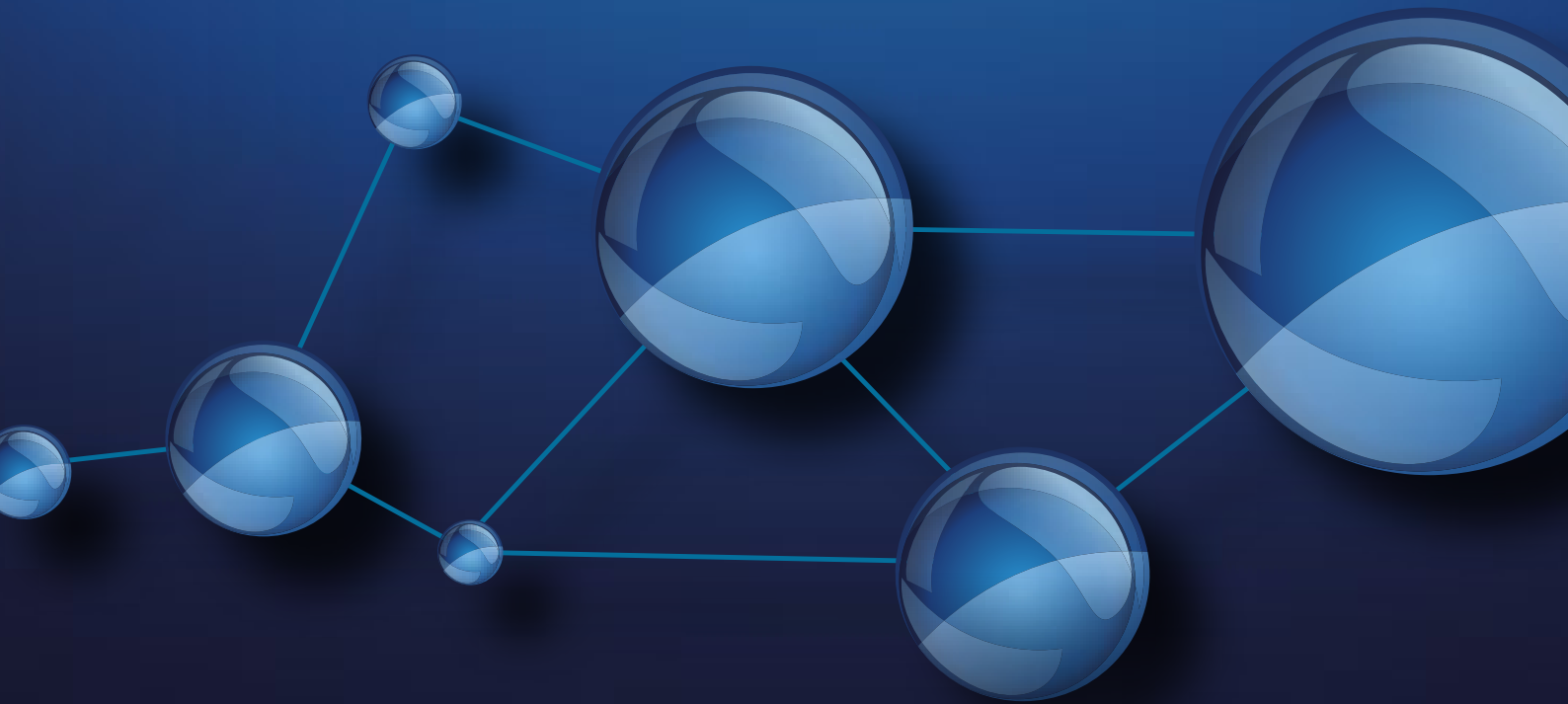




European Materials Research Society



Spring Meeting 2018

from June 18th to 22nd
Strasbourg Convention Centre – France

Call for papers

deadline for abstract submission: 18 January 2018

www.european-mrs.com



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Announcement for 2018 Spring Meeting

It is with great pleasure that we announce the 2018 Spring Meeting of the European Materials Research Society (E-MRS) to be held in the recently renovated new 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 2018 Spring Meeting will consist of 29 parallel symposia with invited speakers, oral and poster presentations, assorted by a plenary session and a number of workshops and training courses. In parallel with the technical sessions, more than 80 international exhibitors are expected to display equipment, systems, products, software, publications and services from June 18 to 22 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.

The focal point of the conference will be the plenary session on Wednesday afternoon which will include the ceremony to award the E-MRS 35th Anniversary prize. 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 February 28, 2018. The presentation of Graduate Students Awards, delivered for each one of the run symposia, will conclude the plenary session. We encourage all junior researchers to apply to these awards.

Please note the deadline for abstract submission is set for January 18, 2018!

It will be our great pleasure to welcome you all in Strasbourg next June.

A handwritten signature in blue ink, appearing to read 'George Kiriakidis', is written over a light blue circular background.

George KIRIAKIDIS

E-MRS President

Presentation

EUROPEAN COORDINATION GROUP

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deadline for abstract submission: 18 January 2018

Presentation

PLENARY SESSION

(Wednesday afternoon-June 20)

Symposium organizers, 35th Anniversary Award, EU-40 Materials Prize and Graduate Student Award winners will be honored at the end of the plenary session on Wednesday afternoon, June 20.

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.

35th ANNIVERSARY AWARD

The 2018 edition marked the 35th Anniversary of E-MRS. A special award for lifetime achievements in Materials Science will be delivered. The Anniversary award recognizes the career contribution of a scientist to fundamental understanding of the science of materials through experimental and/or theoretical research. The ceremony will be held during the plenary session on Wednesday afternoon, June 20.

E-MRS Anniversary award recipients:

- **20th Anniversary Award (2003):**
Sir Richard Friend, Cavendish Laboratory, Cambridge, UK: «Plastic electronics»
- **25th Anniversary Award (2008):**
Dan Shechtman, Technion, Haifa, Israel and ISU, Ames, Iowa, USA. «Quasi-periodic Materials – Crystal Redefined»
- **30th Anniversary Award (2013):**
Sir John Pendry, Centre for Plasmonics & Metamaterials The Blackett Lab, Imperial College, London, UK. «Metamaterials open new horizons in electromagnetism»

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 2018 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 **February 28th, 2018**.

The nominee shall not have reached his/her 40th birthday in the year in which the nomination is submitted (2017). They will be evaluated shortly after and the proposers will be informed end of March 2018.

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 2018 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 2018 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 **May 16th, 2018**. 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 June 19 – 21 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 June 20, 2018 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.

deadline for abstract submission: 18 January 2018

Programme

MATERIALS FOR ENERGY AND ENVIRONMENT

- A** Thin film chalcogenide photovoltaic materials
- B** Theoretical searches for innovative materials for energy harvesting and storage
- C** Substitution and recycling of critical raw materials in optoelectronic, magnetic and energy devices - II

BIOMATERIALS AND NANOMEDICINE

- D** Carbon materials: surface chemistry and biomedical applications III
- E** Nanotechnology for targeted personalized medicines and theranostics
- F** Advanced biomaterials: elaboration, nanostructure, interfaces with tissues

SEMICONDUCTORS AND NANODEVICES

- G** Carrier transport, photonics and sensing in group IV-based nano devices
- H** Charge transport in organic semiconductors: influence of processing and doping
- I** Materials research for group IV semiconductors: growth, characterization and technological developments III
- J** Organic semiconductors: hybrid interfaces and charge transport

NANOMATERIALS

- K** Defect-induced effects in nanomaterials
- L** Carbon- and/or nitrogen-containing thin films and nanomaterials
- M** Block-copolymer self-assembly: fundamentals and applications
- N** Nanostructures for phononic applications

FUNCTIONAL MATERIALS

- O** Materials and devices for green photonics
- P** Solution processing and properties of functional oxide thin films and nanostructures-III
- Q** Aggregation-induced emission: materials, mechanism, and applications
- R** Solid state ionics: advanced functional materials for solid state devices
- S** Polymer and hybrid thin films from innovative deposition techniques to functional devices
- T** Engineering of functional materials with chemical coating methods
- U** Advanced materials and architecture for organic, printable and bio-inspired photonics
- V** Epitaxial integration of dissimilar materials: challenges and fundamentals
- W** Hybrid materials: state of the art and new frontiers

MATERIAL PROCESSING AND CHARACTERIZATION

- X** Photon-assisted synthesis and processing of materials in nano-microscale
- Y** New developments in the modeling and analysis of radiation damage in materials
- Z** Scanning probe frontiers in molecular 2D-architecture world
- AA** Strength, plasticity, fracture and fatigue behaviour controlled by interfaces and grain boundaries
- BB** Current trends in optical and X-ray metrology of advanced materials for nanoscale devices V
- CC** Cultural heritage-materials, techniques and knowledge perspectives on a common identity

SCIENTIFIC WORKSHOPS

More information available on www.european-mrs.com

MATERIALS FOR ENERGY AND ENVIRONMENT

Symposium A

Thin film chalcogenide photovoltaic materials

The Thin Film Chalcogenide Photovoltaic Materials symposium 2018 will closely follow the research in the field of chalcogenide materials for photovoltaic applications. The field is in fast progress, especially considering the emerging field of new materials, such as $\text{Cu}_2\text{ZnSn}(\text{S,Se})_4$ in addition to the more mature materials CdTe , and $\text{Cu}(\text{In,Ga})(\text{S,Se})_2$. The symposium has a long tradition on attracting the most successful researchers in the world within this field. It has grown over the years and become one of the largest symposia at E-MRS Spring Meetings.

Scope:

Chalcogenides are highly interesting for their use as light absorber layers in solar cells due to their uniquely high absorbance. These materials include CdTe and the system $\text{CuInSe}_2 - \text{CuGaSe}_2 - \text{CuInS}_2 - \text{AgInSe}_2 - \text{CuAlSe}_2$ and their alloys. The most commonly used alloy of the latter system is $\text{Cu}(\text{In,Ga})(\text{S,Se})_2$. An emerging material with a growing research interest is $\text{Cu}_2\text{ZnSn}(\text{S,Se})_4$. Examples of chalcogenide materials used as components in this type of solar cells are CdS and $\text{Zn}(\text{O,S})$, which are used as buffer layers.

In the recent past, industrial activities have expanded, especially in the field of CdTe and $\text{Cu}(\text{In,Ga})\text{Se}_2$ and a production capacity of above 2 GW per annum has been built up for CdTe and above 1 GW per annum for CIGS. All of the aforementioned materials are complex and further fundamental research is needed to improve the electrical and material properties and thus enhance the quality of solar cells and modules. The findings will lead to increased efficiencies of the solar cell devices and thereby improved cost structures of the photovoltaic systems. Presently, record efficiencies of 22.6% for $\text{Cu}(\text{In,Ga})\text{Se}_2$, 22.1% for CdTe and 13.6% for $\text{Cu}_2\text{ZnSn}(\text{S,Se})_4$ are obtained, which outperform for example multicrystalline silicon, which has 21.3% efficiency, whereas monocrystalline silicon is at challenging 26.6%.

New concepts for further increasing the performance and reducing the costs by, for example, improved solar cell architectures and processing will be discussed together with new and improved characterization methods involving the latest development in microscopy and electrical measurement equipment.

In previous E-MRS conferences the research communities in these highly productive research fields have met to discuss and learn from each other. In addition to oral presentations and poster sessions, discussion sessions with thematic topics have also been included at the end of each day. A young scientist tutorial has been a very popular event among the PhD students in the field. We strongly believe that this successful series will attract the leading researchers in the field also in the next E-MRS Spring Meeting 2018.

The Thin Film Chalcogenide Photovoltaic Materials Symposium at 2018 E-MRS Spring meeting will include a scientific workshop on $\text{Cu}_2\text{ZnSn}(\text{S,Se})_4$ co-organized by the coordinators of the EU Horizon 2020 projects SWInG (Dr. Bart Vermang) and STARCELL (Dr. Edgardo Saucedo).

Hot topics to be covered by the symposium:

- Processes for film synthesis
- Thin film growth, theory and experimental aspects
- Material combinations and heterostructures
- Chalcogenide PV materials, theory and modeling
- Novel/ alloyed chalcogenide materials
- Material characterization methods
- Electrical characterization methods, device analysis
- New understanding of defects in chalcogenide-based PV materials
- Research related to upscaling and manufacturing
- Diagnostic tools
- Chalcogenide-based solar cells in tandem devices
- The role of alkaline elements in chalcogenide-based solar cells
- Passivation of interfaces and surfaces
- Novel device concepts
- Advanced light management concepts

List of confirmed invited speakers:

- Maria Malitchaya, Aalto Univ.: DFT calculations on role of alkalines in chalcopyrite based solar cells
- Matthias Maiberg, Univ. Halle: 2D simulations of chalcogenide thin film solar cells
- Marika Edoff, Uppsala Univ.: Recent progress in high band gap CIGS with Ag alloying
- Philip Jackson, ZSW: High efficiency CIGSe solar cells
- Susanne Siebentritt, Univ. Luxembourg: Quasi fermi level splitting in CIGS thin film solar cells
- Norio Terada, Kagoshima Univ.: Kelvin probe microscopy on CIGSSe solar cells
- Gong Xiong First-Solar: High efficiency CdTe solar cells and modules
- Jeffrey Britt, Global Solar: Flexible CIGS solar cells and modules
- Lydia Helena Wong, NTU: High efficiency $\text{Cu}_2\text{ZnSn}(\text{S,Se})_4$ solar cells from non-toxic hybrid inks
- Thomas Schnabel, ZSW: Wide band-gap CZGeS kesterite solar cells
- Aron Walsh, ICL: First-principles study of extended defects in $\text{Cu}_2\text{ZnSnS}_4$ and $\text{Cu}_2\text{ZnSnSe}_4$
- Byoung Koun Min, KIST: Solution-processed CIGS for power generating windows

Tentative list of scientific committee members:

- D. Lincot (CNRS), France
- C. Ferekides (University of South Florida) USA
- T. Wada, (Ryokoku Univ.) Japan
- A.N. Tiwari (Empa), Switzerland
- R. Noufi (NREL) USA
- J.F. Guillemoles (CNRS) France
- H.W. Schock (Helmholtz) Germany
- D. Cahen (Weizmann Institute of Science) Israel
- U. Rau (Jülich) Germany
- R. Scheer (University of Halle) Germany
- A. Romeo, (University of Verona) Italy
- M. Edoff, (University of Uppsala) Sweden

Symposium organizers

Stephan BUECHELER (Main Organizer)

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Symposium B

Theoretical searches for innovative materials for energy harvesting and storage

Evolution towards a renewable future demands application-specific materials. Hence, targeted in silico searches across chemical space are emerging as critical tools for accelerated materials discovery. This symposium covers all aspects of those efforts, focusing on technologically paramount areas.

Scope:

In the context of our civilization's growing dependence of technology, the prediction of global shortages of natural resources - both oil and critical raw materials - is among the gravest concerns facing humanity. The situation calls for a rapid transition towards renewable energies and more resource-efficient technologies in critical areas like electricity generation and transportation. Furthermore, technological development in new areas like the Internet of Things, and advances in nanotechnology, require energy harvesting and storage at scales far removed from current mainstream solutions.

Ushered by advances in statistics and computational power, a new kind of dynamics between theory and experiment is emerging in materials science, with the potential to accelerate materials discovery to meet the increased demand for task-specific materials. This new approach enables the exploration of large areas of chemical space in search of good candidate materials with optimal values of a target property. The heightened demand for automation, advanced analysis and predictive capabilities inherent to this new method put it in an exciting crossroads between chemistry, mathematics and computational science.

This transversal multidisciplinary approach is the key ingredient of the European Energy oriented Centre of Excellence (EoCoE) which aims to accelerate the transition to a reliable low carbon energy supply exploiting the ever-growing computational power of HPC (High Performance Computing) infrastructures. The ambitious goal of the Materials4Energy community, one of EoCoE's pillars, is to harness the synergies between disciplines to attain groundbreaking materials design for energy applications.

The symposium aims to bring together key researchers in all fields of study related to theoretical discovery of materials for energy applications to exchange achievements and develop future collaborations. The selection of speakers reflects a desire to turn this symposium into an interdisciplinary meeting point: the organizers believe that the unusual blend of researchers working on solid crystals, organic liquids, and pure methodology will set the event apart from more typical meetings.

All aspects of theoretical materials discovery fall within the scope of the symposium, including: predictive calculation of material properties, computational thermodynamics, generation of descriptors, materials databases, machine-learning methods, and specific applications.

Hot topics to be covered by the symposium:

The symposium will be divided in sessions, dedicated to materials discovery in connection with specific applications, including but not limited to: batteries and other electrochemical devices, hydrogen storage, carbon capture, solar power, small scale energy harvesting/scavenging (thermoelectrics, piezoelectrics...)

List of invited speakers:

- S. Curtarolo (Duke University, Durham, USA),
- R. Ramprasad (University of Illinois, USA),
- C. Wolverton (Northwestern University, Evanston, USA),
- J. Even (INSA-Rennes, CNRS, France),
- F. Giustino (University of Oxford, U.K.),
- A. De Vita (King's College, London, U.K.),
- A. Igartua, (TEKNIKER, Spain),
- C. Massobrio (IPCMS-CNRS, Strasbourg, France)

Scientific committee members:

- M. Buongiorno Nardelli (University of North Texas, Texas, USA),
- N. A. Katcho (CIC Energigune, Minano, Alava, Spain),
- W. Li (Shen Zhen University, China),
- S. Sanvito (CRANN, Trinity College, Dublin, Ireland),
- I. Savic (Tyndall Institute, Cork, Ireland),
- C. Schröder (Institute of Biological Chemistry, University of Vienna, Austria),
- L.M. Varela Cabo (University of Santiago de Compostela, Spain),
- A. Walker (University of Bath, U.K.),
- N. Novakovic (University of Belgrade, Serbia),
- P. Pochet (INAC, CEA Grenoble, France),
- M. Salanne (CNRS, Pierre et Marie Curie University, France),
- U. Aeberhard (FZJ, Jülich, Germany),
- F. Stassin (EMIRI, Energy Materials Industrial Research Initiative, Belgium),
- A. Di Carlo (University of Tor Vergata, Rome, Italy),
- S. Fabris (Centro Democritos, CNR-IOM, Italy),
- P. Asinari (Politecnico di Torino, Italy)

Awards:

A single Best Student Presentation Award will be granted by the symposium and its sponsors, either to a poster or to an oral presentation. The winner will be nominated on the last day of the symposium.

Publication:

The papers will be published in a special issue of Computational Materials Science (Elsevier) to which all invited speakers will be asked to contribute.

Sponsor:

This symposium is supported by the European Energy oriented Centre of Excellence (EoCoE), grant agreement number 676629, funded within the Horizon2020 framework of the European Union.

Symposium organizers

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Symposium C

Substitution and recycling of critical raw materials in optoelectronic, magnetic and energy devices - II

Following the successful edition in 2016, the Symposium is devoted to academic and industrial partners working on the substitution and recyclability of critical raw materials (CRM) in electronic, magnetic and energy harvesting devices. The objective is to strengthen the synergies in this community and promote the development of new efficient CRM-free/lean devices.

Scope:

Raw materials are the basic, but fundamental, elements for a wealth of current technological applications. However, some of these materials have been recently defined by the EU commission as "critical" due to the high risk of supply shortage expected in the next 10 years and for their importance to the European industry. Thus, their (total or partial) substitution and recycling are essential for Europe's economy.

Many technologies with a high impact on the quality of life rely on critical raw materials (CRMs) as key elements, from lighting devices (LED, OLED, CFL: rare earths, like Ce, Y, Eu and Tb, In as CRMs) to energy harvesting devices (transparent conductive layers, solar absorbers), permanent magnets (SmCo, NdFeB), catalytic converters, electrode catalysts in fuel cells [Pt group metals (PGM) and Rh-based catalysts] and rechargeable batteries (rare earths, graphite, Co, Li and Ni as CRMs). New research and development activities are required to improve the fundamental understanding of new material solutions containing reduced or no critical content while maintaining or enhancing the performance of the materials, components and products. The design of the alternatives compounds, the control of growth process coupled with accurate characterization are mandatory for further development of new CRM-free/lean devices.

The symposium provides an interdisciplinary platform to discuss about CRM alternatives from the modelling, synthesis, characterization, processing and device integration viewpoints. Bringing together researchers from academia and industry we aim at increasing the interaction among scientists, engineers, and students working on different areas of the CRM field that are too often treated separately. The symposium is organized by members of the EIP RESET commitment, and will therefore be included and publicised within the program of activities of the commitment.

Hot topics to be covered by the symposium:

Materials Science, Design, Synthesis, Growth, Characterization of Advanced Materials with reduced or free from Critical Raw Materials for :

- Transparent conductive layers
- Phosphors for LED applications, Scintillators, Displays
- OLEDs
- Catalysis
- Solar: photovoltaics, photocatalysis
- Smart windows
- Hydrogen storage materials
- Exchange-coupled nanocomposite magnets with less or no rare earths
- New RE-free/lean highly anisotropic magnetic materials
- Recycling of critical raw materials

Tentative list of invited speakers:

- Alberto López-Ortega, CIC-Nanogune Consolider (San Sebastián, Spain): "Strongly Exchange Coupled Core/Shell Nanoparticles with High Magnetic Anisotropy: A Strategy Toward Rare-Earth-Free Permanent Magnets"
- Oliver Gutfleisch, Institut für Materialwissenschaft, Technische Universität Darmstadt (Germany): "Towards high-performance permanent magnets without rare earths"
- Philippe Smet, University of Gent (Belgium): "Are alternatives needed for the workhorses Eu²⁺ and Ce³⁺ in phosphor converted LEDs?"
- Paolo Mele, Muroran Institute of Technology (Japan): "Development of nanostructured ZnO thin films for thermoelectric harvesting"

The list will be further adjusted and integrated by invited talks selected from outstanding submitted oral contributions, preferentially chosen among younger researchers.

Scientific committee:

- Roland Mathieu (Uppsala University, Sweden)
- Peter Normile (UCLM, Spain)
- Davide Peddis (CNRS, Italy)
- Daniel Salazar (BCMaterials, Spain)
- Alexander Buckow (Fraunhofer ISC, Germany)
- Josep Nogués (ICN2, Spain)
- Su Seong Lee (Singapore)
- Alberto Bollero (IMDEA, Spain)
- Per Nordblad (Sweden)
- Pablo Muñoz (UCLM, Spain)
- Tamio Endo (Japan)
- Ester Vázquez (UCLM, Spain)
- Maria Luisa Grilli (ENEA, Italy)
- M. Cannas (University of Palermo, Italy)
- M. L. Ruello (University of Marche, Italy)
- Sebastiano Garroni (University of Burgos, Spain)
- Riccardo Corpino (University of Cagliari, Italy)
- Etienne Bouyer (CEA, France)
- Santiago Cuesta-Lopez (University of Burgos, Spain)
- Davide Prosperi (Urban Mining, USA)
- Miha Zakotnik (Urban Mining, USA)
- Rocco Lagioia (ITRB Consulting)
- Dario della Sala (ENEA, Italy)
- J.-P. Vilcot (CNRS, France)
- M.-P. Besland (CNRS, France)
- S. Binetti (University of Milano-Bicocca, Italy)
- Christian Hegelueken (Umicore, Belgium)
- Wilfried Favre (CEA, France)
- Joao Pedro Veiga (University of Lisboa, Portugal)
- Guido Sonnemann (University of Bordeaux, France)

Publication:

The papers will be published in a special issue of Physical Status Solidi A (Wiley-VCH), to which all invited speakers will be asked to contribute.

Symposium organizers

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Symposium D

Carbon materials:
surface chemistry and
biomedical applications III

Carbon materials (nanodiamonds, carbon nanotubes, fullerenes, graphene, and carbon dots) are one of the most fascinating platforms in the field of nanomedicine. For their biomedical applications, surface chemical functionalization of carbon materials plays an important role.

Scope:

This symposium focuses on surface chemistry and biomedical applications of carbon materials (diamond, nanodiamonds, graphene, carbon nanotube, fullerene, carbon dot, etc.).

Surface chemistry includes surface terminations, sequential reactions, immobilization of biomolecules, genes and drugs, polymer grafting, physical and mechanical properties, simulations, and theory. Special attention will be drawn to the relationship between surface chemical structure and physical properties of carbon materials, and the actual techniques to control the surface chemistry in view of the biomedical applications. The structural characterization by spectroscopies and other means is also one of the important subjects in this symposium.

Another subject of this symposium is the biochemical and medicinal applications of carbon materials. Special attention will be focused on their in vitro, ex vivo, and in vivo aspects from diagnosis to therapy. Ongoing activity on clinical translation of the nanocarbon materials will also be within a focus of the symposium. The diagnostic research includes carbon material-based biosensors, and biomolecular, cellular and in vivo imaging. The imaging modalities are fluorescence, ultrasound, magnetic resonance (MR), computed tomography (CT), and positron emission tomography (PET). Toxicology of carbon materials and surface-modified ones is also dealt with in this symposium. From the therapeutic aspect, drug delivery system, and photodynamic and photothermal therapy will be discussed especially in the cancer therapy. We believe that this symposium provides good opportunity to exchange information about how to design the carbon-based agent in terms of dispersibility in a physiological environment, targeting specificity, stealth effect to prolong circulation, and controlled release of the drug and gene, and how to construct the agent through surface chemical functionalization of carbon materials.

Hot topics to be covered by the symposium:

- Solution-processed chemistry of carbon materials
- Surface terminations of nanocarbons
- Theory and simulation in surface chemistry of nanocarbons
- Surface modification of carbon materials
- Carbon nanomaterials for bioimaging
- Hybridized carbon materials
- Surface characterization of nanocarbons
- Electro- and bio-chemical applications of carbon materials
- Adsorption of biomolecules to carbon surface
- Medicinal applications of nanocarbons
- Carbon material-based sensors
- Toxicology of carbon materials

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Symposium E

Nanotechnology for targeted
personalized medicines and
theranostics

As one of the newest areas of science, nano-scale science and technology are seen by many as the key technology of the 21st century, which of course raises the question as to what role this technology will play in medicine. Nanomedicine can thus take advantage of the recent developments in Nanobiotechnology research areas for the creation of platforms with superior drug carrier capabilities, selective responsiveness to the environment, unique contrast enhancement profiles and improved accumulation at the disease site.

Scope:

Medicine is currently changing. New materials and technologies are revolutionizing therapeutic treatments, in various domains such as preventive medicine or diagnostic, management of diseases or implants. Multidisciplinary researches, at the edge of Material and Surface Chemistry, Biology, Physics and Medicine pave the way for a new era, in which innovative applications could strongly improve early diagnosis of diseases, patient comfort, with reduced intervention time and an unprecedented efficiency.

The symposium will focus on state-of-the-art recent developments in the design of novel nanomaterials answering important stakes in medicine. The objective is to discuss innovative researches in the fields of personalized medicine and image-guide therapy. A special concern is the design of the new nanoconstructs and the study of their corresponding biological properties. Such a symposium would be a good opportunity to bring together researchers from different communities (chemists, physicists, biologists and physicians) and see the latest developments in the synthesis, properties and clinical validations of nanoparticles and targeted nanomedicines.

Hot topics to be covered by the symposium:

- Nanomedical imaging
- Theranostics
- Targeted and personalized nanomedicines
- Immunotherapies through nano
- Nanoparticles for clinical imaging and therapy
- Translation of targeted nanomedicines
- Nanomaterials in Oncology
- Understanding the Nano-Bio interactions
- Multitherapies
- Magnetic hyperthermia and photodynamic therapies
- Drug delivery nano-systems
- Targeted in vivo siRNA delivery
- Nano-targeting to cells and tissues
- Nanomaterial crosstalk with pathogens

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Symposium F

Advanced biomaterials: elaboration, nanostructure, interfaces with tissues

Medical practice utilizes a large number of devices and implants. Biomaterials in the form of implants (sutures, bone plates, joint replacements, ligaments, vascular grafts, heart valves, intraocular lenses, dental implants, etc.) and medical devices (pacemakers, biosensors, artificial hearts, blood tubes, etc.) are widely used to replace and/or restore the function of traumatized or degenerated tissues or organs, to assist in healing, to improve function, to correct abnormalities, and thus improve the quality of life of the patients.

Scope:

The scope is centered on materials used in devices and implants and their interface with tissues. The proposed symposium will highlight how new materials can be at the root of recent advances and new opportunities in the engineering, researching, nanoscale characterization of devices and implants in medical researches. The field of the symposium is interdisciplinary, bridging together bionanotechnologies, biomimetic devices, tissue engineering and (smart) biohybrid systems. In this context, diverse but complementary contributions are needed on new biomaterials, multiscale modelling, advanced characterizations and processing technologies for the desired biomedical and biotechnological applications.

The physico-chemical structures and properties appear relevant at interfaces to drive the interactions between living and designed systems. A central aspect is then the ability to optimize the functional properties, creating materials that are able to control the interaction with the biological surrounding at the nanoscale thus guiding the responses of biomolecules, cells and tissues.

The objective of this symposium is also to provide a forum to identify critical problems, stimulate new ideas, provide promising solutions, as well as discuss fundamental and applied topics.

Hot topics to be covered by the symposium:

- Biomaterials : bioceramic, porous and composite biomaterials, novel polymers and biopolymers
- Nano and micropatterning for biomedical application
- Smart biohybrid materials
- Tissue engineering scaffolds, biomedical implants
- Cardiovascular tissue engineering and regenerative medicine
- Biointerface engineering, biomolecule surface interaction, surface treatments, antibacterial surfaces
- Osteointegration
- Drug delivery systems
- Blood- and tissue-material interactions
- Cell material interactions and cell instructive materials
- Stimuli and cell responsive materials
- Modelling of cell material interaction and biological recognition

Symposium organizers

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Symposium G

Carrier transport, photonics and sensing in group IV-based nano devices

The new composites and nanostructures of group IV materials provide a platform for advanced devices for Nanoelectronics, Photonics and Sensors. The symposium will focus on group IV materials, nanostructures and related devices with the objective to bring together scientists working in different application fields.

Scope:

The scope of the proposed symposium will include experimental and theoretical innovations related to group IV nanoelectronics, nanophotonics and nanosensing. An emphasis will be made on high mobility materials suitable for fast devices, light emission and light absorption.

These topics have attracted an increasing attention in the recent years for various applications, including infrared communication and imaging. The very critical issues are therefore carrier transport properties and lifetimes which will be reflected in the symposium program.

The photonic devices of particular interest are detectors, light emitting sources, waveguides, optical modulators and CMOS devices. Additional topics in the symposium scope are defect characterization, engineering and the impact of crystal quality on the properties of electronic and photonic devices.

Moreover, integrated photonic devices are recently emerging in the field of biological and chemical sensing allowing ultra-high sensing performances and efficient CMOS-compatible systems.

Simulations and calculations of nanodevices, predicting their physical properties and performances are vital to successful device design and optimization. This is particularly important when novel Si-Ge-Sn-C alloys and structures are involved; and in case of nano scale devices, where conventional approximations can no longer be applied.

The symposium will bring together the whole chain starting with novel technological developments in the field of material synthesis; subsequently, material characterization, device design and fabrication; and finally, device characterization, simulation and modeling. New applications will be welcome as well.

Hot topics to be covered by the symposium:

- Fabrication and characterization of group IV nanostructures, nanodevices and nanosensors
- Carrier transport in nanodevices
- Optoelectronic materials and nanodevices using Si-based heterostructures and nanostructures
- Integration of photonics with Si CMOS technology
- Strain band-gap engineering and carrier transport in CMOS
- Si-based optical modulators, switches and detectors
- Si-based waveguide technology and nanodevices
- Luminescence in Si-based materials
- Photonic crystals
- Integrated waveguide sensing
- Nanomaterials for life science applications
- Nanoscale biosensors
- Defect engineering and characterization

List of confirmed invited speakers:

- Jun Luo, (Chinese Academy of Science) China: Integration of advanced high-k/metal gate stack in nano-scaled transistors
- Eddy Simeon, (IMEC) Belgium: The effect of defects on transport in nano-devices
- Douglas Paul, (Glasgow University) U.K.: "Ge and GeSn nanophotonic devices for mid-infrared sensing"
- Steve Koester, (University of Minnesota) USA: 2D materials for nanoelectronics, nanophotonics and nanosensing"
- Philippe M. Fauchet, (Vanderbilt University) USA: Electrical and optical silicon-based biosensors
- Maksym Myronov, (The University of Warwick) U.K.: Epitaxy of advanced group IV alloys for nanodevices
- Xue Feng, (Tsinghua University) China: Si photonic towards nano-scaled devices
- Yakov Roizin, (TowerJazz & Tel Aviv University) Israel : VLSI scaling roadmap and integration of novel materials with silicon

Tentative list of scientific committee members:

- Mehmet Ozturk, (NC State University) USA
- Matty Caymax, (IMEC) Belgium
- Andrej Kuznetsov, (University of Oslo) Norway
- Chao Zhao, (Chinese Academy of Science) China
- Tian-Ling Ren, (Tsinghua University) China
- Yuji Yamamoto, (IHP) Germany
- Dimitris Tsoukalas, (National Technical University of Athens) Greece
- Peter Pichler, (Fraunhofer IISB) Germany
- Rasit Turan, (Middle East Technical University) Turkey
- Lisik Zbigniew, (Technical University of Lodz) Poland
- Guilei Wang, (Chinese Academy of Science) China
- Slotte Jonatan, (Aalto University) Finland
- Wei.Xin Ni, (Linköping University) Sweden
- Rick Wise, (University of Arkansas) USA
- Lis Nanver, (University of Twente) The Netherlands
- Aleksey Andreev, (Hitachi Cambridge Laboratory) U.K.
- Jan Linnros, (KTH Royal Institute of Technology) Sweden
- Luca Maresca, (University of Napoli Federico II) Italy

Publication:

Manuscripts will be published in a reputable and refereed journal: Materials Science Journal: Materials in Electronics, Springer.

Graduate Student awards:

Five selected member of scientific committee will rank independently the work of young scientists. Top 3 presentations/posters will be critically reviewed and a winner will be selected.

Sponsors:

- EpiLuvac, Lund, Sweden
- Nocilis Materials, Stockholm, Sweden

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Symposium H

Charge transport in organic semiconductors: influence of processing and doping

Organic semiconductors facilitate a wide range of opto-electronic applications as solar cells, light emitting diodes, thin-film transistors, sensors, and thermoelectrics. The concentration and mobility of charge carriers in these materials are known to critically influence the device performance.

Scope:

This symposium aims to bring together key researchers in this field to discuss their novel concepts and approaches with regard to the interplay between materials/device processing, molecular doping, device structure and charge transport, which must be mastered in order to enable widespread use of organic semiconductor-based opto-electronics.

The ability of charge carriers to flow through organic semiconductors strongly depends on its nano- and microstructure, which in turn is defined by the thermodynamics and kinetics encountered during its processing. Further, for many applications it is vital to tune the charge carrier concentration through molecular, or other forms of extrinsic doping. In order to advance the opto-electronic performance of organic semiconductors, and hence the overall performance of the resulting devices, it is crucial to develop effective processing schemes that lead to both optimal nano- and microstructures as well as efficient extrinsic doping.

Despite the tremendous progress on the development of new high-performance materials, device architectures and effective manufacturing methods, great challenges still remain and will need to be addressed in order to fully exploit the potential of organic opto-electronics. These key challenges include (1) the precise control of nano- and microstructures, (2) a fundamental understanding of the various doping mechanisms demonstrated to date, (3) processing schemes that simultaneously grant leverage over nanostructure formation and doping, and (4) the long-term stability of (extrinsically doped) materials and devices.

Hot topics to be covered by the symposium:

- structure-processing-property relationships of organic semiconductors (incl. conjugated molecules, polymers)
- synthesis and processing of organic semiconductors and dopants
- n-type dopants
- phase behavior of organic semiconductor systems
- large-area coating/printing and patterning techniques
- optimization of nanostructures at interfaces
- alignment techniques and anisotropic charge transport
- in-situ and/or real-time characterization
- charge transport and modelling in intrinsic and doped molecular systems
- thermoelectric properties
- environmental and operational stability of organic devices

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Symposium I

Materials research for group IV semiconductors: growth, characterization and technological developments III

Group IV semiconductors lie at the heart of many electronic and photovoltaic devices. Issues associated with bulk silicon continue to be important, but substantial fundamental challenges also exist for other group IV bulk materials and associated alloys, nanostructures, nanocomposites, thin/thick films and heterostructures. Advances in device performance are underpinned by new defect engineering procedures, development of novel growth techniques, and improvements in advanced diagnostic tools. Point and extended defects remain at the center of interest, as are surfaces, and in some cases their engineering represents an option for new functionalities.

In this edition of the Symposium, the organizers intend to hold a specific session dedicated to extended defects in cubic silicon carbide, so abstracts in this area are particularly welcome.

This symposium will include, but will not be exclusively limited to, the following topics:

Crystal growth of group IV semiconductors:

- Modeling of defect generation and modeling of crystal growth
- Crystal growth for solar applications
- Growth of group IV alloy crystals
- Wafering technologies and defect evolution in wafering processes
- Large diameter crystal growth with emphasis on 450mm diameter wafers
- Low quality polycrystalline silicon refinement, including control of dopants

Nanostructures of/ on group IV semiconductors:

- Layer deposition for electronic and photovoltaic applications
- Nanocrystalline materials
- Quantum wires, vertical membranes for FinFETs, and quantum dots

Heteroepitaxy on group IV semiconductors:

- Perovskites on silicon for photovoltaic applications
- Selective epitaxy for advanced electronic applications
- Strain engineering in strained layer epitaxy
- Heterogeneous integration of Si or Ge with III-V epitaxial device quality layers
- Defects at heteroepitaxial merging on patterned Si
- Epitaxial deposition of nitrides and SiC on silicon substrates
- Growth of 2D materials (e.g. graphene, silicene and germanene) on silicon
- Modelling and simulation of epitaxial structures
- Ge, GeSn, GeSiSn on silicon

Thin layer technology:

- Deposition of amorphous and crystalline thin layers
- Surface passivation of silicon for photovoltaics
- Silicon membranes

Fundamental research on point defects and extended defects in group IV semiconductors:

- Defects associated with light induced degradation of solar silicon
- Vacancy and interstitial related point defect complexes with oxygen, nitrogen, carbon, and hydrogen
- Complexes of dopants with intrinsic point defects and light elements
- Diffusivity of impurities and intrinsic point defects
- Modelling and simulation of extended defects

Gettering and defect engineering:

- Gettering of metallic impurities and impurity precipitation in silicon
- Interaction of metals with dopants, impurity atoms and extended defects
- Defect engineered and defect-free silicon wafers
- Dislocation engineering by substrate and process optimization

Technological applications for group IV semiconductors:

- Thin layer and multilayer solar cells
- High speed and high frequency electronic devices
- Power devices
- SOI and s-SOI devices
- Photonics and light emitting devices
- Spintronics
- Thermo-mechanical systems

Scientific Committee (subject to confirmation):

Simona Binetti (University Milano-Bicocca, Italy), Katerina Newell (Dohnalova) (Van der Waals-Zeeman Institute, Netherlands), Stefan Estreicher (Texas Tech University, USA), Giovanni Isella (L-NESS, Politecnico di Milano, Italy), Koichi Kakimoto (Kyushu University, Japan), Sergio Pizzini (University Milano-Bicocca, Italy), Eddy Simoen (IMEC and Ghent University, Belgium), Bengt G. Svensson (University of Oslo, Norway), Michio Tajima (Meiji University, Japan), Yuepeng Wan (GCL, China), Jun Xu (Nanjing University, China).

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Symposium J

Organic semiconductors:
hybrid interfaces and
charge transport

New concepts combining organic semiconductors multi layer device architectures with hybrid or inorganic semiconductors results in unprecedented functionalities and highly efficient devices. In these structures become crucial to design and understand charge carrier and exciton transport. The objective of this symposium is to highlight new developments in full organic and hybrid devices with a focus on transport.

Scope:

While transport in organic semiconductors remains a topic of large interest, with reports of charge carrier mobility steadily increasing, the last years have seen a growing interest in new strategies for implementation in devices for energy, opto-electronics, magnetic memories, and sensors. In particular, the engineering of material interfaces where organics are in contact with other inorganic or hybrid materials results in new functionalities and sometimes record breaking performance.

In order to further exploit these new concepts a complete understanding of the charge and energy transfer at such interfaces is needed. In this symposium we aim at bringing together scientists from different disciplines, coming from the chemistry, physics and material science communities to discuss the most recent developments related to these emerging ideas. Moreover, we want to bridge the gaps often encountered between scientists in the field of inorganic perovskite or 2D chalcogenide materials and the organic semiconductors community.

The symposium offers space for discussing novel experimental and theoretical methods to probe and predict such new material architectures, as well as novel hetero-interface preparation methods and chemical synthesis of novel compounds. The sessions will cover fundamental aspects on the molecular description of transport phenomena, but also the implementation in real devices and the device physics and optimization needed for real world applications.

The symposium organizer collaborate with several industrial partners and expect to have a large participation from both the industrial and academic sectors.

Hot topics to be covered by the symposium:

- Organic transport layers in full organic and hybrid devices
- Interface states with metals and inorganic semiconductors
- Charge separation at mesoscopic interfaces in photovoltaics and LEDs
- Morphologically controlled doping
- Morphology control and impact on charge transport in devices
- Hybrid interfaces with magnetic materials
- Charge and energy transfer in organic/organic bilayers
- Intercalated 2D materials with organic molecules
- Dielectrics in field effect transistor applications
- Theoretical description of hybrid electronic states in doping and charge transfer
- Novel optical and electrical methods to study transport phenomena
- High efficiency devices by heterojunction engineering

Tentative list of invited speakers:

- John Anthony (Univ Kentucky USA)
- Paul Blom (MPI Mainz, Germany)
- Mario Caironi (IIT, Italy)
- Jenny Clark (Univ. Sheffield, U.K.)
- Jerome Cornil (Univ Mons, Belgium)
- Gabriele D'Avino (Institut Néel, Grenoble, France)
- Carsten Deibel (TU Chemnitz, Germany)
- Oana Jurchescu (Wake Forest University, USA)
- Norbert Koch (Humboldt University, Berlin Germany)
- Silvia Milita (CNR Bologna, Italy)
- Paolo Samori (Strasbourg, France)
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- Guglielmo Lanzani (IIT Milan, Italy)
- David Lidzey (Univ. Sheffield, U.K.)
- Erin Radcliffe (Univ. Arizona, USA)
- Ifor Samuel (St Andrews Univ., U.K.)
- Uli Scherf (Univ. Wuppertal, Germany)
- Lukas Schmidt-Mende (Univ. Konstanz, Germany)
- Patrick Too (FlexEnable Ltd, U.K.)
- Concepció Rovira (ICMAB, Barcelona, Spain)

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Symposium K

Defect-induced effects
in nanomaterials

Following a great success of the three previous similar symposia (more than 200 submitted abstracts), this symposium addresses the progress in tailoring basic properties of low-dimensional and nano-materials by introducing dopants (e.g., implantation) or creating growth- and radiation-induced defects. The latest achievements in theory and experiment will be presented and discussed by academic and industrial researchers.

Scope:

Solids without defects are impossible for thermodynamic reasons. The defects are a Janus Bifrons: they can deteriorate the properties of materials and structures, but they can also provide them with unique and useful properties which are absent in the perfect solids. As we are living more and more in a world replete with manmade nanoobjects, it obviously pays to invest efforts in studies of defects in them. The high sensitivity of modern technologies on the submicron scale has promoted the exciting opportunity of developing new advanced materials with reduced dimensionality. This opens new prospects for ion and electron beam applications. Ion tracks and other radiation-induced effects provide a means for controlled synthesis and modification of low-dimensional materials, such as nanoclusters and nanowires, allowing for efficient nano- and optoelectronic devices. Defect behavior in nanomaterials and nanostructures in its turn has often been found to differ substantially from that observed in bulk materials. Recent work has demonstrated spectacular optical and magnetic effects due to deliberately created defects or radiation-induced transformation of nanomaterials as well as radiation-induced displacements in low-dimensional insulators and semiconductors, with numerous potential applications. We plan to discuss how such defects could be introduced controllably, categorized and controlled in nanostructures. Understanding and controlling defect properties in a wide class of advanced nanostructures (novel 2D materials, multiferroics, quantum dots and wires, etc.) could well be a key to breakthroughs in several crucial areas of science and technology. This is the main focus of the symposium.

Hot topics to be covered by the symposium:

- Defects in graphene and other 2D materials
- Swift heavy ion irradiation as the means to tailor nanomaterials
- Effects of grain boundaries and interfaces on the diffusion and transport processes in nanomaterials.
- Electronic structure of defects in nanostructures; consequences for carrier transport, magnetism, optical and electronic properties, as well as device parameters.
- Creation, evolution and properties of radiation defects in nanosize materials and heterostructures; the role of interfaces, nonstoichiometry, strain and adjacent layers.
- Use of defects as microprobes.
- Multiscale computer modeling of defect creation and transformation in nanomaterials.
- Novel technological processes of micro-, nano- and optoelectronics using defects and radiation effects in nanostructures.

List of invited speakers

- Hanns-Ulrich Habemeier, MPI for Solid State Research, Stuttgart, Germany "Materials challenges and recent developments in oxide thermoelectrics"
- Teresa Monteiro, University of Aveiro, Portugal "Optical studies in multifunctional wide bandgap nanomaterials"
- Marjeta Maček Kržmanc, Jožef Stefan Institute, Ljubljana, Slovenia "Defined-shape ferroelectric nanoparticles: synthesis and prospects for energy-harvesting applications"
- Edith Bucher, Montanuniversität Leoben, Austria, "Stability of complex perovskites under solid oxide fuel cell operation conditions"
- Graeme Watson, Trinity College Dublin, Ireland "Ab initio calculations of structure and reducibility of doped CeO₂"
- Alexander Ya. Polyakov, NUST "MISIS", Moscow, Russia "III-Nitrides nanopillars as building blocks for advanced LEDs"
- Sebastian van Dijken, Aalto University, Finland "In situ TEM observation of oxygen vacancy driven structural and resistive phase transitions in La₂/3Sr₁/3MnO₃"
- Maria Eugenia Toimil-Molares, GSI Helmholtzzentrum für Schwerionenforschung, Darmstadt, Germany "Nanostructures fabricated by ion-track technology"

A joint session with Symposium Y "New developments in the modeling and analysis of radiation damage in materials" is foreseen on the following topics:

- In situ TEM and atom probe tomography and
- Ab initio calculations and numerical simulations

Symposium organizers

Eugene KOTOMIN

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Symposium L

Carbon- and/or nitrogen-containing thin films and nanomaterials

This symposium is focused on Carbon and/or Nitrogen containing thin films and nano-materials. The objective is to provide an exchange platform for scientists, engineers and students dealing with the synthesis, characterization and application of these materials. Experimental and theoretical papers as well as industrial contributions are welcome.

Scope:

Carbon or nitrogen containing thin films and nano-materials offer a wealth of structures based on metastable phases, nanocomposites or nanosized multilayers and low-dimensional structures which allow various properties such as optical, optoelectronic, magnetic, electrical and mechanical ones. Metastable films can consist on plasma polymers, diamond-like carbon or CN_x phases while nanocomposite can be tailored by adding either metallic or non-metallic elements with various Carbon or Nitrogen affinity in amorphous or crystalline matrixes. Finally, nitride and carbon-based low-dimensional structures such as flakes, tubes,... can be functionalized by appropriate chemical functionalities to be integrated in a composite material or to be used as building part in a nanomachine. The objective of this symposium is to highlight the progresses in fundamental and applied issues related to the development of these materials and to bridge the gap between science and technology. Among others, Carbon or Nitrogen containing films or composites materials consisting on nanocrystalline particles embedded in an inorganic and/or organic matrix, including plasma polymers, will be considered. On the other hand, nanolaminated structures such as MAX-phases are also in the scope of this symposium. Finally, we also aim to address Carbon and Nitrogen based low-dimensional structures unembedded or not in a matrix.

Contributions investigating plasma composition – material structure - films property – relationships by experimental and theoretical means will be considered. The foreseen contributions will belong to one of these categories: (i) films synthesis by advanced processes, such as high power impulse magnetron sputtering, atmospheric plasma processes, and hybrid techniques, (ii) mechanical, tribological, thermal, electrical, optical, optoelectronic and magnetic properties, biomedical compatibility, and correlations between these properties and deposition parameters, structure or films' composition, (iii) process modeling and diagnostic, surface interaction and nucleation phenomena, investigation of degradation mechanisms e.g. phase and microstructure stability under different environments and coating-substrate interdiffusion, (iv) engineering-oriented contributions including automotive, chemical, electrical, optical, magnetic/optical data storage, pharmaceutical or biomedical applications, and emerging applications as in energy systems.

Hot topics to be covered by the symposium:

- Novel fabrication and synthesis routes in physical and (plasma enhanced) chemical vapor deposition.
- Advances in controlled growth of nanocomposite thin films and nanostructured materials.
- Plasma treatment and synthesis of low dimensional Nitrogen and Carbon based low dimensional structures including their characterizations.
- Diagnostics providing insight into the growth process and resulting material properties.
- Modeling of growth processes and film properties.
- Degradation mechanisms linked to phase and microstructure stability and interdiffusion.
- Multifunctional coatings with advanced applications in tribology, optics, data storage, (bio)sensing and emerging technologies.
- Development of methods for characterization of nanomaterials.
- Biomedical and pharmaceutical applications of coated materials.

List of confirmed invited speakers:

- T. Belmonte (Institut Jean Lamour, University of Lorraine, Nancy, France): Advanced processes for plasma synthesis of nanostructures.
- V. Chirita (Linköping University, Linköping Sweden): Computational studies (DFT and MD) dedicated to thin film growth and materials properties.
- F. Reniers (Chani, ULB, Belgium): Atmospheric pressure plasma for the synthesis of functional plasma polymer films.
- A. Manakhov (National University of Science and Technology, Moscow, Russia): Multifunctional bioactive nanostructured thin films for biomedical applications.
- E. Neyts (University of Antwerp, Antwerp, Belgium): Modeling and simulating dynamic processes in reactive systems at the atomic and molecular scale.
- M. Quintana (University of San Luis Potosi, San Luis Potosi, Mexico): Utilization of carbon-based nanoparticles in biomedical applications.
- E. Sardella (Istituto di Metodologie Inorganiche e dei Plasmi, CNR, Bari, Italy): Polymeric films and nanomaterials .
- D. Thiry (ChIPS, University of Mons, Mons, Belgium): Development of nanostructured plasma polymers by self-organization methods.
- A. A. Voevodin (University of North Texas, Denton, USA): Plasma assisted PVD processes for the fabrication of functional materials for electronic and optoelectronic devices.
- A. Vladescu (National Institute for Optoelectronics, Bucharest, Romania): Multifunctional coatings with advanced applications in energy-relevant fields.

Publication:

The symposium proceedings will be published in the journal «Thin Solid Films» (Elsevier Ltd.) after a standard peer-review processing.

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Symposium M

Block-copolymer self-assembly: fundamentals and applications

Self-assembly of block copolymers can be used to design and control the shape and dimension of resulting nanostructures. The versatility and scalability of this method makes them highly attractive for the synthesis of advanced materials. They represent a potent platform for fundamental studies at the nanoscale and application-driven investigation.

Scope:

The symposium focuses on the self-assembly of block copolymers, reporting recent advances in the understanding of their basic properties and latest progresses towards their technological exploitation.

Block copolymers can hierarchically self-assemble into chemically distinct domains with size and periodicity on the order of 10-100 nm, offering a potentially inexpensive route to generate large-area nanostructured materials. A large variety of distinct periodic morphologies (spheres, cylinders, lamellae and gyroids) can be obtained by proper selection of the macromolecules. The final structure characteristics of these materials are dictated by the properties of the elementary block copolymers, like chain length, volume fraction or degree of block incompatibility.

Modern synthetic chemistry offers the possibility to design these macromolecules with very specific length scales and geometries, directly embodying in the macromolecules the "code" that drives their self- assembling process. However, much remains unknown about the ultimate capabilities of block-copolymer self-assembly, especially as new materials push the limits of size, fidelity, and complexity. The understanding of the kinetics and thermodynamics of the block copolymer self-assembly process in the bulk phase as well as in thin films represents a fundamental prerequisite toward the exploitation of these materials as a tool for the fabrication of functional nanostructured materials. Incorporating block copolymer into device fabrication procedures or directly into devices, as active elements, will lead to the development of a new generation of devices fabricated using the fundamental law of nature to our advantage in order to minimize cost and power consumption in the fabrication process.

In the next coming years this area of research, at the intersection between fundamental science and technology, is expected to disclose additional insights in the physics of the self-assembly process and to delineate unforeseen applications for these materials. The workshop is expected to define a platform for the discussion of the main challenges in this research field bringing together scientists, engineers and students working on all the aspects of block copolymer self assembly, from fundamental physics and chemistry issues to the final application in functional devices.

Hot topics to be covered by the symposium:

- Synthesis of new block copolymer materials
- Theory, modeling, and simulation of the self-assembly of block copolymers
- Block copolymer self-assembly for lithographic applications
- Conductive and ionic block copolymers for electronic, optoelectronic and photovoltaic applications
- Block copolymers for membrane fabrication
- Metrology of block copolymers
- Directed self-assembly of block copolymers
- The controlled assembly of block copolymers in solutions, in the bulk, and in thin films
- Kinetics and thermodynamic equilibrium of block copolymers

List of confirmed invited speakers:

- Jillian M. Buriak, University of Alberta
- Teruaki Hayakawa, Tokio Institute of Technology
- Igor I. Potemkin, Lomonosov Moscow State University
- Yeon Sik Jung, Korea Advanced Institute of Science and Technology (KAIST)
- Alexander Boker, Fraunhofer-Institut für Angewandte Polymerforschung IAP
- Thomas H. Epps III, University of Delaware
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Symposium N

Nanostructures for phononic applications

Heat and vibrations have traditionally been regarded as sources of loss. Today, however, phonons can be controlled and manipulated, particularly in nanoscale materials. This symposium aims at addressing fundamental issues related to phonon transport and the design of nanostructures for phonon manipulation.

Scope:

Recent years have witnessed an enormous progress in the growth and design of nanostructures and now materials with unprecedented level of purity and structural quality are available. Present experimental capabilities are such that nanostructured features of the same characteristic length of phonons, the quantized vibrations of the crystal lattice, can be obtained. This enhanced degree of control in material design opens the way to a wealth of new strategies to control and manipulate phonon transport. The thermal conductivity of a material can be purposely suppressed, to engineer an efficient thermoelectric; thermal budget, which otherwise can be the bottleneck of the performance of many nanoelectronic devices, can be lowered; phonons can be used to encode logic function in devices analogous to their electronic counterparts, such as diodes and transistors; mechanical waves with frequencies within a specific range are not allowed to propagate within the periodic structure in phononic crystals. On the other hand, nano-mechanical vibrations can also be thought of as standing acoustic waves and hence as discretized, low frequency acoustic phonon modes. Additionally, cavity optomechanics explores the parametric coupling of a mechanical resonator to an optical cavity mode.

The progress in nanoscale thermal transport strongly depends on the development of reliable methods to precisely determine all the relevant parameters, ideally at the level of the individual nanostructure. The most pressing issues involve the precise measurement of the thermal conductivity and the determination of contact thermal resistances. Within this scenario, the predictive power of the state-of-the-art theoretical methods is becoming increasingly important, both to assess and help interpreting the results of the measurements and possibly providing guidelines for the design of new experiments. These include solution from first-principles of the Boltzmann Transport equation, for a quantitative prediction of the phononic properties of bulk materials and molecular dynamics calculations, which, despite capturing often only qualitative trends, allow addressing distinctive features of the nanostructuring, such as complex interfaces, or surface roughness.

Hot topics to be covered by the symposium:

- Theoretical methods for phonon dispersion and phonon transport
- Experimental methods for probing phonons and phonon transport
- Coherent phonons and coherent phonon transport
- Thermal circuit elements and computation with phonons
- Thermoelectrics
- Phononic and phoXonic crystals

Tentative list of invited speakers:

- Baowen Li, University of Colorado, Boulder (USA) and National University of Singapore
- Gang Chen, MIT (USA)
- Georg K. H. Madsen, TU Wien (Austria)
- Tobias Kippenberg, EPFL (Switzerland)
- Pierre-Olivier Chapuis, INSA Lyon (France)
- Eva Weig, Universität Konstanz (Germany)
- Daniel Lanzillotti-Kimura, CNRS and Université Paris-Sud (France)

Publication:

Proceedings will be published by Semiconductor Science and Technology (IOP)

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Symposium O

Materials and devices for green photonics

While photonics is expected to provide high efficient and low-cost devices for telecom, data processing or sensing, green photonics additionally explores low-consuming and energy-saver optical based solutions. Appropriate material use is a key element for green photonic component development.

Scope:

The aim of the symposium is to review last developments on materials for green photonics which will very likely bring breakthroughs in photonic device performances within a short reach. Since diversified functions are required on integrated photonic circuits, relevant materials have been classified in five groups, which will also correspond to five sessions:

- Non-linearity for photonics: $\chi(2)$ and $\chi(3)$, magneto-photonics based devices
- Organic and inorganic nanomaterials for optical sources
- New materials for plasmonics: graphene, Aluminum, doped semiconductor
- Artificial nanomaterials
- Nanomaterial and nanostructures for optical sensors

For each of these topics, the purpose is to update participants on performances of recently studied materials for photonics, and to identify the most promising ones in terms of material elaboration, structuration, properties and expected device energy consumption reduction. The final objective is to shed light on these new solutions. In order to cover large view on these topics, invited talks will present state of the arts on each relevant research area, and/or focus on a recent hot research result.

Besides, since the symposium is proposed by the sino-french network PHOTONET, the additional purpose is to present the common work performed since 2015 within the network, and to enlarge the scope of its research at a European and global levels.

Hot topics to be covered by the symposium:

- Non-linearity induced by materials like chalcogenides, functional oxides, carbon-based materials
- Non-reciprocal waveguiding induced by magneto-plasmonics
- Integrated optical sources based on the combination of organic and inorganic materials
- Graphene, aluminum or doped semiconductor for plasmonic like behavior
- Metamaterials and artificial materials

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Symposium P

Solution processing and properties of functional oxide thin films and nanostructures-III

The symposium brings together researchers working in the field of solution derived metal oxides, providing an overview of the latest state of the art. The topic is focused at advanced chemical sol(ution) based synthesis and processing methods of oxide thin films, patterns and nanostructures, including composites and hybrids, and the discussion of original properties and applications thereof.

Scope:

Solution-based processing of inorganic (nano)materials is generally acknowledged to be highly flexible in terms of precursor composition, targeted substrate and processing procedures in ambient pressures, and thus can be faster and less expensive than vapor based deposition routes while providing materials with matching or even superior properties. A wide variety of methods is available, such as (non)-aqueous sol-gel synthesis, metalorganic decomposition, hydro/solvothermal growth, hot injection, microemulsion routes, etc. which yield large-area films, nanocomposites, and functional entities like nanoparticles.

Such materials achieve enhanced and/or novel functionalities which can be applied in electronics, photovoltaics, photoelectrochemical cells, sensors, actuators, energy harvesting and storage devices, memory devices, displays, lighting, magnetic sensors, spintronics, catalysis etc. In all cases, understanding the relation between the synthesis, its reaction mechanisms and the final properties of the material are key to achieving the highest performance. These functional properties can for example be greatly influenced by the grain size, crystal orientation, morphology, porosity, phase, compositional gradients, etc. all characteristics of the synthesized material, which depends largely on the synthesis and processing conditions.

The symposium will address advanced solution processing methods of nanostructured oxides and related hybrid materials with specific functionalities tailored by the processing conditions. Topics to be covered are solution synthesis, crystal structure evolution and phase growth, functional thin films, porous networks, and oxide nanostructures, including their assembly into functional components. The characterization by advanced analytical methods, establishment of processing-structure-property relationships, and the application of solution-derived oxides in forefront technologies are addressed. Finally, integration issues in realization of devices will also be discussed.

Hot topics to be covered by the symposium:

- Solution chemistry and synthesis e.g. hydro/solvothermal, precipitation, hot injection, sol-gel, etc. routes
- Green solution processing
- Oxide nanostructures (particles, wires, sheets) including core-shell, etc.
- Nano-composites and hybrid materials
- Hierarchically structured oxides
- Solution-derived (epitaxial) films
- Solution-based patterning, self-assembly and printing
- Large area and/or low temperature processing
- Solution-derived films on flexible substrates
- Structure-property relations and engineered materials
- Semiconductors and transparent conductors
- Dielectrics, piezoelectrics, ferroelectrics, multiferroics
- Optical, magnetic and superconducting materials
- Photovoltaics, energy generation/storage materials and catalysts
- Ion conductors and batteries

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Symposium Q

Aggregation-induced emission: materials, mechanism, and applications

It has been a textbook knowledge that chromophore aggregation generally quenches light emission. The conceptualization of aggregation-induced emission (AIE) breaks this common belief and provides a new stage for the exploration of practically useful luminescent materials for optical, electronic, energy and biomedical applications.

Scope:

Aggregation-induced emission (AIE) stands for an intriguing phenomenon that a series of non-emissive molecules in solutions are induced to emit strongly in the aggregate or solid state. Since the concept was first coined in 2001, the surging interest in AIE research has led to diverse AIE luminogens (AIEgens) with tunable emissions and high quantum yields approaching unity in the solid state. The weak emission of AIEgens as molecular species and their bright fluorescence as nanoscopic aggregates differentiate them from conventional organic luminophores and inorganic nanoparticles, making them ideal candidates for optical, electronic, energy and biomedical applications. AIE has been ranked #2 in research fronts for chemistry and materials science by Thomson Reuters in 2015, and the research field is expanding significantly in recent years, as evidenced by the exponentially increasing numbers of citations (e.g. 11,000 in 2014, 20,000 in 2015 and 28,000 in 2016) on this theme. In recognizing the increasing importance and activity of AIE research, we propose a symposium to focus on the development of new generations of AIEgens, understanding of the AIE mechanisms and the exploration of advanced technological applications, which will enable this exciting research area to develop further. This symposium will bring together researchers in the field to discuss the progresses, challenges and potential breakthroughs, with the hope that the booming development of AIE materials will shape the future of luminescent materials. We expect to attract around 100-120 abstracts from scientists of over twenty countries.

Hot topics to be covered by the symposium:

This Symposium will represent the latest development in the field of AIE research. To highlight the breakthrough, progress, and challenges in the design, synthesis and applications of AIEgens, we propose to focus on the following topics in this symposium: (1) fluorescent and phosphorescent AIE-based polymers, oligomers and molecules; (2) advanced AIEgens with stimuli-responsiveness (e.g., photo-, thermo-, piezo-, vapo-, acido-, chronochromisms) and the related mechanisms; (3) biocompatible AIE probes for sensing, imaging, diagnosis, therapy and other biomedical applications; and (4) applications of AIEgens in optoelectronic devices and clean energy.

Confirmed invited speakers:

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Symposium R

Solid state ionics: advanced functional materials for solid state devices

Defects, surfaces and interfaces play a major role in the transport and catalytic properties of functional materials. This symposium will focus on strategies to understand and control the functional properties of ionic and mixed conducting materials, with a view toward their application in solid state devices, such as batteries, solid oxide cells, gas sensors and memristive devices.

Scope:

The functional properties of solid state ionic devices, such as batteries, solid oxide cells (SOCs), gas sensors and memristive devices, strongly depend on mass and charge transport occurring in the nanoscale. These processes are related not only to the bulk material itself and the surrounding conditions, such as temperature, oxygen partial pressure or applied electrical field, but also on the presence of local heterogeneities, mainly point defects, grain boundaries, surfaces, dislocations and interfaces. It is increasingly common for researchers to seek novel and optimized functionalities in advanced materials through the creation of "natural" or artificial interfaces (e.g. bilayers, multilayers), controlled grain boundaries (e.g. thin films with high densities of defects) and optimized surfaces (e.g. preventing segregation or enhancing surface kinetics).

The goal of this symposium is to move from the fundamentals – the physics and chemistry of defects in solid materials – to technological applications, thus linking theory, simulations, functional properties and real applications. This symposium will provide a forum for extensive discussion and exchange of information among researchers exploring defect management in functional oxides in different contexts and diverse applications. This will include state-of-the-art methods for structural and chemical characterization such as high resolution transmission electron microscopy, synchrotron-based spectroscopy and diffractometry, scanning probe microscopy and atom probe tomography, combined in many cases with modeling and simulation methodologies such as density functional theory and molecular dynamics. In addition, new methodologies for engineering ionic transport in functional materials will also be one of the main topics under discussion, with special emphasis in high throughput screening, heterostructuring, doping and strain. Electrolysis, switching phenomena, photocatalysis, gas sensing, and thin film based solid state devices for energy and informatics (batteries, solid oxide fuel cells, memristors) will be some of the main applications and devices to be discussed.

Hot topics to be covered by the symposium:

Papers are solicited on (but not limited to) the following topics:

- Defect control in functional oxide interfaces, catalytic surfaces and memristive devices
- Nanoionics: mass and charge transport in the nanoscale
- Grain boundary transport
- Mass transport in bulk materials for solid state devices
- Methodologies for engineering ionic transport in functional materials: high throughput screening, heterostructuring, doping, strain, etc
- Electrolysis of CO₂ and H₂O
- Switching phenomena
- Photocatalysis
- Thin film based solid state devices for energy applications: batteries, solid oxide fuel cells, etc.
- Gas sensors and memristive devices

Confirmed list of invited speakers and tentative title of the presentation:

- Jürgen Fleig, TU Wien, Austria, "Interfacial phenomena in multifunctional heterostructures"
- Roger A. De Souza, Aachen University, Germany, "Grain boundary characterization and modeling"
- David Diercks, Colorado School of Mines, US, "Atom probe of grain boundaries"
- John Paul Strachan, HP labs, CA-San Jose, USA, "Revealing the origin of switching and failure mechanisms in memristive devices by spectroscopy"
- Susanne Hoffmann-Eifert, FZ-Juelich, Germany, "The role of interface reactions in memristive device heterostructures"
- Nini Pryds, DTU, Denmark, "High mobility oxide heterostructures for nanoelectronics"
- William Chueh, Stanford, USA, "'CO₂ / H₂O electrolysis"
- Jennifer Rupp, MIT, USA, "Solar-to-Fuel Conversion Reactor Materials"
- Peter Bruce, Oxford, U.K., "Oxygen redox cathodes for Li-ion batteries"
- Eugene Kotomin, Max-Planck Institute, Stuttgart, Germany, "Ab-initio modelling of oxygen vacancies in perovskites"
- Jose Santiso, ICN2, Barcelona, Spain, "Misfit dislocations in complex oxide epitaxial thin films"
- Igor Lubomirsky, Weizmann Institute, Israel, "Electromechanic and inelastic effects in oxygen deficient ceramics"
- Yan Chen, South China University of Technology, China, "Electrochemical reaction processes near the surface and interface of oxide materials"
- Ainara Agüero, Imperial College London, U.K., "Electrocatalyst for oxygen evolution and reduction reactions"
- Christian Jooss, University of Göttingen, Germany, "Defect control at catalytic surfaces"

Tentative list of scientific committee members:

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Symposium S

Polymer and hybrid thin films from innovative deposition techniques to functional devices

Polymers are essential components of functional devices in alternative or in combination with inorganic materials. Their synthesis as thin films has significant advantages due to the reduced amount of supply used and faster processing times. Their low cost, ease of fabrication and the ability to be easily integrated into processing lines, make them attractive functional materials.

Scope:

Polymer films are currently garnering more recognition in thin-film industry that historically has been dominated by inorganic films. Functional polymer thin films (< 100 nm) are typical components of modern devices in a variety of fields, including microelectronics, biotechnology and microfluidics. The need for miniaturization and structuration has boosted the development of advanced thin film growth techniques that can be easily implemented in the manufacturing steps of device production. As free-standing structures, two-dimensional thin films have advantages over bulk materials due to their large surface-to-volume ratios, desirable for applications requiring enhanced surface interactions. Thin films can also be employed as coatings over bulk materials to achieve application-specific properties that are unattainable in the substrate material. The combination of polymers with inorganics can drive to innovative hybrid functional materials.

Recent efforts are dedicated to conceive innovative deposition techniques that are versatile platforms for fabrication of a wide range of polymer thin films preserving all the desired chemical functionalities. The retention of the functional groups of polymers is critical to achieve the desired response. Not only, polymer thin films to be successfully integrated into functional devices require a combination of properties: chemical structure, micro- and/or nano- scale topography, porosity, durability, stiffness/elasticity, surface energy, etc. Each of these properties needs to be optimized to for the specific application. The control of the film properties requires tuning of the thin film deposition parameters, which in return requires a thorough understanding of the underlying mechanisms of deposition.

The symposium will be dedicated to advanced functional polymer and hybrid thin films with particular highlights on the correlation between polymer properties and functionality and to innovative deposition techniques that allow tuning and controlling the polymer properties. The focus will be on polymers synthesized by vapor phase deposition that provide ultrathin layers (<100 nm), conformal coverage, with low defect/impurity levels.

Hot topics to be covered by the symposium:

Areas of particular interest will include, but not limited to, the following topics:

- Functional Polymer Thin Films and their application in microfluidics, sensors, biomaterials, pharmaceuticals, healthcare, energy, etc.
- Innovative Deposition Techniques, which retain the chemical functionality: initiated CVD, oxidative CVD, downstream/pulsed/low power plasma CVD, parylene deposition, Vapor Deposition Polymerization and Molecular Layer Deposition
- Nanostructured Polymer and Hybrid Thin Films, including hierarchical structures, nanocomposites, multilayers.
- Rational Design of Polymer Thin Film Properties to achieve the desired functionality, including engineering surface and interfaces properties.
- Surface Modification/Functionalization approaches

List of confirmed invited speakers:

- Malancha Gupta, University of South California, USA,
- Salvador Borros, IQS School of Engineering, Universitat Ramon Llull, Barcelona, Spain
- Gozde Ozaydin-Ince, Sabanci University, Istanbul, Turkey
- Kenneth Lau, Drexel University, USA
- Stacey Bent, Stanford, USA
- Mustafa Karaman, Selçuk University, Turkey
- Piero Favia, University of Bari, Italy
- Shannan O'Shaughnessey, GVD, USA
- Sal Baxamusa, Lawrence Livermore National Lab, USA
- Reeya Jayan, Carnegie Mellon University, USA
- Nicolas Boscher, Luxembourg Institute of Science and Technology, Luxembourg
- Tobias Voss, Technical University Braunschweig, Germany
- Maarit Karppinen, University of Aalto, Finland
- Andreas Greiner, University of Bayreuth, Germany
- Jane Chang, UCLA, USA
- Hossein Sojoudi, University of Toledo, Spain

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Symposium T

Engineering of functional materials with chemical coating methods

The aim of this symposium is to provide a forum to discuss current trends and cutting-edge research on the engineering of functional materials and devices based on tailored chemical coating methods, both in 2D (thin films) and in 3D (nanostructures, nanocomposites and heterostructures).

Scope:

Functional materials displaying magnetic, ferroelectric, superconducting, optical and catalytic properties provide the platform for a wide range of technologies including computation, communication, and energy conversion and storage, thus they are essential in our everyday lives. In order to go beyond the state of the art in these applications, new materials and combinations of materials with dedicated, finely tuned functionalities need to be developed with emphasis on nanostructures, thin films, nanocomposites and organic/inorganic hybrids. In all these cases, where the surface- and interface-related effects start to become dominant over the bulk counterpart, adequate coating fabrication tools are crucial to provide precise control at the nanometer scale. Chemical routes (i.e. atomic layer deposition, chemical solution deposition, electrodeposition) are flexible low-cost deposition routes that allow for tailoring the physical properties through the chemical precursor and type and conditions of growth, especially when epitaxial growth is desired. It is also interesting to compare the complementarity of these techniques with traditional chemical vapor deposition and physical deposition techniques as well as the technological advances to develop and integrate processes in a cost and energy efficient process consumption for scale up. Advanced characterization tools, in-situ and ex-situ, are necessary to understand the relationship between synthesis and properties to design materials for a specific application.

Contents of the symposium:

- Preparative methods: ALD, CVD, CSD, galvanic methods
- Areas of applications: renewable energy conversion (photovoltaics, catalysis, energy storage), information technology and communication (data storage and sensing)
- In-situ monitoring of film growth and ex-situ characterization

Hot topics to be covered by the symposium:

- Thin coatings, multilayers, heterostructures
- Hybrid and nanocomposite coatings
- Novel deposition processes for improved coatings
- Gradient thin films (chemical, strain)
- Role of surface chemistry in film properties
- 2D materials formed into 3D structures
- Advanced characterization in-situ and ex-situ
- Upscaling approaches

Confirmed list of invited speakers:

- J.Dendooven (f) (Department of Solid State Science, Ghent University-Belgium) «In-situ characterization of atomic layer deposition coatings»
- P. McNally (m) (Electronic Engineering, Dublin City University, Ireland) «Copper halide nanostructures for quantum electronic applications»
- P. Poedt (m), (Holst Centre/TNO, Eindhoven, The Netherlands) «Spatial ALD and roll-to-roll for conformal coatings»
- F. Rivadulla (m) (Universidad Santiago Compostela, Spain) "Polymer assisted deposition of epitaxial thin-film oxides with different functionalities"
- N. Schneider (f) (IRDEP Paris, France) "Nanomaterials synthesis and functionalization in Energy Technology"
- R. Ameloot (m) (KU Leuven, Belgium) "Nanoporous thin films from the vapor phase: chemical vapor deposition of metal-organic frameworks (MOF-CVD)"
- Y. Surendranath, (m) (MIT, Harvard, USA) "Electrochemical energy conversion with surface chemistry and thin film approaches "
- P. Wasserscheid (m) (Erlangen, Germany) "SILP: catalysis in thin ionic liquid layer in porous materials"

Confirmed list of scientific committee members:

- A.J.M. Mackus (TU Eindhoven, The Netherlands)
- C. Bae (SKK University, South Korea)
- A. Carretero-Genevri (CNRS, France)
- J. Gazquez (ICMAB, Spain)
- B. Noheda (U.Groningen, Netherlands)
- A. Yanguas (Argonne National Laboratory, USA)
- A. Borrás (ICMS, Spain)
- M. Creatore (Technical University of Eindhoven, The Netherlands)

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Symposium U

Advanced materials and architecture for organic, printable and bio-inspired photonics

Photonics is one of the key enabling technologies and plays a central role in fields such as information and communication technology and health-care. Novel and more performing organic and hybrid materials offer major improvements in photonic applications.

Scope:

Photonics deals with light generation, transmission, modulation and detection and has been identified as one of the key enabling technologies (KETs) by the European Union. It relies heavily on the development of novel and more performing materials based on organic and hybrid semiconductors that allow fabrication of low cost, flexible and lightweight photonic devices such as amplifiers, switches, sensors and lasers. Despite the recent advances in the field, there are still several key issues to be investigated for organic photonics to yield its full potential. Biomimetic and bio-inspired photonics has also been a tremendous source of inspiration for the whole photonic areas, albeit with a limited, so far, intellectual cross-fertilisation with the photonics of organic, printable and hybrid semiconductors.

This symposium aims at filling this gap, by reviewing recent breakthroughs in organic photonics and biomimetic/biologically inspired photonics, specifically by bringing together world-class researchers in the field from both academia and industry. The multidisciplinary and intersectorial programme will focus on: (i) materials chemistry and synthesis, including supramolecularly-engineered, bio-inspired and perovskite-like materials; (ii) characterisation of fundamental optical and surface properties, including ultrafast and transient spectroscopy and scanning probe microscopies; (iii) design and fabrication of photonic devices, including high-resolution lithographic techniques and device modelling, and with a view to quantum computing platforms; (iv) characterisation, modelling and exploitation of bio-mimetic photonic structures; (v) biocompatibility of organic semiconductors, also with a view to implantable photonic devices such as artificial retinas.

Hot topics to be covered by the symposium:

- Supramolecular, bio-inspired and perovskite-like materials
- Ultrafast and transient spectroscopy
- Modelling and simulation of photonic devices (LEDs, Lasers, EO modulators, PVs, quantum computing prototypes)
- High-resolution lithographic techniques
- Microcavity and photonic crystal lasers
- Unconventional lasing: polariton and random lasing
- Biomimetic photonic structures
- Photonic-enhanced bio-chips, biosensors, lab-on-chip devices
- Organic-semiconductors based and/or biophotonic applications (artificial retinas etc.)

Tentative list of invited speakers:

- G. Lanzani (Istituto Italiano di Tecnologia, Italy)
- H.L. Anderson (Oxford University, U.K.)
- F. Wurthner (University of Würzburg, Germany)
- B. Fraboni (University of Bologna, Italy)
- G. Malliaras (Mines ParisTech, France)
- C. Silva (University of Montreal, Canada)
- N. Stingelin (Georgia Institute of technology, USA)
- V. Mattoli (Istituto Italiano di Tecnologia, Italy)
- C. Brabec (Erlangen University, Germany)
- H. J. Snaith (Oxford University, U.K.)
- D.D.C. Bradley (Imperial College London, U.K.)
- A. Zayats (King's College London, U.K.)
- J. Hofkens (University of Leuven, Belgium)
- D. Norris (ETH, Switzerland)
- R. Krahne (Istituto Italiano di Tecnologia, Italy)
- U. Scherf (Bergische Universität Wuppertal, Germany)

Tentative list of scientific committee members:

- D. Comoretto (University of Genova, Italy)
- P. Ho (National University of Singapore)
- G. Barillaro (University of Pisa, Italy)
- R. H. Friend (University of Cambridge)
- S. Hayes (University of Cyprus, Cyprus)
- A. Petrozza (Istituto Italiano di Tecnologia, Italy)
- D. Lidzey (University of Sheffield, U.K.)
- F. Scotognella (Istituto Italiano di Tecnologia, Italy)
- R. Sapienza (King's College London)
- A.L. Giesecke (AMO GmbH, Germany)
- K. Müllen (MPI Mainz, Germany)
- C. Soci (Nanyang Technological University, Singapore)
- T.M. Brown (Rome, Italy)
- U. Steiner (Freiburg, Switzerland)
- L. Manna (Istituto Italiano di Tecnologia, Italy)
- I.D.W. Samuel (St. Andrews, U.K.)

Symposium organizers

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Symposium V

Epitaxial integration of dissimilar materials: challenges and fundamentals

We aim to bring together researchers who co-integrate complementary functionalities by the heteroepitaxial growth of dissimilar materials. The challenges due to the heterogeneity of materials properties will be at the heart of the symposium, with both experimental and theoretical points of view.

Scope:

Desirable physical functionalities (e.g. charge transport, photonics, ferro- or piezo-electricity, magnetism, spin-dependent effects, thermal phenomena) can be realized in well-defined crystalline materials (SiGe, III-Vs, Heusler alloys, etc.) but some also in organic materials such as molecular semiconductors. For applications as diverse as low-power optoelectronics for the Internet of Things, biosensors, energy harvesting and quantum or neuromorphic computing, it is highly promising to deeply integrate multiple functionalities into a single "hybrid" material system. Among the possible strategies to achieve integration, heteroepitaxy of dissimilar materials may be able to provide both very large scale integration of new functionalities, compatibility with existing technological platforms and hence cost reduction. However, this approach faces the challenges of materials property heterogeneity between dissimilar material groups: chemical mismatch, lattice mismatch, crystal structure and polarity, 2D/3D growth, incompatible growth kinetics, etc. As ever more ambitious heteroepitaxial systems are investigated, now is a perfect time to bring together researchers working in different hetero-material systems to explore the common theme of property integration across dissimilar materials. The symposium will span a wide range of hetero-integration strategies (e.g. III-V/Si, oxides/semiconductors, organic/inorganic, 2D materials on 3D templates). It will cover both theoretical and experimental approaches to understanding and overcoming the problems associated with each hybrid material strategy, such as interfacial effects, extended defects and chemical mixing/segregation. Experimental topics will include both synthesis and advanced characterization (e.g. atomic-scale microscopy, neutron or X-ray diffraction / reflectivity). Theoretical topics will include both ab initio property prediction and multi-scale modelling approaches to heteroepitaxy (e.g. Monte Carlo, phase-field, molecular dynamics).

Hot topics to be covered by the symposium:

- 2D materials (Graphene, Chalcogenides, h-BN, phosphorene) interacting with 3D materials.
- Group III-V semiconductors (arsenides, phosphides, nitrides and antimonides) on group IV semiconductors (Si, Ge, Sn or SOI).
- Oxides (Functional perovskites, ZnO, ferroelectric, piezoelectric) on semiconductors (group III-V or group IV).
- Organic semiconductors on conventional semiconductors (III-V or Si) or on 2D materials.
- Integration of topological and chiral materials

Each topic will include state-of-the-art contributions on epitaxy, advanced characterization (e.g. atomic resolution microscopy) and cutting-edge theory (e.g. multi-scale modelling).

Symposium organizers

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Symposium W

Hybrid materials: state of the art and new frontiers

The field of advanced multifunctional hybrid materials has seen a rapid and exponential growth as a result of the synergy between academics and researchers. To exert a major impact on society the next generation of hybrid materials will call for a deeper involvement of industrials and will foster the use of new approaches and paradigms of materials science.

Scope:

In the last decades, the continuing demand for adaptable and multifunctional materials and devices with less weight, less volume, higher performance and cheaper has urged the materials science community to devote considerable efforts to design, synthesize, characterize and develop useful innovative high-tech hybrid material systems, often bio-inspired, with a wider range of applications. This challenging materials strategy aims at solving the major problems of a modern society with serious concerns in terms of energy, building, information storage, environmental pollution, transportation, health, and nutrition. The design of such innovative key hybrid material systems relies on a deep knowledge of the basic scientific concepts behind the establishment of organic/inorganic interfaces. It is accepted nowadays that this strategy will benefit extraordinarily from a more important involvement of industrials, who will hopefully help driving hybrid materials faster to reach potential markets.

The next generation of hybrid materials will profit from the new synthetic approaches and new design concepts which emerge everyday in the domain of materials science. It will be thus of the utmost interest to join researchers from different scientific fields in a forum of discussion which will promote the development of new ideas and will certainly lead to new fruitful collaborations. The symposium, as cross-disciplinary as the previous E-MRS symposia of this series, will emphasize the latest breakthroughs and approaches in materials science prone to being adopted for the development of the next generation of advanced (multi)functional hybrid materials with enhanced features and improved properties for the production of systems and devices with high performance. The new frontiers established in this research area will be highlighted. The symposium will encompass researchers, academics and industrials from classical domains, such as chemistry, physics, biology, materials science and engineering, but will also urge the participation of members from other potential key areas, such as aeronautics, space, solar, building construction, among others.

Hot topics to be covered by the symposium:

- "Building block" approach to multifunctional materials
- Adaptable/complex/hierarchical functional systems
- Scale-up and process adaptation
- Bio-inspired synthesis
- Green production routes
- Larger scale fabrication
- In situ study of hybrid materials growth/engineering/modeling
- In operando, in vivo studies
- Hybrid materials for electronics/spintronics
- Hybrid materials for energy storage/conversion
- Hybrid materials for pharmaceuticals/theranostics
- Hybrid materials for an aging society
- Hybrid materials in nutrition/nutraceuticals
- Hybrid materials for aeronautics/space
- Hybrid materials for biomedicine
- Hybrid materials for civil engineering
- Hybrid materials for solar applications

List of confirmed invited speakers and topic/title of the presentation:

- Andreas Friedrich, German Aerospace Center, Germany, Fuel cells
- Alex Boeker, Fraunhofer Institute of Applied Polymer Research, Germany, Biohybrid systems
- Christina Wege, University of Stuttgart, Germany, Tobacco mosaic virus hybrid materials for electrodes & electronics
- Danielle Laurencin, Institut Charles Gerhardt de Montpellier, France, Boronides
- Dong Ha Kim, Ewha University, Korea, Responsive polymers and plasmonic coupling based sensors
- Elvira Fortunato, Universidade Nova de Lisboa, Portugal; Sustainable hybrid materials applied to flexible electronics
- João Rocha, University of Aveiro, Portugal, Functional MOFs and microporous silicates
- Marcel Mayor, University of Basel, Switzerland, Nanoelectronics
- Pedro Gómez-Romero, Catalan Institute of Nanoscience and Nanotechnology, Spain, Hybrid electroactive materials for hybrid energy storage
- Stéphane Parola, University of Lyon, France, Composite sol-gel materials for optical applications

List of confirmed scientific committee members

- Christian Bonhomme (Pierre et Marie Curie University, France)
- Clément Sanchez (Collège de France, France)
- Guido Kickelbick (University of Saarbrücken, Germany)
- Jeff Brinker (The University of New Mexico, USA)

Publication:

We have made special arrangements with the Beilstein Journal of Nanotechnology (www.BJNANO.org) to collect selected works related to this topic as a thematic series (special issue).

All submissions will undergo a standard peer-review process and publications will be collected together as they are published. This is a unique opportunity to publish your original research as a review article, research article or letter in an open access platform, without any costs for submission.

BJNANO is a Q1 physics/materials science journal with a 2016 JIF of 3.1. The Beilstein-Institut fully supports this 100 % non-profit journal.

Please see the instructions which will be sent to you via e-mail regarding how to submit.

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Symposium X

Photon-assisted synthesis and processing of materials in nano-microscale

After more than fifty years since its "birth", the laser is a modern, efficient and elegant tool, with applications in physics, chemistry, biology, analytics, material science, medicine, space and security. The proposed symposium provides an interdisciplinary forum to discuss recent progress in the area of laser-matter interaction and photon processing of materials for basic and applied research.

Scope:

The main pillars of laser-matter interaction, synthesis, processing and diagnostics will be covered from the nanosecond to the femtosecond time scale, pointing at the fabrication and characterization of nanostructures, thin films, heterostructures, for fundamental and applied research. The symposium will have a cross-discipline framework based on physics, chemistry, and the various theoretical modeling aspects of photon-matter interactions.

Current and futuristic applications in materials engineering from nano to microscopic scale will be discussed, including application in optoelectronics, biomaterials, sensors, nanocatalysis and electronics, synthesis of non-conventional materials with Free Electron Laser, medicine and non-contact art restoration. In addition to laser light, the interaction of high-energy photons for photochemical processing is also among the scientific topics of the symposium. The photo-induced chemical reactions and material modifications are of wide interest for the processing of organic, inorganic and biological surfaces, as well as for a number of industrial applications.

Hot topics are methods that overcome the optical diffraction limit, 3D nano and micro fabrication (including fabrications buried inside a material), growth of innovative nanostructures for applications ranging from photonics to bio-engineering, ultrashort high intensity lasers and applications, eco-design through processing of photovoltaic cells, thermoelectric materials and devices, micro and nanosystems for energy storage and conversion.

This symposium will focus on the inherent interdisciplinarity of laser and photon materials processing thus offering to all participants of the E-MRS conference a multidisciplinary forum covering a wide range of fundamental and applied applications.

Bringing together young scientists with experts in the field of photon materials processing will promote the discussion of exciting ideas as well as the transfer of knowledge to the next generation of scientists.

Hot topics to be covered by the symposium:

- Laser nanostructuring and nanoparticle generation
- Laser processing of soft matter (polymers, biomaterials): LIFT, MAPLE
- Pulsed laser deposition of thin films: interface phenomena
- Ultrashort high intensity laser pulse; interaction with materials
- Laser-based spectroscopy and plasma diagnostics
- Ripple formation in fs laser ablation of metals and ceramics
- Ultrafast probing techniques and results
- Laser ablation in art restoration/conservation
- FEL direct synthesis of functional materials
- Nanophotonics and Biophotonics
- 3D processing of material and applications
- Industrial applications of Laser Patterning
- Multiphoton processing by chemical reactions: multiphoton polymerization, reduction or modification with ultrashort laser pulses

Tentative list of invited speakers:

- Patrick Hoffmann, EMPA, Switzerland
- James Lunney, Trinity College Dublin, Ireland
- Maria Farsari, FORTH IESL, Greece
- Ionela Vrejoiu, University of Cologne, Germany
- Chantal Leborgne, GREMI Orleans, France
- David Geoghegan, Oak Ridge National Lab, USA

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Symposium Y

New developments in the modeling and analysis of radiation damage in materials

Energetic particles (including electrons, neutrons, ions and photons) are widely used to modify materials or to emulate extreme environments. Particle/solid interaction usually generates damage whose formation mechanisms and subsequent evolution must be precisely characterized. This symposium provides a forum to discuss recent progress in the modeling and analysis of radiation damage in materials.

Scope:

Energetic-particle irradiations are widely used both in the industry and in academic research laboratories to tune the physical properties (e.g. by ion doping) and microstructure of materials (e.g. nanopatterning, thin film growth, phase change) or to emulate radiation environments such as those encountered in space and nuclear reactors. Particle/solid interactions usually lead to (micro-)structural and/or chemical changes. In the case of controlled irradiation-induced material modifications, part of these changes may be deleterious as they can degrade the material properties (although there exists irradiation-defect engineering) and they are therefore considered as damage. On the other hand, when energetic particles are used to reproduce specific radiation environments, changes are purposely generated to evaluate the radiation-resistance of materials. Yet, in both cases, i.e. whether the damage is desired or suffered, its accurate characterization and fine description is a mandatory issue to tackle for the development and optimization of advanced materials and irradiation processes.

In this framework, the recent years have seen the development and improvement of experimental characterization techniques, computational tools, theoretical models and codes for data fitting. In addition, new ways to generate, emulate and simulate damage, either via computational methods or using innovative platforms delivering particle beams, are constantly being developed. The aim of this symposium is therefore to provide a forum for researchers to present and discuss new developments and findings in the generation, observation, description, and modeling of irradiation-induced damage in materials. Special focus will be given to techniques, protocols, and methodologies allowing damage quantification. The coupling of experimental and computational characterizations will also receive particular attention. Finally, recent progress in in situ measurements, small-scale testing as well as improvements of conventional techniques to investigate radiation damage will also be addressed. To finish, this symposium is cross-disciplinary on a wide range of materials including metals, semiconductors, and ionocovalent materials with different dimensionality (e.g. 0D quantum dots, 1D nanowires or tubes, 2D thin film materials and 3D bulk materials) and on a broad range of irradiation conditions, experimental techniques and computational simulations.

Hot topics to be covered by the symposium:

Generation, description and quantification of the radiation damage in materials includes the following topics:

- Phase transformations, micro-structural changes, and surface effects
- Defects and disorder at different length, space, and time scales
- Quantitative analysis of radiation disorder
- Simulation and modeling of damage formation and evolution
- Experimental techniques for particle irradiation, characterization techniques and data-fitting codes

List of invited speakers:

- Diana Bachiller Perea (ACS – Orsay/Madrid, France/Spain)
- "Ionoluminescence: an efficient sensor of radiation-induced defects"
- Alexandre Boule (CNRS / Univ. Limoges, Limoges, France)
- Radiation damage in materials: coupling X-ray diffraction with multi-scale numerical simulations"
- Tiziana Cesca (University of Padova, Padova, Italy)
- "Energy-transfer and radiation damage in rare-earth ion-implanted silica: a photoluminescence investigation"
- Jean-Paul Crocombette (CEA/DEN/DMN/SRMP, Saclay, France)
- «Rate Equation Cluster Dynamics approach to defect evolution in irradiated ceramics»
- Sergei Dudarev (U.K. Atomic Energy Authority, Culham, Oxfordshire; University of Oxford, and Imperial College London, U.K.)
- "Simple manifestations and the multiscale complexity of radiation damage"
- Nuria Gordillo García (Autonomous University of Madrid, Madrid, Spain)
- "Study of damage induced by focused MeV ions in Diamond and its recovery after annealing by means of μ -Raman and photoluminescence"
- Emmanuelle Marquis (University of Michigan, Ann Harbor (MI), USA)
- "Quantification of irradiated microstructures using atom probe tomography"
- Christophe Ortiz (CIEMAT, Madrid, Spain)
- "A BCA-MD method to simulate high-energy collision cascades in irradiated materials: Application to materials for Fusion"
- Gihan Velisa (Oak Ridge National Lab, TN, USA)
- "On the quantification of irradiation-induced damage evolution in concentrated solid-solution alloys»"
- Elke Wendler (University of Jena, Jena, Germany)
- "Modelling of damage accumulation in ion implanted materials"

List of scientific committee members:

- Eduardo Alves, University of Lisbon, Lisbon, Portugal
- Charlotte Becquart, University of Lille, Lille, France
- Maria José Caturla, University of Alicante, Alicante, Spain
- Flyura Djurabekova, University of Helsinki, Helsinki, Finland
- Thomas Jourdan, CEA-Saclay, Saclay, France
- Sergei Kucheyev, Lawrence Livermore National Laboratory, Livermore (CA), USA
- Giovanni Mattei, University of Padova, Padova, Italy
- Lionel Thomé, CNRS/IN2P3, Orsay, France
- Christina Trautmann, GSI Helmholtzzentrum, Darmstadt, Germany
- William J. Weber, University of Knoxville, Knoxville (TN), USA

Symposium organizers

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Symposium Z

Scanning probe frontiers in molecular 2D-architecture world

Scanning probe microscopy (SPM) remains a central tool to gain atomistic details of molecular surface assemblies. For weakly adsorbed species, the formation of a 2D monolayer is mostly driven by intermolecular lateral interactions. SPM can reveal such subtle features to facilitate the engineering of 2D crystal with designed functional properties.

Scope:

The main scope of this symposium is about gathering the international community involved into the development and advancement of an atomic scale description of molecular assemblies through scanning probe microscopy (SPM) techniques. SPM are mostly used to describe structural properties of assemblies, but they are also used to probe more specific properties and to support strategies for building 2D molecular systems with new functionalities. The property description with SPM may go from the simple structural imaging of a molecular island on a surface to a more accurate determination of the intermolecular energy within the units of this island, and possibly its growth mechanism. The emergence of SPM techniques that are coupled to a spectroscopic (FTIR, Raman, XPS, etc.) probe may reveal additional information related to electronic, electrical, magnetic or vibrational properties of assemblies at the atomic scale. The improving knowledge and understanding of intermolecular interactions obtained from SPM also contribute directly to the strategy for creating more specific molecular building blocks, for designing and producing well defined assemblies, and for predicting the influence of new functionalities of modified molecular building blocks. This symposium will strongly encourage the presentation of experimental and theoretical works that explore and contribute to extent the limits of SPM techniques.

Hot topics to be covered by the symposium:

- New approaches in SPM
- Supramolecular 2D frameworks
- Multilayer architecture
- Molecular surface pattern origami
- SPM in nanometrology
- High speed high resolution imaging
- Atomic and molecular manipulation
- Dual SPM-spectroscopy techniques.

List of invited speakers:

- Markus Lackinger (TUM, Germany)
- Saw-Wai Hla (ANL, USA)
- Matthew Zimmt (Brown Univ., USA)
- Johann Coraux (Néel Institute, France)
- Dong Wang (ICCAS, China)
- Federico Rosei (INRS, Canada)
- Bruno Grandidier (IEMN, France)
- Willi Auwärter (TUM, Germany)
- Fabrizio Cléri (IEMN, France)
- Muriel Sicot (Univ. Lorraine, France)
- Dimas Oteyza (EHU, Spain)
- Laurent Limot (Univ. Strasbourg, France)
- Meike Stohr (RUG, The Netherlands)
- Dmitrii Perepichka (McGill Univ., Canada)
- Guillaume Schull (Univ. Strasbourg, France)
- Christian Loppacher (IM2NP, France)
- Andrew Mayne (Paris Sud, France)
- Peter Grutter (McGill Univ., Canada)
- Gwénaél Rapenne (CEMES, France)
- Johannes Barth (TUM, Germany)

- Philippe Leclère (Univ. Mons, Belgium)
- Ruben Perez (UAM, Spain)
- Nian Lin (UST, Hong Kong)
- Sylvain Clair (IM2NP, France)
- Trolle Linderoth (INano, Denmark)
- Wei Xu (Tongji Univ., China)
- Shengbin Lei (Tianjin Univ., China)
- Mauro Sambi (Univ. di Padova, Italia)
- Mathieu Abel (IM2NP, France)
- Oussama Moutanabbir (PolyMTL, Canada)
- Steven Tait (Indiana Univ., USA)
- Roberto Otero (UAM, Spain)
- Fabrice Charra (CEA, France)
- Giovanni Costantini (Univ. Warwick, U.K.)

List of keynote speakers:

- Angelika Kuhnle (Mainz Univ., Germany)
- Paolo Samori (Univ. Strasbourg, France)
- Yoshito Tobe (Osaka Univ., Japan)
- Werner Hofer (Newcastle Univ., U.K.)
- Roman Fasel (EMPA, Switzerland)

Scientific committee:

- Gregory Lopinski (NRC, Canada)
- André Gourdon (CEMES, France)
- Mauro Sambi (Univ. di Padova, Italia)
- Xavier Bouju (CEMES, France)
- Steven de Feyter (Leuven, Belgium)
- Frédéric Chérioux (FEMTO-ST, France)
- Alain Rochefort (PolyMTL, Canada)
- Nian Lin (UST, Hong Kong)
- Willi Auwärter (TUM, Germany)

Symposium organizers

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Symposium AA

Strength, plasticity, fracture and fatigue behaviour controlled by interfaces and grain boundaries

It is known that interfaces, grain boundaries, phase boundaries, and surfaces play a crucial role in determining material strength and deformation mechanisms. Recent developments in mechanical testing and high-fidelity modelling techniques have made it possible to correlate interfacial phenomena with mechanical response.

Scope:

Understanding the mechanics of interface dominated materials is of fundamental importance because it simultaneously allows for the exploration of new properties at the smallest length scales as well as provides a basis for understanding multiscale phenomena that originate at these length scales. This symposium will focus on recent developments in the fields of mechanical testing and modelling behaviour of nano-objects, thin films and bulk nanostructured materials, focusing on the governing mechanisms for improved strength, fracture and fatigue (mechanical and thermal) behaviour as well as advanced characterization methods of interfaces, grain boundaries, and surfaces. Thin film and small volume mechanical behaviour has been explored for many years using several different in-situ and ex-situ techniques (nanoindentation, TEM, SEM, micro-XRD, etc), however, the need for new or improved testing techniques for the coupled measurement of electrical, magnetic, or shape memory properties under stress are also of interest - for example, changes in resistance due to micro-cracking or materials degradation. Furthermore, the enhanced understanding of microstructures that influence fatigue and fracture in thin films and nanostructured materials is of interest. The combination of advanced testing techniques and simulation methods will improve the knowledge related to strength, fatigue and fracture of surfaces, interfaces and grain boundaries dominated materials.

Hot topics to be covered by the symposium:

- Mechanical and thermal fatigue of thin films and nanostructured materials
- Influence of microstructure and/or interfaces on fatigue damage development
- Nano- and microscale characterization of interfaces;
- 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.

Tentative list of invited speakers:

- Frederic Sansoz (The University of Vermont, USA)
- T. Pardoen (UCL, Belgium)
- David Armstrong (Oxford, U.K.)
- Cynthia Volkert (Uni. Göttingen, Germany)

Tentative list of scientific committee members:

- Daniel Kiener (Dept. Material Physics, Montanuni. Leoben)
- Gerhard Dehm (MPIE, Düsseldorf, Germany)
- Angus Wilkenson (Oxford, U.K.)
- Clarissa Yablinsky (LANL, USA)
- Benoit Devincre (LEM-ONERA, Châtillon, France)

Symposium organizers

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Symposium BB

Current trends in optical and X-ray metrology of advanced materials for nanoscale devices V

Photonic probes are an essential tool to characterize novel materials, since they can be non-destructive and are sensitive to many of the critical characteristics of the materials. This symposium will explore the use of photons from terahertz to x-ray to characterize materials essential for many emerging technologies.

Scope:

This symposium will explore recent advances in photonic characterization of novel materials used in applications as varied as renewable energy, medical applications, and art restoration. Visible photons are very easy to produce and manipulate, and have the proper energy to characterize semiconductor materials, such as might be found in solar cells. Infrared and terahertz photons much lower energy and are harder to produce and manipulate, but give information about lattice vibrations and impurities in materials. X-rays are much higher energy, and therefore can explore material characteristics such as lattice spacing and atom identification. This international symposium is intended to give an overview of the current status and future trends of optical, terahertz, infrared and x-ray metrology used to characterize nanoscale and other materials essential for many emerging technologies. Particular attention will be placed on materials essential for renewable energy and health applications, particularly ellipsometric characterization of solar cells. In addition, the optical and x-ray techniques used as analytical tools to study art and other cultural artifacts will be explored, with a particular emphasis on the understanding of the mechanisms of aging and stabilization. Another emphasis of the symposium will be on use of larger facilities, such as synchrotrons, which produce x-rays with characteristics beyond the capability of laboratory light sources. An important consideration in this symposium will be on the actual characteristics measured, as well as the limits of the technique.

In addition to the scientific objectives, we will promote and encourage the interaction between worldwide scientists, particularly from Europe, USA and Asia now working in these fields. Interactions between academics, national lab scientists and instrument manufacturers will be encouraged to improve standard analytical methods and qualification of newer techniques suitable for addressing the needs for the emerging technologies of the future.

Hot topics to be covered by the symposium:

- Ellipsometric techniques (Mueller Matrix, Infrared, THz, time-resolved)
- X-ray diffuse scattering
- Ellipsometric and other studies of photovoltaic materials
- X-ray synchrotron sources and techniques developed to explore thin-layered materials of micron dimensions as well as single crystals.
- Spatially resolved optical and x-ray techniques.
- Characterization of complex materials such as graphene, graphene oxide, Hybrid perovskites, 2D semiconductor materials, nanotubes and nanowires, nanoporous materials and composites.
- Characterisation of new or advanced concepts of solar cells.
- Nanostructures, photonic crystals, and metamaterials; plasmons at interfaces and in nanostructured materials.
- Dielectrics and ceramics: low- and high-k materials; transparent semiconductors, ferroelectrics, ferromagnetics

Symposium organizers

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Symposium CC

Cultural heritage-materials, techniques and knowledge perspectives on a common identity

Cultural Heritage (CH) consists of tangible and intangible, natural and manmade, movable and immovable assets inherited from the past. It is our legacy and what we pass on to future generations. Access, preservation and education on CH are essential for humankind evolution representing an irreplaceable source of life, inspiration and unity.

There is a general need for further studies and research to better understand the dynamic relationship between heritage conservation and the various dimensions it involves, from Natural Science for CH, Digital Science for CH, the use of advanced and big Infrastructures, as well as implications of sustainable development, with particular attention to the effect on CH produced by natural hazards and climate change effects.

Scope:

Managing cultural heritage while aiming for sustainable development and managing sustainability while redeveloping cultural heritage are most relevant and challenging tasks in view of the European Commission proposed European Year of Cultural Heritage for 2018 (<http://ec.europa.eu/culture/news/20160830-commission-proposal-cultural-h...>) There is a general need for improved studies and research to better understand the dynamic relationship between heritage conservation and the various dimensions of sustainable development. The ever-constant development and evolution of societies, technology and environment promotes the need for a close cooperation between CH researchers, professionals, students, policy makers, authorities and people in general for the understanding of our common memory and identity and its rich national, regional and local diversity.

This Symposium intends to be a common ground where challenges and solutions in the knowledge of arts, archaeology and ancient technology can best be answered by the application of methodologies, techniques and solutions generally used in Materials Science. The Symposium sponsors an interdisciplinary exchange in expertise stimulating the development of new and improved materials related to preservation and conservation science addressing questions on weathering, restoration strategies, climate change and anthropic pressure on movable and immovable CH, with the aim to advance our understanding of material culture.

The Symposium will stimulate and encourage scientific research devoted to the sustainable development of CH and to the positive contribution of cultural heritage management towards a sustainable environment, by promoting innovative research and practices and improving the compatibility of current materials and methods and the development and applications of emerging solutions.

This Symposium will provide a multidisciplinary forum for cutting-edge scientific and technological issues in art, archaeology and all cultural heritage concerns and perspectives involving the large and varied community of international experts. Contributions for this symposium will explore and enhance the importance of Materials Science, and the use of its analytical techniques, in understanding ancient objects, the technologies used to produce them, and the mechanisms of aging, stabilization and consolidation. The Science for conservation includes the experts in Natural Sciences applied to the Cultural Heritage, the specialists of Digital Heritage Science. Hence, the Symposium provides a multidisciplinary forum for scientific and technological issues in art, archaeology, building conservation and preservation

Hot topics to be covered by the symposium:

- Current and emerging technologies
- Large scale facilities for CH (Synchrotron, neutron and ion beam)
- Non-destructive methodologies
- New sustainable solutions in terms of methodologies and materials
- Multi-scale imaging
- From wide area observation to ground based technologies
- Monitoring environmental conditions (outdoor and indoor contaminants and pollution)
- Modelling and Theoretical approaches
- Early stage research and use of tailored methodologies
- Ecological sustainability
- Expertise and authentication
- Dating CH
- Metrology for CH
- Effects of climate changes
- Hydro-geological and seismic risks
- Remote monitoring
- Maintenance and sustainability Risks management
- Case Studies
- Social impact of CH
- Tourism and economy
- Innovative protocols for CH
- Best practices and legislation

Symposium organizers

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Practical information

Practical information

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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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/accommodation.html>

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 ENGLISH

ABSTRACT SUBMISSION

Deadline for abstract submission: January 18, 2018.

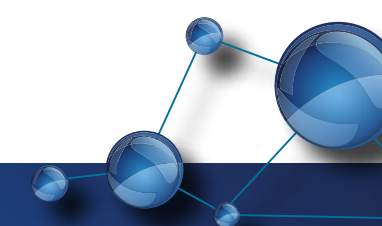
Abstract Length: submissions are limited to 1500 characters. (including spaces, only plain text, no figures, no formulae...)

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 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 March 7, 2018 at the latest.



Practical information

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 June 9. If you do not have an E-MRS account on our website, you need to create one before 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, June 17 at 15:00.

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

On-site payment hours:

Sunday June 17 - 15:00 - 18:30
Monday June 18 - 7.30 - 18.00
Tuesday June 19 - 8.00 - 18.00
Wednesday June 20 - 8.00 - 18.00
Thursday June 21 - 8.00 - 18.00
Friday June 22 - 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 May 15, 2018 595 EUR net**
- **AFTER May 15, 2018 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 May 15, 2018 340 EUR net**
- **AFTER May 15, 2018 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)

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

Bank transfer:

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Paying Bank: CRONENBOURG MITTEL
Account: ASS E MRS
IBAN: FR76 1470 7500 1111 1913 8543 942
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Other modes of payment

Practical information

- Purchase order (bon de commande) - to be sent by May 15 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 June 1st which will cause a €25 processing fee. No refunds will be issued on requests postmarked after June 1st. 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 June 18 (14:00 - 19:00)

Exhibition hours:

Tuesday June 19 - 9:30 - 18:30 pm
Wednesday June 20 - 9:30 - 18:30 pm
Thursday June 21 - 9:30 - 16:30 pm

Dismantling: June 21, after 16:30

PLENARY SESSION

A plenary session is scheduled for Wednesday afternoon June 20 .

Symposium organizers, Graduate Student Award, EU-40 Materials Prize, and 35th anniversary awards will be honored at the end of the session.

SOCIAL EVENT

A reception is being arranged for all the conference participants on Wednesday evening June 20 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.

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

Free 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.



Practical information

TRAVEL INFORMATION

REACHING STRASBOURG

Strasbourg enjoys excellent national and international connections, with a TGV high-speed train station with direct access to trains in the city center.

by air

Strasbourg-Entzheim International Airport

Strasbourg airport is just 10 minutes from the city center by connected train to the railway station. It offers several flights a day to and from Lyon, Nice as well as some international connections, for example Amsterdam, Bruxelles, London, 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.

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 there trains run to Strasbourg, normally with one change in Offenburg. From station to station the journey is about 45m-1hr.

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

Frankfurt International Airport (Germany) 2h30 away from Strasbourg by express bus and is the nearest intercontinental airports to Strasbourg. 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 SQUAIRE WEST ». You can also take a train from Frankfurt to Strasbourg.

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



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Event: E-MRS 2018 SPRING MEETING

Valid for travel from 13/06/2018 to 27/06/2018
Event location: Strasbourg, France

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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.

Frequent flyer / loyalty programs of Air France and KLM partner airlines are credited with «miles» when Air France or KLM flights are used.

* not available in certain countries
** subject to conditions

Practical information

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 or airport (at least one change)

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 companies, 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).

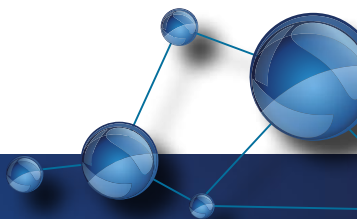
The Strasbourg-Mulhouse route joins it to the rest of the French motorway network. Strasbourg is fifteen minutes from the Hamburg-Frankfurt-Basel-Genova

or Milan motorway, itself linked to the entire European motorway network.

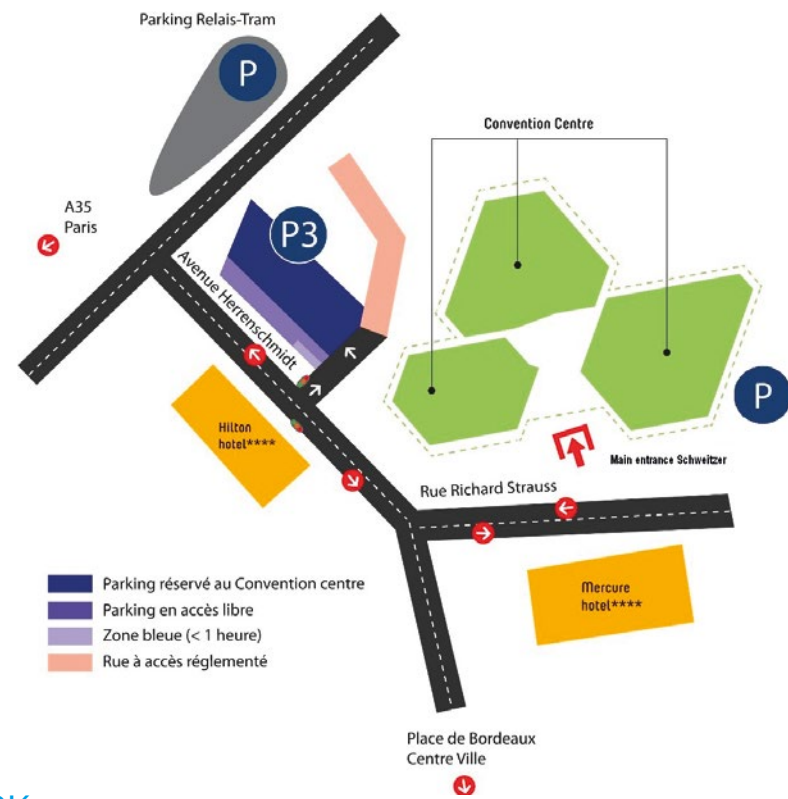
REACHING THE CONGRESS CENTRE

- 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
- 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

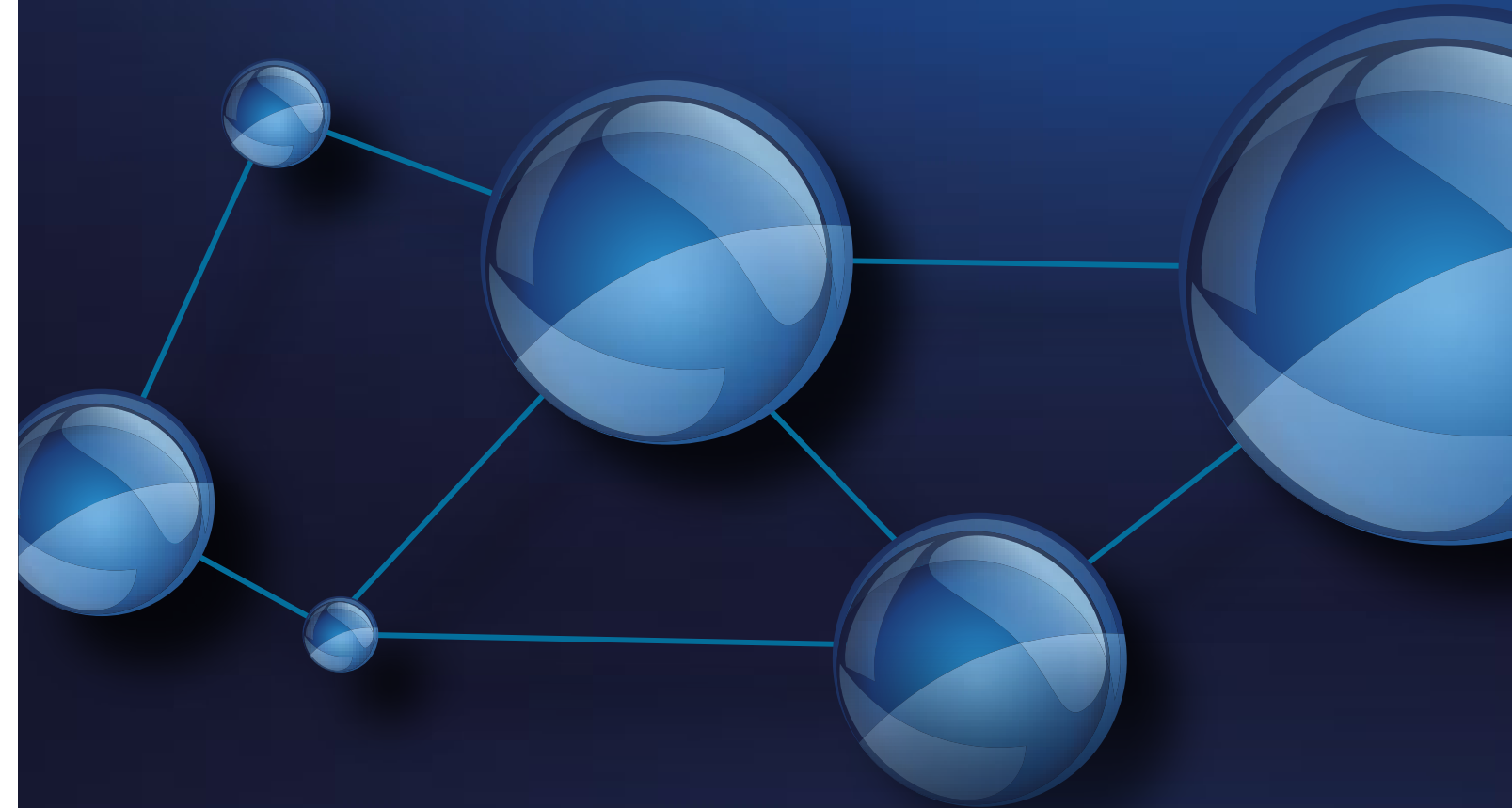
[More details on the next page](#)



PARK AT THE CONVENTION CENTRE



TRAM NETWORK



E-MRS
BP20
67037 Strasbourg Cedex 2
France

Motif de non distribution / Not deliverable for the following reason :

- Adresse insuffisante / Insufficient address
- Inconnu / Unknown
- Refusé / refused
- Parti sans laisser d'adresse / Moved without leaving address
- Autre / Other