media whose electromagnetic properties were considered. This led to new concepts and devices such as negative refraction, artificial magnetism, super lenses or invisibility cloaks. Recently the field of metasurfaces were initiated by F. Capasso, where one considers the bidimensional analogue of metamaterials, with the aim of realizing extended laws of diffraction, designing flat achromatic lenses, polarization and geometrical phases control devices, efficient solar cells etc. Very recently the concept of topological insulators was extended to metamaterials.

The field has in fact expanded far beyond the historical borders of electromagnetism and the concepts have been extended to acoustic waves, water waves and even seismic waves and thermal transport. There are now as well impressive works on mechanical metamaterials where one aims at designing the mechanical properties of artificial media. Totally unconventional properties such as a negative Poisson modulus have been obtained experimentally. An important direction of research is the tentative of controlling several different physical phenomena, leading to the concept of multiphysics metamaterials. Specifically, it is possible to imagine, e.g., the simultaneous control of heat flow and the emission of electromagnetic radiation by a metamaterials. Another interesting direction is that of quantum metamaterials where one introduces quantum degree of freedom inside a photonic mesostructure in order to control the effective permittivity through the quantum microstates inside the system. This leads to a "blurring" of the classical disciplines. This challenging yet extremely powerful interaction between different fields is one of the key drivers for further innovation.

The symposium will be intrinsically multi-disciplinary. It will bring together researchers from different horizons and provide a valuable forum to discuss the latest advances and issues in the design and modeling of optical, acoustic, mechanical and multiphysics metamaterials. The symposium will welcome both experimental and theoretical works.

Hot topics to be covered by the symposium:

- Electromagnetic metamaterials;
- Metasurfaces;
- Quantum metamaterials;
- Topological metamaterials;
- Acoustic and mechanical metamaterials;
- Multi-physics metamaterials;
- Mathematical and numerical methods.

Symposium organizers

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**All practical information to simplify your coming:
 contact address, conference venue, transportation,
 hotel reservation, Visa assistance, bank information,
 financial support, etc ...**

CONFERENCE SECRETARIAT

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Domiciliation / Paying Bank: CRONENBOURG
 MITTEL
IBAN (International Bank Account Number):
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BIC (Bank Identification Code): CCBPFRPPMTZ

HOTEL ACCOMMODATION

**Book your hotel on time. Strasbourg is a very
 busy city at this period.**

For hotel reservations, accommodation can be easily booked by using the online accommodation booking system: <http://www.otstrasbourg.fr/en/your-stay/accomodation.html>

We have negotiated special conference rates at the Grand Hôtel in Strasbourg. Attendees can either book directly at the Grand Hôtel (situated directly in front of the railway station) by phone: +33 3 90 40 00 00, or by using the website www.sogeho.com and enter the code EMRS17.

Warning for Participants

The European Materials Research Society (E-MRS) has been made aware of a service provider of the name Exhibition Housing Services (EHS), which has contacted a number of participants, citing the Congress, to offer hotel reservation services.

Please note that Exhibition Housing Services (EHS) do not represent the European Materials Research Society (E-MRS) nor Strasbourg Convention Centre, nor have the E-MRS Strasbourg Convention Centre authorised them to use their names or trademarks on information they send out to participants.

CONFERENCE VENUE

Palais de la Musique et des Congrès
 Place de Bordeaux
 67082 Strasbourg
<http://www.strasbourg-events.com/en>

Tram station: Wacken (line B and E)

CONFERENCE LANGUAGE IS ENGLISHABSTRACT SUBMISSION

Deadline for abstract submission: January 18, 2017.

Abstract Length: submissions are limited to 1500 characters. (including spaces, only plain text, no figures, no formulae...)

Note: All abstracts must be submitted via the E-MRS website www.european-mrs.com. Submitting abstracts via the E-MRS website is easy and convenient. Follow the step-by-step instructions on the template, making sure that complete mailing address information is included for the presenting and contact authors. After submitting your abstract, please use your Control ID number in all communications with E-MRS regarding the abstract UNTIL a paper number (e.g., A-IV.8) is later assigned.

Because major revisions may affect a symposium organizer's decision to accept your abstract, please review it carefully before submission. In the unusual circumstance of having to revise your original abstract, the online submission center enables authors to revise their abstracts **up to and including the submission deadline of January 18**. After that date, the change must be submitted to: **emrs@european-mrs.com** (Subject: Abstract Revision) and must include your Control ID number. Please state

Practical information

exactly where the revisions are located (e.g., title, author, body, etc.).

Papers will be selected by the scientific committee of each symposium.

Authors will be notified of acceptance and mode of presentation by February 27, 2017 at the latest.

MANUSCRIPTS AND PROCEEDINGS

Depending on the symposium, a selection of full length papers will be published as special issues in appropriate journals. Submitted papers will be refereed to journals standards. Instructions to authors will be dispatched together with the notification of acceptance of the abstract.

The decision of which journals shall publish the symposia proceedings will be made jointly by symposium organizers and journal editors. An announcement of these journals will be published on the concerned symposium webpage.

POSTERS

A printing office will welcome you on site and will give you the opportunity to print your poster at special cost (conference badge required)

OPENING TIMES: 9:00 - 17:00 (Mon – Thu)

The viewable size of the poster board is: vertical 1.10 m and horizontal 0.90 m. The boards are full white. Please use tape (no pins)! Attendees can preview their posters the morning before the formal presentation.

Authors need to be present at their posters for discussion with attendees during the session.

Subsequently, it is each author's responsibility to remove his/her poster immediately at the end of the session. E-MRS assumes no responsibility for posters left up after this time.

REGISTRATION

IMPORTANT:
Each attendee (including chairpersons, invited speakers, presenting authors, co-authors, scientific committee members....) must register online.

Registration starts at the end of the abstract submission period only. Online registration will be possible until MAY 8, 5 pm (CET) If you do not have an E-MRS account on our website, you need to create one before registering to the Spring Meeting.

fore registering to the Spring Meeting.

Pre-registration is compulsory and pre-payment is recommended to avoid a long queue.

Attendees can also register on-site at the Convention Center. On-site registration opens SUNDAY, May 21 at 14:30.

IMPORTANT: On-site registration may not include any conference pack: bag, printed version of the conference program, USB stick, ... (depends on availability left). It includes only access to symposium rooms, lunches, coffee breaks and social event.

On-site payment hours:

Sunday May 21 - 14:30 - 18:30
Monday May 22 - 7.30 - 18.00
Tuesday May 23 - 8.00 - 18.00
Wednesday May 24 - 8.00 - 18.00
Thursday May 25 - 8.00 - 18.00
Friday May 26 - 8.00 - 12.00

REGISTRATION FEES

Abstract acceptance does not mean registration: each author attending the conference must register separately

FULL RATE

including: access to symposia, lunches, coffee breaks, social event, E-MRS membership for one year and one proceedings volume (if applicable).

- **BEFORE APRIL 21, 2017 595 EUR net**
- **AFTER APRIL 21, 2017 695 EUR net**

STUDENT RATE

including: access to symposia, lunches, coffee breaks, social event, E-MRS membership for one year and one proceedings volume (if applicable). (Students have to give evidence of their university registration at the main desk)

- **BEFORE APRIL 21, 2017 340 EUR net**
- **AFTER APRIL 21, 2017 420 EUR net**

E-MRS is a non-profit organization, no subject to VAT.

PAYMENT OF FEES

Payment should be made in EURO for the net total amount due. The following possibilities are offered:

Credit card (Carte Bleue, Visa, Eurocard/ Mastercard) (mode preferred)

Practical information

Bank transfer:

Bank: BP ALSACE LORRAINE CHAMPAGNE
Paying Bank: CRONENBOURG MITTEL
Account: ASS E MRS
IBAN: FR76 1470 7500 1111 1913 8543 942
BIC: CCBPFRPPMTZ

Watch to identify well your transfer by indicating your ID Number and your name and first name

- Purchase order (bon de commande) - to be sent by April 21 at the latest.
- Cheque (to the order of E-MRS)
- Cash (on-site payment only)

CANCELLATION

In case the E-MRS conference is cancelled, the conference attendees will be entitled to claim the reimbursement of the registration fee. In no case can the Conference Organisers be held liable for the reimbursement of any other cost, such as travel costs, accommodation costs, living expenses etc. Such costs are the exclusive responsibility of Conference attendees.

In order to receive a refund, cancellation requests must be in writing and sent by May 2 which will cause a €25 processing fee. No refunds will be issued on requests postmarked after May 2. In recent years, there has been a move away from long scary disclaimers of liability for acts of God, terrorism, strikes, volcano eruption etc., so these are no longer included.

EXHIBITION HOURS

Location:

Palais de la Musique et des Congrès
Place de Bordeaux
67082 Strasbourg
<http://www.strasbourg-events.com/en>

Installation: Monday May 22 (14:00 - 19:00)

Exhibition hours:

Tuesday May 23 - 9:30 - 18:30 pm
Wednesday May 24 - 9:30 - 18:30 pm
Thursday May 25 - 9:30 - 16:30 pm

Dismantling: May 25, after 16:30

PLENARY SESSION

A plenary session is scheduled for Wednesday afternoon May 24 .

Symposium organizers, Graduate Student Award,

EU-40 Materials Prize, Reach.Out! Award winners will be honored at the end of the plenary session on Wednesday May 24 - room SCHWEITZER

SOCIAL EVENT

A reception is being arranged for all the conference participants on Wednesday evening May 24 starting at 19:00. All conference attendees are invited to this reception as a chance to meet and renew relationships with colleagues. Music and food will be provided free of charge.

TRAVEL INFORMATION

REACHING STRASBOURG

Strasbourg enjoys excellent national and international connections, with a TGV high-speed train station in the city center and an international airport just 9 minutes away.

by air

Strasbourg-Entzheim International Airport

Strasbourg airport is just 9 minutes from the city center by train. It offers several flights a day to and from Lyon, Nice as well as some international connections, for example Amsterdam, Bruxelles, Londres Luton, Madrid, Prague.

More information on: <http://strasbourg.aeroport.fr/en>

Paris Charles de Gaulle (France) – Directly from the airport, you can take a TGV to Strasbourg. When booking with Air France, your airfare can include the transportation by TGV to the Strasbourg main station. Click here for more information.

More information on <http://www.parisaeroport.fr/en>

Basel-Mulhouse-Freiburg Airport (France) - one-hour twenty minutes by train (take the shuttle bus to the Saint-Louis train station (Line 11) and then catch the train to Strasbourg).

Karlsruhe/Baden-Baden Airport (Germany) is located about 60km away in Germany. The best way to get to Strasbourg is to get a bus from the airport to Baden-Baden Hauptbahnhof (Main Station) from here trains run to Strasbourg, normally with one change. From station to station the journey is about 45m-1hr.

More information on
<https://www.baden-airpark.de/en>

deadline for abstract submission: 18 January 2017

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Practical information

Frankfurt International Airport (Germany) is about 2h30 hours away from Strasbourg, and is one of the nearest inter-continental airports to Strasbourg, with Paris Charles de Gaulle. Lufthansa operates a shuttle bus between Strasbourg (stops at the train station and at the Hilton Hotel, just in front of the Convention Center) and Frankfurt Terminal 1 – « THE SQUARE WEST ». You can also take a train from Frankfurt to Strasbourg.

More information on:
<http://www.frankfurt-airport.com>



Attractive discounts on a wide range of fares on all Air France and KLM flights worldwide**. Event ID Code to keep for the booking: 28932AF

Event: E-MRS 2017 SPRING MEETING

Valid for travel from 17/05/2017 to 31/05/2017
Event location: Strasbourg, France

Use the website of this event or visit www.airfranceklm-globalmeetings.com to

- access the preferential fares granted for this event*,
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- issue your electronic ticket*,
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If you buy your ticket via AIR FRANCE & KLM Global Meetings website, your electronic ticket will carry a special mention which justifies the application of the preferential fares.

Should you prefer to process your reservations and ticket-purchase directly with an Air France and KLM sales outlet, you must keep this current document which serves to justify the application of the preferential airfares.

Keep the document to justify the special fares with you as you may be asked for it at any point of your journey.

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* not available in certain countries

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by train

Strasbourg has one of the largest railway stations in France and enjoys direct TGV connections to many French towns and cities. The city is also an important high-speed train hub, lying on the intersection of the East European and Rhine Rhône TGV lines, and is a short ride away from major European cities. For more information, please visit the SNCF web site.

Examples of travel times to Strasbourg:

- 1h20 from Stuttgart
- 2h05 from Zürich
- 1h50 from Paris
- 3h40 from Munich
- 1h45 from Frankfurt (central station)

For more information, please visit
<http://en.voyages-sncf.com/en/>

by bus

Strasbourg can be reached by bus at attractive prices from major European cities. Four agencies, Eurolines, Isilines, Flixbus and Ouibus provide bus connections with Strasbourg and cities like Amsterdam, Barcelona, Basel, Brussels, Bucharest, Budapest, Frankfurt, Krakow, London, Lyon, Marseille, Munich, Vienna, Zurich, ...

More information on <http://www.eurolines.fr/en/>
<https://www.isilines.fr/fr>
<https://www.flixbus.com/>
<http://www.ouibus.com/>

by road

Strasbourg can be reached from various directions:

- From the west (Paris, Benelux) taking the A4 highway (E25). About 4 hours from Paris;
- From the south (Switzerland, Lyon), taking the A35 highway (E25). About 5 hours from Lyon;
- From the north and east (Germany), taking the A5 highway (E35).

The Strasbourg-Mulhouse route joins it to the rest of the French motorway network. Strasbourg is fifteen minutes from the Hamburg-Frankfurt-Basel-Genova or Milan motorway, itself linked to the entire European motorway network.

Practical information

REACHING THE CONGRESS CENTRE

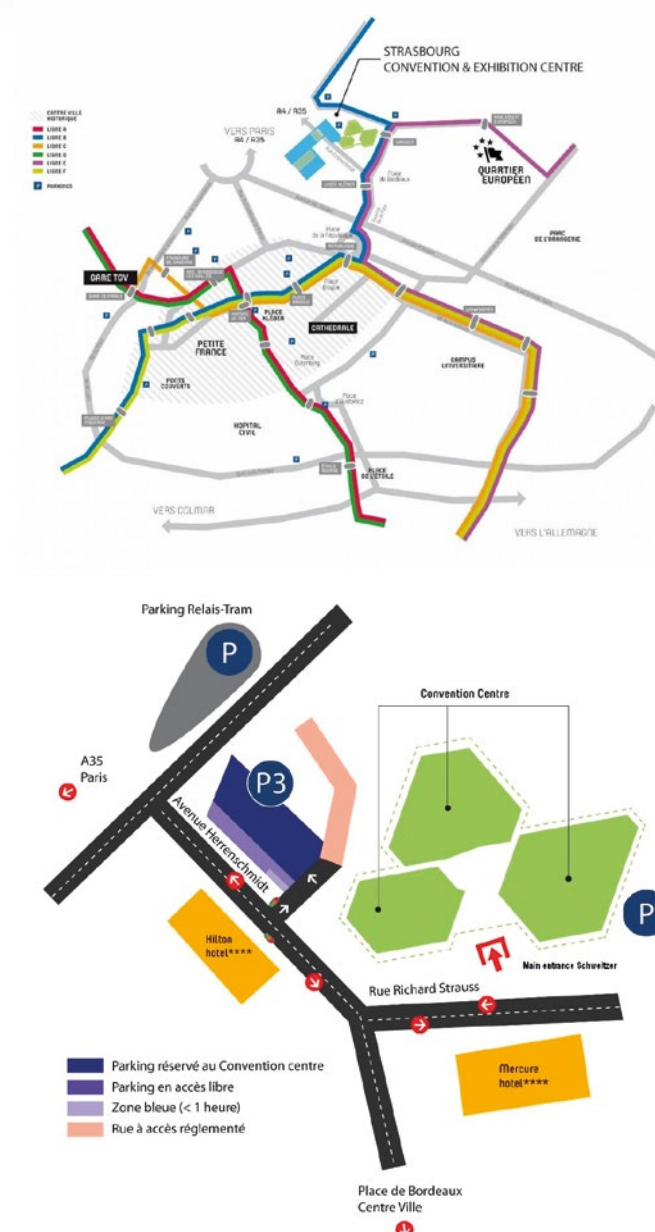
- 10 minutes by tramway from the center of the city. Trams are running every 10 minutes.
- 15 to 20 minutes from the Central Railway Station (connection with Strasbourg Airport and fast train to Paris)
- Tramway: lines B and E - Wacken tram stop

Strasbourg

the **europolit**

Due to the generosity of the City of Strasbourg, every paid attendee will be issued a public transport pass (also called “Sympopass”) to allow complimentary, unlimited use of both tramway and buses of Strasbourg’s public transport network during the 2017 E-MRS Spring Meeting. The ticket will be valid from 22 to 26 May 2017 (5 consecutive days).

- Parking: 250 free parking spaces on-site and a 570-space park-and-ride nearby
- Vélhop self-service cycle hire scheme: rental points at the railway station and in the city centre. A cycle path brings you directly to the Convention Centre



deadline for abstract submission: 18 January 2017

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Practical information

VISA ASSISTANCE

Citizen having passports from certain countries need a visa to enter France. If you need any assistance to obtain your visa, please contact us as soon as possible (indicate your address, date and place of birth, your passport number and date of expiration).

By email: emrs@european-mrs.com

Subject: VISA ASSISTANCE

All letters of invitation will be sent by airmail and by PDF e-mail attachment unless a courier account number is provided with the original request. E-MRS is not able to contact Embassies in support of an individual attempting to gain entry to attend the meeting.

Because the application for a visa can be a lengthy process, we recommend that you start your visa application process as soon as you have been notified that your paper has been accepted. We also recommend that you secure your travel visa before registering for the symposium.

COFFEE BREAKS

Coffee will be served during the morning and afternoon breaks. Please check the individual technical conference listings for exact times.

INTERNET ACCESS / WIFI

A limited number of internet access terminals will allow attendees to access their internet e-mail during the conference. E-MRS is also pleased to provide complimentary wireless access to the internet for all conference attendees bringing their own laptops.

AUDIOVISUAL PACKAGE

The standard audio-visual package in each symposium room will consist of:

- video projector, screen, laser pointer/remote control & microphone
- PC windows XP pro / Microsoft Office pack (including power point), USB plug and CD-Rom

CONFERENCE APP

Navigate conference venue, receive most recent push up information from the organizers, arrange meetings with other participants (app required on both sides). Also check recent programme, speakers list and exhibitors list.

Download it from Apple Store if you have iOS or from Google Play for Android system.



European Materials Research Society

Spring Meeting 2017

deadline for abstract submission: 18 January 2017

E-MRS

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France

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