



European Materials Research Society

Spring Meeting 2016

From May 2nd to 6th
Lille Grand Palais - France

Call for papers
deadline for abstract submission:
15 January 2016



E-MRS

European Materials Research Society

Spring Meeting 2016

Announcement for 2016 Spring Meeting

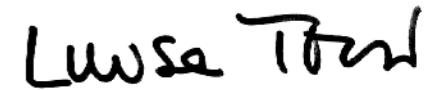
It is my great pleasure to announce the 2016 Spring Meeting of the European Materials Research Society (E-MRS) to be held in the beautiful town of Lille in France from the 2nd to the 6th of May. In line with the previous editions it is foreseen that this event will be the largest in Europe in the field of Materials Science and Technology. Indeed, we expect thousands of delegates coming from all over the world to attend the 31 parallel symposia, the three workshops, the exciting poster sessions as well as our exhibition and, last but not least, the plenary session. All technical sessions and non-technical events will be conveniently held at the Lille Grand Palais.

The high quality scientific programme will span over a wide spectrum of topics encompassing the latest findings in the most exciting fields of materials science. Among the chosen topics particularly relevant are those related to hybrid and adaptive materials, semiconductive and transparent materials, bio-materials and materials for energy. Nano and 2D materials will also have their dedicated forum. The focus will be both on fundamental investigations as well as on technological applications.

Additional key features of the conference will be the workshops on sustainable solutions for restoration and conservation of cultural heritage as well as on advanced materials and technologies for renewable energies. A one day symposium on function-assembly of nano-materials towards electronics, energy and biological applications will also be offered. Highlight of the Spring meeting will be the continuation of bilateral symposia with other MRS societies. For the Spring 2016 conference E-MRS is planning for five one-day symposia jointly with the MRS-Japan under the general theme of "Materials Frontiers" including transparent materials theory, deposition, characterization, electronics and oxides for environmental applications. In addition, a major exhibition of equipment manufacturers, book editors and service units will be organized.

This very exciting programme is complemented by the plenary session, taking place on Wednesday afternoon, with two outstanding speakers, Prof. Dr. Joachim Maier, of Max-Planck-Institut Stuttgart, Germany, and Prof. Stéphanie P. Lacour, of Bertarelli Foundation, Ecole Polytechnique Fédérale de Lausanne (EPFL), Lausanne, Switzerland. This central session will continue with the Reach out Award and the EU-40 Materials Prize. The latter is a prestigious prize awarded to researchers under 40 who are showing exceptional promise for leadership and have made outstanding and innovative contributions to Materials Research in Europe. Who feels that she/he complies with such a profile is encouraged to apply by February 29, 2016. The presentation of the Graduate Students Awards will conclude the plenary session.

I look forward to see you numerous in Lille where it will be my pleasure to welcome you and do not forget that the deadline for abstract submission is January 15, 2016!



Luisa Torsi
E-MRS Elected President for 2016



September 2015

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PLENARY SESSION

(Wednesday afternoon-May 4th)

Symposium organizers, Graduate Student Award, EU-40 Materials Prize, Reach.Out! Award winners will be honored at the end of the plenary session on Wednesday afternoon, May 4

E-MRS AWARDS

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

EU-40 MATERIALS PRIZE

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

The award consists of a 5,000 Euro cash prize, a certificate, waiver of the meeting registration fee and a plenary talk at the 2016 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 29, 2016.

The nominee shall not have reached his/her 40th birthday in the year in which the nomination is submitted (2015). They will be evaluated shortly after and the proposers will be informed end of March 2016.

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 2016 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 2016 Spring Meeting as an attendee and author or co-author of a symposium paper.
 - Outstanding performance in the conduct of this project and promise for future substantial achievement in materials research as judged by the faculty advisor.
 - Significant and timely research results.
- Application materials required:
- Application form under www.european-mrs.com

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

Submit the complete application to the E-MRS Secretariat. Deadline for complete application is April 5, 2016. Winners will be notified directly by the concerned symposium organizer. E-MRS Graduate Student Award Winners must be present during the plenary session to get their prizes.

EXHIBITION

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

To be held on May 3 – 5 in the Congress Center of Lille (Grand Palais), 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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 Phone: +33 3 88 10 63 72
 Email: emrs@european-mrs.com

SOCIAL EVENT CONFERENCE RECEPTION

All participants are invited to attend the conference reception on Wednesday May 4, 2016 at 19:30. 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.

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Reach.Out! Competition

Take part in the Reach.Out! 2016 Competition! Introduce an advanced materials topic of your choice to the public!

Reach.Out! is a science communication competition that aims to engage the members of the European Materials Science community (students, scientists, engineers, researchers etc) who have designed, organised and implemented a public outreach activity in the EU between May 2015 and the 31st of March 2016.

This outreach activity must be related to Advanced Materials and its main aim must have been to uncover, to the non-specialists, one or more of the following aspects of work within this field: its applications, its impact on the creation of sustainable societies, its impact on the economy, the people behind the scenes, the complexity of the work done, and of course, possible controversies etc.

Eligibility

Entrants must be individuals of 18 years old or more, and members of the European Materials Science community, i.e. currently studying or having studied a relevant subject at University (from undergraduate to doctoral level), or working in the science, technology or engineering of Advanced Materials. Their project may be a result of personal or team work.

Procedure

The selection of the winners will be achieved by a judging committee, consisting of distinguished researchers and science communicators.

The finalists will be selected based on the following criteria:

- **Impact:** The number of people that the project has reached, its aims and how they were met, its social or economic aspects, the stakeholders' gain and feedback, etc.
- **Accuracy:** The project must be scientifically correct, and must also be relevant to the field of Advanced Materials.
- **Innovation and Creativity:** The originality, the creativity and the innovation involved in the project will be also evaluated.

Project ideas may include

(but not be restricted to) tools like:

- Popular science articles (printed or digital)
- Blogging
- Storytelling
- Experimental exhibitions and science shows
- Theatre or stand-up comedy shows
- Videos or mini documentaries
- Café scientific talks or presentations
- Science and Art blending
- Games (mental or physical skills games, digital or real-life ones)
- Musical composition or song writing

Deadline

All application materials must be sent by APRIL 15, 2016 at nathalie.geyer@european-mrs.com

The finalists will be announced at the Reach Out! Award Ceremony held during the plenary session, on Wednesday May 4.

Award benefits

According to the jury's ranking, three prizes will be awarded, accompanied by a diploma.



This competition is organized in the frame of the project Stimulate, which received funding from the European Union's Seventh Programme for research, technological development and demonstration under grant agreement No 608995.

Programme

Materials

- A** Hybrid materials: from the laboratory to the market
- B** Adaptive materials: devices and systems towards unconventional computing, sensing, bio-electronics and robotics
- C** Laser-material interactions for tailoring future applications
- D** Solid state ionics: defect interactions and their influence on ionic and electronic transport
- E** Substitution of critical raw materials: synthesis, characterization and processing of new advanced materials in optoelectronic and magnetic devices
- F** Advanced materials for printing
- G** Molecular systems for spintronics
- H** Tailored disorder - an advanced materials design for innovative photonic applications
- I** Functional oxynitride films for sustainable development
- J** Established and emerging nanocolloids: from synthesis & characterization to applications II

Semiconductors

- K** Group IV semiconductors materials research - growth, characterization and applications to electronics and spintronics
- L** Wide bandgap materials for electron devices
- M** Silicon compatible materials and integrated devices for photonics and optical sensing
- N** Materials frontier for transparent advanced electronics II (E-MRS / MRS-J bilateral symposium)
- O** Group IV semiconductors at the nanoscale - towards applications in photonics, electronics and life sciences

Biomaterials

- P** Carbon materials: surface chemistry and biomedical applications II
- Q** Smart biointerfaces for functional biomaterials
- R** Multifunctional nanostructures for diagnostic and therapeutic of diseases
- S** Biomimetic bioactive biomaterials – the next generation of implantable devices

Energy

- T** Advanced materials and characterization techniques for solar cells III
- U** Materials by design for energy applications
- V** Thin film chalcogenide photovoltaic materials
- W** Materials and systems for micro-energy harvesting and storage
- X** Functional materials for environmental sensors and energy systems

Nanomaterials

- Y** Graphene and related materials: from fundamental science to applications
- Z** Two dimensional crystals and van der Waals heterostructures for nanoelectronics
- AA** Solution processing and properties of functional oxide thin films and nanostructures II
- BB** Defect-induced effects in nanomaterials
- CC** In situ studies of functional nano materials at large scale facilities: from model systems to applications
- DD** Light interaction with nanomaterials
- EE** Carbon- or nitrogen-containing nanostructured thin films

Workshops & Tutorials

- FF** Sustainable knowledge and preservation of Cultural Heritage for future generations
- GG** Advanced materials and technologies for renewable energies - AMREN-2 (5 - 6 May 2016)
- HH** Function-assembly of nano-materials towards electronics, energy and biological applications (one day symposium)

Symposium A

Hybrid materials: from the laboratory to the market

Hybrid materials can nowadays be made with diverse chemical, biological, and physical properties. One central problem is bringing advanced hybrid materials to a larger market, where they can really benefit a large number of people worldwide. If this problem is, however, solved, hybrid materials will be key in providing better lives to humanity.

Scope:

The demand for new materials and devices has led to a tremendous research activity exploring the possibilities offered by various kinds of functional building blocks to design matter for a virtually unlimited number of different applications. As such, hybrid materials have provided useful and not otherwise accessible materials in all fields of modern technology, ranging from health and nutrition to electronics, sensing, energy, buildings, and transportation, to just name a few important fields. The field has expanded far beyond the historical borders of chemistry and has "spilled over" into biology, physics and engineering, leading to a "blurring" of the classical disciplines. This challenging yet extremely powerful interaction between different fields point is one of the key drivers for further innovation, as combining concepts of many disciplines results in the realization of new systems with peculiar chemical, physical, or biological properties.

Such systems have obvious usefulness and market potential. Yet the market potential has in many cases remained a mere "potential" and many hybrid materials have, in spite of their interesting and highly promising properties, not made it into the markets. In order to design better materials, to transfer much more knowledge from the science-oriented laboratories to the manufacturing companies, there is a need to much better connect academia and industry and to provide industry-capable materials and processes. Therefore, cross-disciplinary approaches involving academia, technology development and startup companies, and larger companies will be crucial to a successful further development of the field. From top to bottom, flexible processing, self-assembly, self-organization, particles shaping, chemical bonding should be investigated to respond to the ever-growing need in designing new performing materials regarding their use for energy, information storage, sustainable development, health care and theranostic (bio-sensing, imaging and cargo particles). A particular focus should be on the transfer to suitable processes for larger scale developments and subsequent market entry.

Therefore, cross-disciplinary approaches will be specially emphasized, as well as some frames regarding toxicology and legislation concerning hybrid materials. The symposium, intrinsically multi-disciplinary, will be dedicated to forefront research and development advances and be a very valuable and stimulating forum for researchers and developers in bioscience, chemistry, physics, materials science and engineering where to discuss the latest advances and issues in the design of smart organic/inorganic based devices.

Hot topics to be covered by the symposium:

- Bio-inspired synthesis and larger scale materials fabrication
- Green production routes to hybrid materials
- In situ study of hybrid materials growth, engineering and modeling
- In Operando, in vivo studies
- Hybrid materials for electronics and spintronics
- Hybrid materials for energy applications
- Hybrid materials for pharmaceutical and theranostic application
- Hybrid materials for an aging society
- Hybrid materials in nutrition and nutraceuticals
- Adaptable and complex systems
- Scale-up and process adaptation

Tentative list of invited speakers:

- Joao Mano (Portugal), biomaterials & soft matter
- Renald Bakov (France), Integrative chemistry for rational syntheses of advanced functional materials
- Etienne Duguet (France), hybrid nanoparticles
- Rachel C. Evans (Ireland), photochemistry, optical devices
- Joachim Bill (Germany), protein/inorganic hybrids, energy & electronic
- Thomas Körzdörfer (Germany), computational, solar cells, energy
- María-Pau Ginebra (Spain), biohybrids, biominerilization
- Chris Weder (Switzerland), very soft materials, nanoparticles, hydrogels, nanomachines
- Thomas Hirt (Liechtenstein), dental materials, Ivoclar Vivadent
- Emmanuel Stratakis (Greece/Crete), Tissue Engineering, Ultrafast Laser Micro- and Nano-processing, Near-Field Probing Techniques
- Anna Martinelli (Swe), ionic liquids, fuel cells, physical chemistry
- Stephen Mann (UK)

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Symposium B

Adaptive materials: devices and systems towards unconventional computing, sensing, bio-electronics and robotics

Adaptive materials are strategic for bio-inspired systems, capable of parallel processing, learning and decision making that is for unconventional computing. The symposium covers all related materials and interfaces issues in particular with reference to biological benchmarks, neuromorphic computational paradigms and bio-electronics.

Scope:

In the challenging and fast growing field of unconventional computing the integration and optimization of materials properties, design and fabrication of devices and systems and modelling are becoming more and more relevant to the advances and perspective of the field. A major novel aspect that is being proposed for the first time by the symposium is the perspective of integrating competences coming from the world of sensing (in particular bio-sensing and bio-electronics) with the one of memristive devices and systems together with that of unconventional computing. The exchange of recent achievements, knowhow and challenges in the different disciplines that should contribute, is at the core of the aims of the symposium. The focus will be mainly on Memristive materials (both inorganics and organics), devices and systems, capable of learning and decision making, together with related aspects of unconventional computing concerning robotics, the integration with biological systems, bio-electronics and neurosciences. The symposium will establish a tight feedback between theoretical and experimental scientists aiming at better understanding of results and paving the way to further developments from both the materials science and technology point of views.

The organizers feel that this is a particularly stimulating intersections of very stimulating questions where the intercrossing of competences coming from worlds that have had little contacts up to know may be particularly fruitful and where bio-mimicking and bio-inspired approaches could be particularly promising aiming at stimulating projects based on converging sciences and technologies.

The material aspects will concern the composition (organic, inorganic, biological) and experimental methods of the realization of all types of single devices and networks. The involvement of the industrial participants (chairing round tables) will underline necessary actions helping the realization of commercial prototypes of the devices and systems. The only previous conference on memristive devices was organized within E-MRS 2014 spring meeting. There were about 100 participants and large interest from participants of other symposia. The present proposed symposium widens and refocus the aims and topics expecting to become a real forum that will allow a breakthrough in the improvement of the elements and networks composition, as well as methods of realization. The symposium will give novel opportunities for young scientists to improve their educational level in this cross-disciplinary field. We plan to organize at least 3 sessions, dedicated to the on-going European projects, stimulating the formation of new international teams for the European Horizon 2020 program and for other International collaborations.

Hot topics to be covered by the symposium:

The symposium will be divided in sessions, dedicated to special topics:

- Inorganic, organic and bio inspired adaptive materials and devices;
- Neuromorphic memristive networks and systems;
- Modeling of nervous system and brain function;
- Chemical and bio-inspired computing;
- Neuron networks;
- Memristive systems for biosensors, bio-electronics and robots.

At the end of the symposium we plan to organize a round table with the invitation of industry representatives for the discussion of theory-experiment relations and feedback, as well as perspectives of the industrial realization of prototypes, discussed during the symposium.

List of confirmed scientific committee members:

- Andrew Adamatzky – University of the West England (UK)
- Theodoros Zanos - Montreal Neurological Institute (Canada)
- Bert Nickel - Ludwig-Maximilians-Universität (Germany)
- Sandro Carrara - EPFL (Switzerland)
- Viktor Jirsa - Aix-Marseille Université (France)
- Zoran Konkoli - Chalmers University of Technology (Sweden)

List of confirmed invited speakers:

- Massimiliano Di Ventra, University of California (USA)
- Dominique Vuillaume, CNRS, Institute of Electronics, Microelectronics and Nanotechnology (France)
- Mirko Prezioso, University of California (USA)
- Randy Mcintosh, Rotman Research Institute (Canada)
- John Boland, Trinity College Dublin (Ireland).

Publication:

The materials of the symposium will be published in *Physica Status Solidi C* with selected papers published in *Physica Status Solidi A*.

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Symposium C

Laser-material interactions for tailoring future applications

The proposed symposium provides an interdisciplinary forum for discussing the most recent progress in advanced laser processing of materials and devices at any length scale (from nano to macro level) including very recent research fields such as biomedical applications and biotechnology. Experimental and theoretical papers as well as contributions from industry are welcome.

Scope:

Laser processing of materials is a rapidly expanding field in both fundamental science and material technology requiring a multidisciplinary approach and knowledge. The topics of the proposed symposium include laser-based materials synthesis, surface structuring and functionalization, process analytics and materials diagnostics with the special emphasis on the micro- and nano-scale. The traditional symposium addresses fundamental and applied topics and is bridging the gap between science and technology.

The meeting is intended to bring together engineers, technologists, and scientists interested in understanding and applying the above mentioned innovative laser and laser-related plasma techniques. This symposium will consist of invited presentations by leading scientists in their respective fields of research and contributed papers as oral and poster presentations. Particular attention will be given to presentations by young scientists showing top achievements. As in previous years, the submitted papers will be published in a refereed journal.

Hot topics to be covered by the symposium:

- New approaches in laser-materials interactions: fundamentals and applications in various fields (e.g. environment, biology)
- Laser 3D machining for MEMS, MOEMS and photonic crystals
- Laser Induced Forward Transfer of functional materials for organic electronics and sensing applications
- Laser/plasma production of thin films, nanoparticles, nanocomposites and novel nanomaterials
- Laser/plasma modification of surfaces and films including organic compounds and biomaterials
- Modelling of laser-materials interactions and basic mechanisms
- Processing with ultrashort laser pulses
- Time-resolved diagnostics of laser processing
- Laser machining in industry

Symposium organizers

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Symposium D

Solid state ionics: defect interactions and their influence on ionic and electronic transport

The performance of diverse electrochemical, electroceramic and memristive devices is determined by ionic and/or electronic transport processes. This symposium will focus on characterising, modelling and understanding defect interactions (also between point defects and higher dimensional defects) and their influence on transport processes in such devices.

Scope:

Many functional materials currently under consideration for application in diverse electrochemical, electroceramic or memristive devices are characterised by high defect concentrations. That is, defect concentrations exceed levels at which interactions between defects are generally expected to become important. Some notable example systems that attract much attention at present are:

- electrodes and electrolytes for solid oxide fuel cells;
- electrodes and electrolytes for lithium batteries;
- mixed ionic and electronic conducting membranes for oxygen separation;
- active zones (filaments or regions) in resistively switching devices.

The related topics of defect interactions and their influence on ionic and electronic transport have been considered to varying degrees and from varying standpoints, depending on the particular material and the particular application. The first aim of this symposium is to bring together scientists from diverse disciplines working on ionic and electronic transport processes in functional materials, with a focus on defect interactions.

As well as interactions between point defects themselves, interactions between point defects and extended defects, such as dislocations, grain boundaries and interphase boundaries, will be discussed at this symposium. The presence of an extended defect may result in the formation of a space-charge zone, may produce segregation phenomena, and may, through mechanical strain, modify defect formation and migration. In this sense, ionic and electronic transport in materials for information and energy technologies, that exhibit enhanced densities of extended defects, e.g., thin films, heterostructures, or nano-grained ceramics, is of particular interest.

For both focal points of the symposium, strong interactions between experiment and simulation is to be fostered.

Hot topics to be covered by the symposium:

- Defect chemistry of ionic and mixed conducting oxides, with emphasis on point-defect interactions
- Interface-induced defect interactions: strain fields, space-charge zones, segregation phenomena
- Ionic transport in thin films and heterostructures
- Transport processes and reactions at dislocations, grain boundaries, surfaces
- Advances in atomistic and phenomenological modelling of defect interactions and transport processes
- Novel ionic and mixed conducting materials
- In situ characterisation of transport processes in electrochemical, electroceramic and memristive devices

Tentative list of invited speakers:

- Neil Allan, Bristol University, UK, "Point-defect interactions in CeO₂ and other materials"
- Monika Backhaus-Ricoult, Corning Glass, France, "Defects at surfaces and interfaces in perovskite electrodes and their impact on global oxygen transport"
- Elizabeth Dickey, North Carolina State University, USA, "Temporal Redistribution of Point Defects in Metal Oxides: Implications for Device Conductivity"
- Regina Dittmann, Forschungszentrum Jülich, Germany, "Impact of defects on resistive switching and forming in SrTiO₃ thin film devices"
- John Kilner, Imperial College London, UK, "Fast Oxygen Transport in Mixed Conducting Oxides; Defects and Surfaces"
- David Mebane, West Virginia University, USA, "The Poisson-Cahn theory for space charge modeling near interfaces in concentrated solid electrolytes"
- Rotraut Merkle, Max-Planck Institute, Stuttgart, Germany, "Cathode materials for protonic ceramic fuel cells: which parameters determine proton concentration and mobility"

- Truls Norby, University of Oslo, Norway, "Proton defect interactions in oxides"
- Jennifer Rupp, ETH Zürich, Switzerland, "Resistive switches: Understanding and Novel Engineering Strategies of Oxygen Anionic-Electronic Defects at high Electric Fields"
- Albert Tarancón, IREC, Spain, "Artificial mixed ionic electronic conductors by grain boundary engineering"
- Kazunori Takada, National Institute of Materials Science, "Electrode/electrolyte interfaces in solid-state lithium batteries"
- Shu Yamaguchi, University of Tokyo, Japan, "Defect interaction and percolation conductivity in perovskite oxides"
- Bilge Yildiz, MIT, USA, "Elastic and Plastic Strain Effects on the Stability, Mobility and Reactivity of Point Defects in Oxides"
- Han-Il Yoo, Seoul National University, Korea, "Ion/electron interference upon their transfer in mixed condutors: its measurement, degree, innerworking, and implications"

Tentative list of scientific committee members:

- N. Allan, Bristol University, UK
- M. Backhaus-Ricoult, Corning Glass, France
- E. Dickey, North Carolina State University, USA
- J. T. S. Irvine, University of St. Andrews, UK
- T. Ishihara, Kyushu University, Fukuoka, Japan
- J. Janek, Justus Liebig University Giessen, Germany
- J. A. Kilner, Imperial College, London, UK
- T. Norby, University of Oslo, Norway
- W. Sitte, Montanuniversität Leoben, Austria
- S. Yamaguchi, University of Tokyo, Japan
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Symposium E

Substitution of critical raw materials: synthesis, characterization and processing of new advanced materials in optoelectronic and magnetic devices

The Symposium aims to attract at the EMRS meeting experienced researcher as well as industries in the field of the substitution of critical raw materials in electronic and magnetic devices to increase the synergies in this community and help in the development of new efficient devices free from Critical Raw Materials.

Scope:

Raw materials are fundamental in most technological applications, however some of them are being 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 in the European Industry.

The theme of Critical Raw Materials is fundamental to Europe's economy, and their substitution or reduction is essential for maintaining and improving the quality of life and technologies.

Different devices utilize nowadays compounds with CRMs as key elements, from lighting devices, (LED, OLED, CFL: Rare earths, like Ce, Y, Eu and Tb, In as CRMs), to optoelectronics, such as transparent conductive layers (In as CRM), permanent magnetic materials (in 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). Research is needed to improve the fundamental understanding of the development of new material solutions with a reduced or completely eliminated critical content, while maintaining or enhancing the performance of the materials, components and products.

The design of the alternative compounds, the control of growth process coupled with accurate characterization are mandatory for further development of new CRM free devices.

The symposium, organized by members of EIP RESET commitment, will provide an interdisciplinary platform to discuss about the alternatives to these materials from modelling, to the synthesis and processing up to their integration in the actual optoelectronic devices and hard magnets.

Bringing together researchers from academia and industry we would increase the interactions among scientists, engineers, students working on different aspects in this field that too often are treated separately. Experimental research and computational modelling will provide complementary views and a unique opportunity in this challenge for a sustainable technological growth.

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
- Rechargeable batteries,
- Phosphors for LED applications, Scintillators, Displays
- OLEDs
- Catalysis
- Photovoltaics
- Smart windows,
- Exchange-coupled nanocomposite magnets with less or no REEs
- New RE-free highly anisotropic magnetic materials
- New and energy efficient motors and generator technologies which do not depend on permanent magnets

deadline for abstract submission: 15 January 2016

Symposium F

Advanced materials for printing

Printed Electronics is an emerging field in which conventional printing technologies, both analog and digital, are utilized to manufacture a variety of electronic devices thanks to the development of a wide range of solution processable functional materials, including metals, insulators, and semiconductors.

Scope:

The scope of the symposium is to collect innovative ideas in the field of Printed Electronics. This subject has promised to revolutionize the manufacturing of electronic devices, achieving very low fabrication costs of large area devices thanks to additive, low temperature processes, and on the other our daily life, promoting the ubiquitous applications of microelectronics and sensors in wearable components and conformable devices. Additive fabrication process is in contrast to traditional micro-fabrication processes that rely critically on subtractive patterning. Nanostructured / nanoengineered materials are ideal additive building blocks for additive processes such as those used in Printed Electronics, since they allow control over size distribution, dimensionality and carrier wavefunctions confinement, any physical / chemical property. Traditional high throughput printing of plastic sheets, paper, fabric, is done using fast rotary machines. Printed Electronics technologies involve the same analog process, in particular screen printing, gravure printing / imprinting, flexographic printing. The contact between the transferred ink and the desired substrate, its subsequent motion under the joint influence of surface tension interaction with the substrate, the evaporation of the solvent, the time-dependent viscosity of the variable mass ink system, the interaction with the ambient in terms of temperature and humidity, the post-printing treatments to induce functional properties (e-beam, light, UV, laser, thermal, microwave, magnetic, etc.), are all examples of the aspects evaluated by actual research. Besides this, digital processing involves a layer by layer construction of two-dimensional or three-dimensional objects using a liquid ink fed into a printhead, operated by an electronic driver thanks to a transducer (piezoelectric, piezoelectric, magnetostrictive, electroacoustic, magnetohydrodynamic, etc.

Hot topics to be covered by the symposium:

- Digital Printing (thermal inkjet, piezoelectric, magnetohydrodynamic, new approaches, fully printed circuits, new functional inks like CNTs, graphene, graphene oxide, sintering, electronic, magnetic, surface and photonic properties of printed materials);
- Analog Printing (roll-to-roll, gravure, flexography, rotary serigraphy, fully printed circuits, new functional inks, electronic, magnetic, surface and photonic properties of printed materials);
- Emerging Roll-to-Roll equipments (R2R Sputtering, R2R Atomic Layer Deposition);
- Substrate Materials – Nanocellulose, Paper, Silk, Technopolymers;
- Technologies (plasma treatments, laser drilling and processing).

Tentative list of invited speakers:

- Ronald Österbacka, Åbo Akademi University, Finland – «Printed Electronics on Paper»
- Graham Martin, Uni Cambridge, U.K. - «Latest in inkjet technology»

Tentative list of scientific committee members:

- M. Caironi, Center for Nanoscience and Technology, Istituto Italiano di Tecnologia, Italy
- Jukka Hast, VTT Technical Research Centre of Finland
- Stefan Gütler, Media University, Stuttgart, Germany
- Martin Möller, DWI – Leibniz-Institut für Interaktive Materialien e.V., Aachen, Germany

Symposium organizers

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deadline for abstract submission: 15 January 2016

Symposium G

Molecular systems for spintronics

Molecular systems are attractive building blocks for spintronics, however the realization of corresponding devices and the study of their functional properties requires interaction between scientist from different disciplines (chemistry, magnetism, optics, surface science...). The symposium will review the recent advances in the field.

Scope:

Molecular/ organic spintronics is an emerging and very challenging research area that needs to be developed and exploited. It is an embryonic field that blends spin electronics with organic/molecular electronics. Organic spintronics, when compared to its inorganics counterparts, offers many advantages. From the application point of view, organic materials open the way to cheap, low-weight, mechanically flexible, chemically interactive, and bottom-up fabricated electronics. Furthermore, more efficient and innovative devices may be produced due to the expected long spin coherence time and spin-flip length, thanks to the weak spin-orbit coupling for light elements such as H, C, N... In this respect, organic material may appear either in the "passive" part of a device (eg the barrier of a magnetic tunnel junction) or in the "active" part when it intrinsically possesses a specific functionality (may it be magnetic, optic, electric...). However, interface effects have a strong impact on the electronic, magnetic and functional properties of molecules as nanostructures or when inserted in devices. This leads to the observation of new effects and novel research directions regarding fundamental studies of molecule/metal interaction, the supramolecular interactions leading to the organization of molecules on (ferromagnetic) surfaces, the development of ab initio theoretical tools to understand them and the realization of devices to study functional and multifunctional properties.

Hot topics to be covered by the symposium:

- Magnetoresistive and multifunctional devices for organic spintronics
- Spin properties of single molecules
- Interfaces and nanostructures
- Spintronics with 2D materials (graphene, chalcogenides)
- Quantum magnetism of molecular architectures

Symposium organizers

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Symposium H

Tailored disorder an advanced materials design for innovative photonic applications

Disorder, complex order, and broken periodicity are an emerging and lively research area in photonic materials, whose optical response fundamentally relies on the structural architecture. Materials that are not periodically ordered reveal novel and designable manipulation of light. Numerous important scientific achievements are reported in the areas of biology, materials science, and nano-photonics and define routes to a new design guide for innovative materials with advanced optical properties.

Scope:

Natural systems are able to produce materials surfaces with unique properties. The formation of complex three-dimensional structures in nature is of fundamental importance to break the limits imposed by available construction elements. Structuring into ordered, and especially into complex or disordered systems is the key to define new roadmaps to innovative materials engineering. The importance of disordered structures in biology can be most efficiently demonstrated on natural optical materials. It has been shown that structural disorder is most beneficial in nature and can be used as an engineering guide for the development of novel advanced photonic devices. While still in its infancy, the general subject of structural disorder is rapidly emerging into an area of interdisciplinary scientific interest. Therefore, the purpose of this symposium is to bring together specialists from various scientific communities such as physics, biology and materials science and engineering to advance the structural disorder research area based on basic and applied research with emphasis on multidisciplinary approaches and fabrication routes. Contributions from the fields of theoretical, applied and computational physics, optics and photonics in biology, materials engineering and nano-patterning are encouraged. The development of novel approaches and design routes to realize tailored disorder in materials will be one of the main topics of the symposium. Presentations not limited to various patterning procedures such as self-assembly, sol-gel procedures, solid state synthesis, soft lithography, layer-by-layer deposition with the focus on materials functions and properties are welcome.

Hot topics to be covered by the symposium:

- Advanced optics;
- Disorder in optics;
- Anderson localization of light;
- Random lasing;
- Structural optics;
- Biological optical materials;
- Bioinspired optical materials;
- Cavity quantum electrodynamics (cQED);
- Solid-state lighting, security and (quantum) authentication;
- Ultrafast all-optical switching;
- Wavefront shaping.

Symposium organizers

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Symposium I

Functional oxynitride films for sustainable development

The symposium focuses on Functional Oxynitride films. Oxygen substitution by nitrogen in oxides changes the band structure and properties of the material which may be of interest for renewable energy applications, especially solar energy converters.

In nature, nitrogen plays an essential role for several processes. Oxynitride films, Nanoparticles, Nitrogenized Perovskites, and Bio-inspired materials comprise a vast class of emerging materials with new properties. Our general interest is engaged on simpler, mastered, tunable synthesis and metastable nanocrystalline structure elaboration through nitrogen incorporation, large scale and low cost production, and critical materials replacement, re-use, recycling and green synthesis.

The large variety of Oxynitride structures make them versatile for a plethora of applications, such as photocatalysts for water splitting and organic molecule degradation, all-solid state thin film batteries, fuel cells, pigments, phosphors, selective solar absorbers, dichroic filters, or sensors based on colossal magneto-resistance effect. Application-oriented papers including electrochemical energy conversion (electrolytes, batteries, fuel cells) and emerging applications related to a sustainable development, as well as magnetic sensors will be considered.

The symposium will provide a multidisciplinary forum for the advancement in research of Oxynitride properties, synthesis and applications, seeking for their deep understanding of the nitrogen role. It will be a unique opportunity, for the researchers and the developers to share new acquired knowledge on Oxynitride and bio-inspired materials, in close connection with the requirements imposed by applications specificity.

Recycling, reuse and green synthesis will be highlighted as well as advanced synthesis processes, such as pulsed laser deposition, high power impulse magnetron sputtering, atmospheric plasma processes, nanoparticles synthesis, hybrid techniques. Papers elucidating properties and correlations with elaboration parameters, structure and reactivity are encouraged.

We call for papers giving the latest information on research and development in topics corresponding to one or more of the above-mentioned areas. All aspects covering new applications of the oxynitride functional films and nanomaterials, at the crossroads between different technologies and disciplines, will be emphasized.

The manuscripts submitted to this symposium and accepted after peer-review processing on the basis of the referee procedure adopted for regular papers will be published in the international scientific journal "Surface and Coatings Technology" by Elsevier.

The following hot topics would be particularly highlighted:

- Comparison with Nature : from photo-synthesis to artificial photo-electrochemical water splitting reactions
- Sustainable energy-relevant and environmental-relevant applications using Oxynitride
- Correlations between properties and synthesis, composition, multi-scale structure
- Synthesis development (hetero-epitaxial growth, high power impulse magnetron sputtering)
- Physical and chemical properties
- Degradation mechanisms, regenerating, re-use and Biocompatibility
- Development of characterization methods and device analysis.

Scientific committee:

J. Alvarez (France), F. Alvarez (Brazil), F. Vaz (Portugal), A. Borisova (Ukraine), A. Cavaleiro (Portugal), F. Cheviré (France), V. Craciun (USA), M. Dialet (South Africa), M. Dinescu (Romania), K. Domen (Japan), K. Ghafarzadeh (UK), A. Gonzalez-Elipe (Spain), N. Herlin-Boime (France), M.C. Hugon (France), S. Kikkawa (Japan), P. Kelly (UK), J.P. Kleider (France), N. Laidani (Italy), L. Le Gendre (France), N. Martin (France), T. Minea (France), M. Nistor (Romania), G. Paddeletti (Italy), P. Patsalas (Greece), L. Petrik (South Africa), I. Petrov (USA), J.F. Pierson (France), N. Radic (Croatia), R. Sanjines (Switzerland), J. Schneider (Germany), L. Sirghi (Romania), F. Tessier (France), A.-L. Thomann (France), J. Vlcek (Czech Republic), L. Zagonel (Brazil), Yan Ye (USA).

deadline for abstract submission: 15 January 2016

Invited speakers:

- J. Paul Attfield, University of Edinburgh, United Kingdom
- Fabien Capon, University of Lorraine, Institut Jean Lamour, Nancy, France
- Stefan Ebbinghaus, Martin Luther University Halle-Wittenberg, Germany
- Claude Grison, Université Montpellier 2, France
- Tatsumi Ishihara, Kyushu University, Japan
- Thomas Lippert, Paul Scherrer Institute, Switzerland
- Daniel Ruddy, National Renewable Energy Laboratory, USA

Graduate student awards (GSA):

A 'special oral session' will be organized during the symposium for selected candidates of the GSA. A Jury Committee of three scientific experts will deliver two awards (~300 € + refunding of registration fees). To be eligible, applicants must fulfill the following criteria:

- preparing a PhD thesis in a research field covered by the symposium,
- being in charge of the presentation (oral or poster session) of one paper on a topic to be addressed in the symposium.

Selection of the finalists for the 'special oral session' of the GSA will be made on the basis of the education, research work and evaluation from their PhD's advisor.

Important dates:

- Deadline for Abstract Submission: 15 January 2016
- Notification of Abstract acceptance and final program: 25 February 2016
- Deadline for on-line manuscript submission: 31 May 2016

Symposium organizers

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Symposium J

Established and emerging nanocolloids: from synthesis & characterization to applications II

This symposium is the 2nd installment of a highly successful biennial series which began in 2014. It will present the latest research in colloidal nanostructures, from their preparation and characterization to their applications in scientific areas including optoelectronic and photonic devices as well as catalysis and biomedicine. It will cover all aspects from fundamental growth issues to novel material developments for a wide range of applications and it will blend experimental with numerical and theoretical approaches.

Scope:

Colloidal nanomaterials are part of an emergent class of materials prepared in solution and providing unprecedented levels of functionality. Such nanostructures can not only be used to study new physical and chemical phenomena in low dimensional systems but they also enable a route for the development of new technologies in key areas. Examples include communications and information processing, sensing and renewable energy, electronic and photonic devices, as well as biomedicine.

This symposium will provide a platform to discuss the preparation of nanocolloids, including well-established nanomaterials such as quantum dots and metal nanoparticles, but also emerging nanostructures such as doped semiconductors, ferroelectrics and multiferroics. Challenges linked to their applications will also be presented. Such applications include, but are not limited to, the latest developments of novel colloidal nanostructures used in catalysis, lasers, photodetectors, light emitting diodes, memory and optoelectronic devices, as well as bio-applications including MRI contrast agents, imaging and delivery carriers. This symposium will bring insight into the relevant fundamental materials and interfaces issues as well as material design, device fabrication, and functionality.

The symposium will bring together researchers working in academia and industry (see Scientific Committee composition) to stimulate interaction among scientists, engineers, students working on various aspects of colloidal nanostructures and their applications. Targeting this outcome, each session will be organized to associate experimental results, computational modeling, and theoretical presentations to complement one another and to create long-lasting opportunities of scientific interaction between attendees. Overall this symposium will favor informal interactions and will help to strengthen this community to unravel new research directions, which is the key for the ultimate success of colloidal-nanostructure based applications.

Hot topics to be covered by the symposium:

- Synthesis, characterisation and «self/triggered» assembly of Nanomaterials
- Emerging nanoscale materials: doped, ferroelectrics, multiferroics
- Bio-inspired systems and bio-applications
- Nanomagnetism and spintronics
- Colloidal plasmonics
- Photonic properties & spectroscopy of nanoparticles (optical, THz, etc.)
- Surfaces and interfaces at nanometer scales from electronic to catalysis
- Nanoparticle-molecule hybrid systems
- Energy conversion and storage
- Optoelectronic and photonic hybrid devices (LEDs, FETs, memory, sensors, etc...)

Symposium organizers

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deadline for abstract submission: 15 January 2016

Symposium K

Group IV semiconductors materials research growth, characterization and applications to electronics and spintronics

The major challenges for fundamental research and technological development are no more confined to bulk silicon and silicon devices only, but to a variety of silicon-based structures, such as alloys, nanostructured and nanocomposite materials, composite systems, thin and thick films, and heteroepitaxy on patterned silicon substrates. Their performances are still driven by defect engineering procedures, novel growth techniques, and advanced diagnostics tools. Point defects and extended defects remain in the center of interest for both electronic and photovoltaic applications; where in some cases their engineering represents an option for new functionalities, such as the case of spintronic devices.

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

Crystal growth

Modeling of defect generation and modeling of crystal growth
Crystal growth for solar applications
Control of carbon, phosphorous and boron in solar grade silicon
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

Heteroepitaxy on silicon

Selective epitaxy for advanced electronic applications
Strain engineering in strained layer epitaxy
Heterogeneous integration of Si or Ge with II-V epitaxial device quality layers
Defects at heteroepitaxial merging on patterned Si
Epitaxial deposition of nitrides and SiC on silicon substrates
Novel methods for the growth of graphene, silicene and germanene
Modelling and simulation of epitaxial structures

Epitaxial growth of group IV semiconductors

Selective epitaxy for advanced electronic applications
Strain engineering in strained layer epitaxy
Heterogeneous integration of Si or Ge with II-V epitaxial device quality layers

Thin layer technology

Deposition of amorphous and crystalline thin layers
Silicon membranes
Layer deposition for electronic and photovoltaic applications

Basic research on point defects and extended defects

Defects causing 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 and co-doping of light elements
Modelling and simulation of extended defects

Gettering and defect engineering

Gettering of metallic impurities and impurity precipitation in silicon
Interaction of metals with dopants and impurity atoms
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 sSOI devices
Silicon-based light emitting devices
Thermo-mechanical systems

Fundamental and applications of Group IV spintronics

Spin current generation, manipulation, and detection
Optical orientation and spin-photon interfaces
Spin relaxation, decoherence and dephasing
Spin-orbit interaction and Rashba field
Spin properties of vacancies in diamond, SiC and of atomic defects
Spin-dependent properties of graphene, silicene, germanene and stanene
Spin Qubits in nanostructures

Preliminary list of invited speakers:

- Cor Claeys, IMEC, Belgium
- "Technology Development Challenges for Advanced Group IV semiconductor Devices" (Plenary Talk)
- Fabio Isa, ETH Zurich, Switzerland
- "Defect engineering in the epitaxial growth of 3D SiGe crystals on Si and their merging to a suspended film"
- Giovanni Isella, LNESS, Politecnico di Milano, Italy
- "Spin current generation, manipulation, and detection"
- Matthieu Jamet, CEA/INAC Grenoble, France

deadline for abstract submission: 15 January 2016

Symposium L

Wide bandgap materials for electron devices

Wide bandgap semiconductors materials like GaN, SiC and Oxides have become serious alternatives for the replacement of silicon in power electronics and sensors devices especially in harsh environment. The aim of this symposium is to discuss the status, the remaining material issues and new routes in these fields.

Scope:

More than two decades ago, wide bandgap semiconductor materials emerged as potential candidates for high efficiency power and harsh environment devices. While SiC experienced a slow but sustained increase in substrate diameter, a good sign for cost reduction, the control of n and p doping as well as noticeable progresses in the reduction of surface and interface states led to the development of a widespread family of devices for high power applications. More, the heteroepitaxy of SiC on foreign substrates like silicon has deceived but may find opportunities in the field of sensors, especially ones operating in harsh environments where silicon fails. A first scope of the symposium will be to make a status of the present state of the art in terms of performance, material availability and economical viability of substrates, as well as homoepitaxial and heteroepitaxial SiC films for power devices and sensors. On the other hand, the massive development of GaN based devices can presently be imagined from heteroepitaxial materials on large diameter foreign substrates like Sapphire, SiC and last but not least Silicon substrates eventually followed by layer transfer process. However, many questions remain concerning the epitaxy of GaN on foreign substrates. This is the reason why another scope of the symposium will be to address the issues related to the heteroepitaxy of GaN for electron devices. In particular, the control of the III-N / silicon interface, AlN on Si nucleation layers, the solutions for strain engineering, the role of structural defects on the electrical performance, thermal properties and reliability will be addressed in this symposium. More, beyond the progresses in GaN heteroepitaxy and in SiC substrate diameter increase, some benefit can be expected from the combination with other materials like diamond, graphene etc.. Last, the symposium will address the status of Gallium and Zinc oxides as alternative wide bandgap semiconductors for electron devices.

Hot topics to be covered by the symposium:

- SiC homoepitaxy on low-offcut substrates.
- III-N on silicon : nucleation layer, interface control.
- Thermal issues in GaN and oxide devices.
- Integrating Graphene with Nitrides or SiC (direct growth, layer transfer).
- Selective area growth for new device architectures.
- Wide-bandgap materials for high performance power inverters
- Wide-bandgap materials for MEMS and NEMS
- p-type doping by implantation

Tentative list of invited speakers:

- Andrei Vescan (TU Aachen, Germany)
- GaN on silicon field effect transistors: from growth to electrical properties.
- Martin Kuball (Univ. Bristol, UK)
- Thermal issues in GaN devices: challenges and solutions.
- Rachel L. Myers-Ward (NRL, Washington DC USA)
- Challenges of the SiC/Epitaxial Graphene Interface
- Francesca Iacopi (Griffith University, Australia)
- Strain management in heteroepitaxial SiC.
- Filippo Giannazzo (CNR, Italy)
- Advanced nanocharacterization of wide bandgap semiconductors and interfaces with two dimensional materials
- Stephen Saddow (Univ. of South Florida, USA)
- Bio applications with 3C-SiC.
- Sylvie Contreras (Univ. Montpellier II, France)
- Characterizations of p-type doped SiC
- Julien Pernot (Néel Inst. Grenoble, France)
- Diamond electron devices
- Masataka Higashiwaki (NICT Tokyo Japan)
- Gallium Oxide materials for electronics
- Additional invited talks will be selected from the submitted abstracts.

Tentative list of scientific committee members:

- Daniel Alquier (Univ. Tours, France)
- Enrique Calleja (ISOM, Madrid, Spain)
- Didier Chausende (CNRS, France)
- Rebecca Cheung (SMC, Edinburgh, Scotland)
- Danilo Cripa (LPE, Italy)
- Yvon Cordier (CRHEA-CNRS, France)
- Gabriel Ferro (Univ. Lyon, France)
- Guy Feuillet (CEA, France)
- Philippe Godignon (CNM, Barcelona, Spain)
- Owen James Guy (Univ. of Swansea, UK)
- Kestutis Jarasinskas (Vilnius University, Lithuania)
- Michael Krieger (Erlangen University, Germany)
- Mike Leszczynski (Unipress, Poland)
- Alfonso Patti (STMicroelectronics, Italy)
- Fabrizio Roccaforte (CNR-IMM, Italy)
- Joachim Würfl (FBH, Germany)
- Rositza Yakimova (Linkoping University, Sweden)
- Konstantinos Zekentes (FORTH, Greece)
- Marcin Zieliński (NOVASIC, France)
- Arnaud Yvon (STMicroelectronics, France)

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deadline for abstract submission: 15 January 2016

Symposium M

Silicon compatible materials and integrated devices for photonics and optical sensing

This symposium will focus on innovative materials and devices integrated on Si platform with the main objective to bring together people involved on this topic but working in different application fields from telecommunication to sensing.

Scope:

The extensive and ever advancing miniaturization in microelectronics imposes higher and higher barriers. To master these challenges, more and more materials with highly specific properties have already been and still have to be integrated on the Si technology platform. However, this high rate of innovation does not only drive the development of microelectronics, but also creates new emerging application fields. This especially applies to integrated Si-based photonics which has an enormous bandwidth of potential applications ranging from telecommunication to optical sensing. Several classes of Si compatible materials have been explored for light emitters, amplifiers and detectors, also their coupling with plasmonic materials permits to manipulate light at the nanoscale on the Si platform. The same integrated photonic devices are recently also devoted to the emerging field of on-chip biological and chemical sensing by allowing ultra-high sensing performance and efficient CMOS-compatible readout schemes.

This symposium intends to highlight the newest developments and breakthroughs in terms of materials and their integration for photonic purposes, integrated device design and architecture, as well as advanced and innovative applications. Many topics are highly interdisciplinary and settled at the interface between optics, electronics, material science, chemistry and biology. Thus, this symposium will provide a discussion forum which brings scientists and engineers from these areas together and stimulates an exchange between academia and industry.

Hot topics to be covered by the symposium:

The symposium will include, but will not exclusively limited, to the following hot topics.

Materials science with related integration techniques:

- Si nanostructures like clusters and nanowires
- rare earth based materials
- compound semiconductor and Ge integration for light emission and detection
- C-based materials
- plasmonic materials and metamaterials

The sessions will include also the following devices and application areas:

- light emitters and detectors
- modulators, optical switches
- resonators, photonic crystals, plasmonic sensors
- integrated waveguide sensing
- building blocks for telecommunication

List of invited speakers (confirmed):

- Ryan Bailey (University of Illinois, Urbana, USA)
- Silke Christiansen (Helmholtz-Center for Materials and Energy Berlin -HZB-, Germany) "Three-dimensional silicon based nano-architectures for energy conversion and sensing"
- Philippe Fauchet (University of Rochester, USA) "Photonic crystals for sensors"
- Ewold Verhagen (FOM Institute, The Netherlands) "Nano-optomechanical sensing with subwavelength light fields"
- Romain Quidant (ICFO - The Institute of Photonic Sciences, Spain) "Nanoplasmonics for biosensing"
- Gunther Roelkens (University of Ghent, Belgium) "III-V on silicon photonic integrated circuits for optical communication and sensing"
- Ioannis Raptis (Institute of Nanosciences & Nanotechnologies (INN) NCSR 'Demokritos', Greece)
- Markus Schmidt (IPHT Jena, Germany) "Hybrid fibers: a new base for plasmonic nanopropes and optofluidic nanoparticle sensing"
- Pol Van Dorpe (IMEC, Belgium)
- Ralf B. Wehrspohn (Fraunhofer Institute, Germany) "Stable field-enhanced emission and surface ionization from silicon nano-tip arrays"

deadline for abstract submission: 15 January 2016

Symposium N

Materials frontier for transparent advanced electronics II (E-MRS / MRS-J bilateral symposium)

Research and development for wide bandgap oxide materials and their applications have been progressing pervasively, which should be the key for technologies driving the sophisticated applications needed to realize a "Ubiquitous Society" and a "Universal Design". This session will focus on "Materials Frontier for Transparent Advanced Electronics", as 2nd Bilateral E-MRS / MRS-J symposium.

Scope:

Research and development for wide bandgap oxide materials and their applications have been increasingly pervasive in many fields such as high-performance thin film transistors (TFTs/TFTs) or storage devices, renewable energy technologies, various kinds of display devices, and many other optoelectronic applications. In particular, transparent oxide semiconductors (TOSs) and amorphous oxide semiconductors (AOSs) such as indium-gallium-zinc-oxide (a-IGZO) and related materials, have attracted much attention as high-performance channel materials for thin film transistors. Moreover, transparent conductive oxides (TCOs) have also been the key enabling materials for the emerging technologies driving the sophisticated applications needed to realize a "Ubiquitous Society" and a "Universal Design". These topics will be discussed in a framework of traditional and emerging fields of oxide materials and their device applications including but not limited to: TOSs, AOSs and TCOs for high-performance TFTs/TFTs, solar cells, displays, lighting, storage, flexible electronics and other transparent electronics.

Topics to be covered by the symposium:

- Materials for transparent oxide semiconductors;
- Materials for metal nano-network transparent contacts;
- Materials for carbon based transparent contacts;
- Indium based or Indium-free high performance transparent conducting oxides;
- Theory based guidance for new materials development and optimization;
- Non-vacuum based deposition and processing of transparent contacts;
- Composite, hybrid and multi-layer structures of increased functionality;
- Applications of transparent materials for renewable energy technologies;
- Applications of transparent materials to new and emerging electronics.

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deadline for abstract submission: 15 January 2016

Symposium O

Group IV semiconductors at the nanoscale towards applications in photonics, electronics and life sciences

The advances in silicon technology have been the main driver for today's electronics and computers. In photonics, silicon dominates solar cell applications and an upcoming area is integrated photonics, expected to become almost as important as electronic chip technology. Finally, also for applications in life sciences such as "lab-on-a-chip", biosensors and microfluidic systems, silicon technology is the main platform. All these application areas have become possible as a result of the continuous strive for miniaturization where nano-fabrication becomes a natural avenue. However, nano-sized structures enable both observation and utilization of new phenomena such as quantum effects, surface dominance and sizes approaching that of biomolecules. Thus, one may foresee many new applications of semiconductor nanotechnology, in particular related to silicon and group IV semiconductors, which will span a large range of different disciplines beyond traditional electronics.

This symposium will focus on aspects of nanoscience and technology associated with silicon and other group IV semiconductors. Consequently different issues relevant to low-dimensional structures, such as nanowires, nanocrystals, nanopores and arrays or systems of such structures are particularly interesting. This includes fabrication issues, such as advanced nanolithography, processing, nanoparticle formation and new routes to nanofabrication as well as the physics of nano-sized group IV structures relating to quantum confinement, light emission, surface and interface properties, electronic properties and transport etc. We will also address complex nanostructures, such as core-shell nanocrystals, nanocrystal-nanowires and nanocrystal-nanosheets, including nanocrystal-graphene combinations. Moreover, the interface towards biomolecules and applications in life science such as biomolecule sensing, molecular sorting and translocation in membranes are within the scope of the symposium.

Thus, this symposium will gather scientists working in various application areas using silicon or related semiconductors nanotechnology with the aim of focusing on common fabrication issues and phenomena which can inspire towards new fabrication routes and new applications and related devices.

Hot topics to be covered by the symposium:

Fabrication:

- Group IV nanoscale structures by lithographic methods
- Chemical, CVD, plasma or other methods to form group IV nanostructures
- Electrochemical etching for nanofabrication
- Nanowires and their applications
- Membranes and solid state nanopores in group IV compatible structures
- Metrology and imaging of group IV structures
- Silicene and other 2D materials
- Hybrid structures combining 1- and 2-D elements

Nano photonics and photovoltaics:

- Luminescence from nanoscale group IV structures
- Nanoscaled group IV structures for solar energy harvesting
- Group IV nanoparticles as phosphors or for bioimaging
- Group IV related plasmonics

Electronics:

- Electrical transport at the nanoscale
- Group IV quantum phenomena

Life sciences:

- Nano structures for life science applications
- Nanoscale biosensors

deadline for abstract submission: 15 January 2016

Symposium P

Carbon materials: surface chemistry and biomedical applications II

Carbon materials (nanodiamond, carbon nanotubes, fullerenes and graphene) are one of the most fascinating platforms in the fields of nanomedicine. In 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, nanodiamond, 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. 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 informations 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
- 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

Tentative list of invited speakers:

- T. Nakamura, AIST, Japan (confirmed)
- Surface functionalization of nanodiamond
- C. Chen, National Center for Nanoscience and Technology, China (confirmed)
- Toxicology & cancer theranostics with carbon nanomaterials
- Y.-K. Oh, College of Pharmacy, Seoul National University, Korea
- Graphene-based drug delivery
- M. Merroux, LEPMI, France (confirmed)
- Surface modifications of detonation nanodiamonds probed by multi-wavelength Raman spectroscopy
- I. Vlasov, Prokhorov General Physics Institute, Russia (confirmed)
- Silicon-Vacancy color centers in Nanodiamonds and their applications
- E. Osawa, Nanocarbon Research Institute, Japan (confirmed)
- Single-digit Nanodiamonds and their applications
- Y. Harada, iCEMS, Kyoto University (confirmed)
- Bioimaging Utilizing NV-center
- S. Szunerits, Université de Lille 1 – Sciences et Technologies, France (confirmed)
- Graphene for bio-applications
- J. Rosenholm, Åbo Akademi University, Turku, Finland
- Photoluminescent graphene oxide nanostructures as optical probes in preclinical imaging
- S. Quinn, University College Dublin, School of Chemistry, Ireland (confirmed)
- Carbon dots: from synthesis to bioapplications
- S. Turner, EMAT, University of Antwerp, Antwerp, Belgium (confirmed)
- HRTEM/EELS investigation of defects in detonation nanodiamonds
- D. Heller, Memorial Sloan Kettering Cancer Center, USA (confirmed)
- Bioimaging Utilizing SWNTs

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deadline for abstract submission: 15 January 2016

Symposium Q

Smart biointerfaces for functional biomaterials

The symposium on "Smart Biointerfaces for Smart Biomaterials" aims to bring together scientists from universities, research institutes and industries to review the current frontiers in the strongly interconnected areas of Nanobiotechnology, Biointerfaces and Biomaterials. The symposium will focus on a set of interdisciplinary topics, spanning from advanced drug delivery systems to novel tissue engineering strategies, from smart diagnostic and nano-resolved imaging techniques to safety of nanomaterials.

Scope:

The field of Smart Biointerfaces is markedly interdisciplinary, bridging together bionanotechnologies, biomimetic devices, tissue engineering and biohybrid systems. The key to achieve important advances in the field of biointegrated devices resides in the successful integration of these technological and scientific areas. In this context, diverse but complementary contributions are needed on new biomaterials, multi-signal patterning methodologies, multiscale modelling, advanced characterization and processing technologies for the desired biomedical and biotechnological applications. Thus, the concept of Smart Biointerfaces is constantly gaining new valences. Chemical structures of the interfaces along with the electrical, mechanical and morphological properties at nanoscale appear equally relevant to drive the interactions between living and synthetic systems. A central aspect is then the ability to optimize the functional properties with high spatial resolution, 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. Accordingly, by responding to changes in the biological environment, or transformation from one state to another in the presence of biological systems, functional biomaterials must not only improve device integration and control tissue regeneration, but also use controlled responses to power hybrid biodevices. In this view, the symposium will seek to integrate the experimental and theoretical research endeavours drawing the strengths from all the aspects of interface design and fabrication as well as characterization of the interactions at the material/biological systems interface.

Hot topics to be covered by the symposium:

- Responsive biointerfaces
- Small biointerfaces
- Cell material interactions
- Functional biomaterials
- Drug delivery systems
- Cell instructive materials
- Tissue engineering scaffolds
- Biomedical implants
- Novel polymers and biopolymers
- Stimuli and cell responsive materials
- Biomolecules surfaces interaction
- Biointerfaces engineering
- Surface treatments for biomedical applications
- Nanoparticles-biological interaction
- Nano and micropatterning for biomedical application
- Smart biohybrid materials
- Porous and composite biomaterials
- Biomedical Microsystems
- Micro and nanosystems for biological recognition
- Antibacterial surfaces
- Blood- and tissue-material interactions
- Modelling of cell material interaction and biological recognition

deadline for abstract submission: 15 January 2016

Symposium R

Multifunctional nanostructures for diagnostic and therapeutic of diseases

Although much progress has been made in treatment of diseases and cancer this last decade, new approaches are necessary at the same time for improving existing therapies or developing new techniques of treatment in order to minimise deleterious side effects and to increase the patient survival rates. The fast growing research in nanoscale science and nanotechnology has brought many potential opportunities as well as challenges in innovations in medicine.

The symposium will focus on state-of-the-art on multifunctional nanomaterials designed for revolutionizing the field of diagnosis and therapy. The recent advances in new materials, advanced characterizations, and breakthrough innovations for therapy and early diagnosis will provide a strong basis for the symposium.

Scope:

There is currently a medical need to develop novel efficient nano-objects for treatment of diseases. Image-guided therapy will be also crucial for the development of these compounds. Therefore the future of nanomedicine lays in the development of multifunctional nanoplatforms which combine both therapeutic components and multimodality imaging and which also act locally in tumors to avoid side-effects.

The explosive growth of nanotechnology has brought challenging innovations in the synthesis of multifunctional nano-objects for medicine, able to revolutionize the field of diagnosis and therapy. Furthermore, one important input of today's nanotechnology in biology is that their design will also allow real progress to achieve temporal and spatial site local therapy and imaging. Such a breakthrough is made possible by the development of multifunctional biocompatible nanosystems resulting from cutting-edge researches based on multi-disciplinary approaches.

This symposium will be a good opportunity to bring together researchers from different communities (organic chemistry, nanoparticles synthesis, material sciences, biology, physics, engineering and medicine) and exchange the latest developments in the synthesis and functionalisation of multifunctional bioactive nano-objects, as well as their biomedical applications.

Original Research can be submitted to be published in Journal Material Chemistry B (to be confirmed). The deadline for submission 30th September 2016.

Hot topics to be covered by the symposium

- Design, synthesis and characterization of nanoparticles: inorganic, polymers, liposomes, dendrimers...
- Biofunctionalisation of nanoparticles
- Targeting strategies
- Drug delivery systems
- Biomedical Imaging (e.g. MRI, MPI, SPECT, PET)
- Therapeutics (e.g. hyperthermia, curie therapy)
- Diagnostics (e.g., enzymatic assay, immunoassay, biosensing)
- Biodistribution/bioelimination
- Nanotoxicology

List of confirmed keynote speakers(to be updated):

- Mary McCommack, University College London Hospitals, UK.
- O. Tillement, Université Claude Bernard-Lyon, France.
- Stefaan Soenen, University of Leuven Belgium.
- Steve Colan, College of Medicine, Swansea University, UK.
- Delphine Felder-Flesch, IPCMS, Université de Strasbourg, France.
- Michael Farle, Duisburg – Essen University, Germany.
- Michael Giersig, Freie Universität Berlin, Germany.
- Alessandro Lascialfari, Univ. of Milano, Italy.

List of confirmed invited speakers(to be updated):

- Lanry Yung, Department of Chemical and Biomolecular Engineering, National University of Singapore.
- Jianping Xie Department of Chemical and Biomolecular Engineering, National University of Singapore.
- Xu Chenjie, Division of Bioengineering, School of Chemical and Biomedical Engineering College of Engineering, NTU, Singapore. , NTU, Singapore.
- Olivier Sandre, Laboratoire de Chimie des Polymères Organiques, Université de Bordeaux, France.

Scientific Committee:

- Simon Spassov, Centre de Physique du Globe de l'Institut Royal Météorologique de Belgique
- Claire Billotey, Hospices civil de Lyon, Lyon, France
- Damien Mertz, IPCMS, Strasbourg, France
- Puerto Morales, Instituto de Ciencia de Materiales de Madrid, Espagne
- Sophie Laurent, University of Mons, Belgique
- Daniel Ortega, Ciudad Universitaria de Cantoblanco, Spain
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deadline for abstract submission: 15 January 2016

Symposium S

Biomimetic bioactive biomaterials the next generation of implantable devices

This symposium will bring together scientists to review current advancements and shortfalls in the growing areas of advanced functional biomaterials.

Scope:

As the human population ages and life expectancy increases, clinical cases will continue to increase, putting a further physical and financial strain on healthcare systems. Current surgical repairs are based on tissue grafts. However, their clinical functionality / suitability has been questioned the recent years due to delayed remodelling; substandard stability; inferior mechanical function; and poor biological performance. Furthermore, issues associated with immune response imposing the need for the development of alternative, more efficient therapies. To this end, scaffold-based therapies are under rigorous investigation. Such approaches hypothesise that repair and restoration of lost tissue function will be achieved by triggering a repairing mechanism of endogenous progenitor cells by delivering an exogenous stimuli. Specifically, natural or synthetic scaffolds, functionalised with biophysical (e.g. spatiotemporal cues that preferentially direct cell growth and differentiation), biochemical (e.g. localised and controlled delivery of therapeutic molecules) and/or biological (e.g. cells, growth factor, hormones, peptides and gene carrier systems) signals are customarily utilised, with variable degree of efficacy. In the proposed symposium, we will capture and critically assess advances and shortfall of current materials, functionalisation strategies, processes and emerging therapies for various clinical targets and discuss how these newly emerging technologies will enable clinical translation and commercialisation.

Hot topics to be covered by the symposium:

The symposium will cover the full spectrum of current and emerging technologies, along with specific applications to current bottlenecks in clinical practice:

- Nano and micro-fabrication technologies
- Delivery of bioactive / therapeutic molecules technologies
- Natural, synthetic, hybrid, smart and stimuli responsive biomaterials
- Biophysical, biochemical and biological signals
- Tissue engineering by self-assembly
- Cell-surface interactions
- Blood / tissue-material interactions
- Antibacterial surfaces
- Modulating foreign body response / implant failure
- Engineering functional in vitro microenvironments
- Cell phenotype maintenance
- Nanotoxicity
- Bioreactors

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Symposium T

Advanced materials and characterization techniques for solar cells III

Thanks to recent developments in photovoltaic research, cost/efficiency ratio of solar cells has been decreasing steadily. New efficiency records have been announced for various technologies, single crystalline, polycrystalline, and amorphous/crystalline tandem, CdTe, CIGS, CZTS, polymer, organic and most recently perovskite solar cells. These record efficiencies have been achieved partially thanks to advance characterization techniques that need to be further developed to decrease the cost/efficiency value. This symposium will provide a platform for discussion on the wide range of materials and characterization techniques used for advanced photovoltaics.

Scope:

Photovoltaics provides renewable, clean, abundant and potentially low-cost energy. Recent drop in cost/efficiency ratio of electricity produced by photovoltaics allow more people to have access to clean energy. Photovoltaics is an area that is frequently highlighted by EU commission and takes place in Horizon 2020 targets under "competitive low-carbon energy" calls.

Silicon has been dominated the photovoltaics industry over several decades thanks to its superior properties and well-developed microelectronics industry based on it. Recently, very high efficiencies have been reported from solar cells fabricated using various materials such as CdTe, CIGS, perovskites, kesterites organics, III-V based multijunction, thin silicon. One most recent remarkable achievement is the increase the efficiency of perovskite solar cells from few percent to over 20% in a very short time period of 5 years. Characterization of solar cells and solar materials play an essential role in these developments together with choosing the right material. In addition, development of earth-abundant, low-cost materials and their characterization are important to reduce the cost/efficiency ratio further.

The focus of the proposed symposium is on areas of growth, modelling and characterization of solar materials and devices. Special emphasis will be given, but not limited, to the effect of the material properties on the device efficiency with particular interest on cells manufacturing, thin films, nanostructures, phenomena at interfaces, structural defects, bulk and surface properties, carriers transport properties, etc. The symposium aims at bridging the fundamental knowledge and information obtained from characterization techniques to developed solar cells with high efficiencies at lower costs.

All colleagues interested in the recent progresses and future challenges are invited to participate and encouraged to submit their contributions for oral and poster presentation.

Hot topics to be covered by the symposium:

- Silicon-based wafer-scale solar cells
- Thin-film silicon solar cells
- CdTe and CIGS solar cells
- Solar cells based on Kesterites
- Perovskite solar cells
- Tandem and heterojunction solar cells
- Up- and down- converters
- Light trapping
- Photogenerated carriers transport and modeling
- Surface and interface issues in solar cell design
- Innovative materials for transparent contacts
- Advanced glass and flexible substrates

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Symposium U

Materials by design for energy applications

The discovery of new materials have always played a critical role in energy production, conversion and storage. Today, both the demand for new materials and the demands that these materials have to meet are greater than ever. Despite its importance, the discovery of new materials is often based on trial and error. The need for a more systematic approach to materials discovery combining modelling, experiment and big data approaches is urgent. High-throughput materials science shows great promise in this respect. These methodologies bring their own challenges such as: handling and generation of large datasets, Cross validation of experimental and theoretical high-throughput studies and the application of data-mining methods for discovering patterns in large data-sets.

With special focus on materials for energy applications, the symposium will cover state-of-the-art experimental and theoretical work aimed at meeting these challenges for designing new materials with specific properties.

The symposium will follow up on the successful 2014 symposium and will bring together design strategies from such diverse fields as battery materials, photo-voltaic materials, thermoelectric materials, fuel cell materials and power electronics. Furthermore, special focus will be put on interface dominated materials properties, for the understanding of realistic materials across the length scales.

Hot topics to be covered by the symposium:

- Materials for energy harvesting and storage including
- - Battery materials
- - Photo-voltaic materials
- - Thermoelectric materials
- - Fuel cell materials
- - Power electronics
- Interface dominated materials properties
- Handling and generation of large datasets
- Cross validation of experimental and theoretical high-throughput studies
- Data-driven and knowledge based materials design
- Kinetics and Materials by design

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Symposium V

Thin film chalcogenide photovoltaic materials

The Thin Film Chalcogenide Photovoltaic Materials symposium 2016 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 Cu₂ZnSn(S,Se)4 in addition to the more mature materials CdTe and Cu(In,Ga)(S,Se)2. The symposium has a long tradition of attracting the most successful researchers in the world within this field and has grown to become one of the largest symposia at E-MRS Spring Meetings.

Scope:

Chalcogenides are highly interesting for use as light absorber layers in solar cells, due to their uniquely high absorbance. These materials include CdTe and the system CuInSe₂ – CuGaSe₂ – CuInS₂ – AgInSe₂ – CuAlSe₂ and their alloys. The most commonly used alloy in the latter is Cu(In,Ga)(S,Se)2. An emerging material with a growing research interest is Cu₂ZnSn(S,Se)4. Examples of chalcogenide materials used as components in this type of solar cells are CdS and Zn(O,S), which are used as buffer layers.

In the recent past industrial activities have expanded, especially in the field of CdTe and Cu(In,Ga)Se₂ 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 a fore mentioned materials are complex and further fundamental research is needed to investigate the electrical and material properties in order to improve the quality of solar cells and modules. The findings will lead to improved efficiencies of the solar cells and thereby improved cost structures of the solar cell systems. Presently record efficiencies of 21.7% for Cu₂(In,Ga)Se₂, 21 % for CdTe and 12.6 % for Cu₂ZnSn(S,Se)4 are obtained, which outperform to for example multicrystalline silicon, which has 20.4 % efficiency, whereas monocrystalline silicon is at challenging 25.6 %.

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 also discussion sessions with thematic topics have been and will be 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 conference 2016.

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 in chalcogenide based solar cells
- Passivation of interfaces and surfaces
- Novel device concepts

List of invited speakers:

- Theresa Magorian Friedlmeier, ZSW: High efficiency CIGS solar cells
- Ana Kanevce, NREL: Photoluminescence microscopy and numerical simulations
- Negar Naghavi, IRDEP: Ultrathin CIGS solar cells
- Roberto Menozzi, Parma University: 2D/3D device modeling
- Bart Vermang, IMEC: Surface and interface passivation in thin-film solar cells
- Janez Krk, University of Ljubljana: Optical confinement in chalcogenide based solar cells
- Tokio Nakada, Tokyo University of Sciences: Buffers and windows of chalcogenide based solar cells
- Gang Xiong, First Solar: High efficiency CdTe solar cells and modules
- Shogo Ishizuka, AIST: High efficiency CuGaSe₂ solar cells

Tentative list of scientific committee members:

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- T. Wada, (Ryokoku Univ., Japan)
- A.N. Tiwari (Empa, Switzerland)
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Symposium W

Materials and systems for micro-energy harvesting and storage

Internet of Things and Trillion Sensors are buzzwords illustrating the next grand paradigm: Smart Anywhere. In many of those distributed sensing and intelligence realizations long term autonomy of systems will be a must. Micro-energy autonomy solutions based on the combination of energy harvesting and storage may play a decisive role.

Scope

Energy autonomy keeps being one of the most desired functionalities in the context of off-grid applications, such as wireless sensor networks, mostly being served by primary batteries. However, battery replacement will eventually become impractical (economically, environmentally, and logistically) not only for sensor networks in remote places or harsh environments, but also for more standard applications when the number of nodes explodes exponentially as current forecasts point to. Harvesting energy, tapping into environmentally available sources such as heat and vibrations, may be a good solution in different scenarios. Furthermore, coupling those harvester devices to storage devices to buffer enough energy to account for power demand peaks could be a quite enabling energy autonomy solution.

The success of those solutions will depend on material performance, including nanofeatures, but also on their integration capability in small dimension devices (few cm² or cm³ at most) and adaptability to different large volume / low cost fabrication schemes such as silicon technology or flexible substrates. This will bring additional challenges on material/process compatibility and adequacy to extreme (3D) architectures. Enabling technologies such as advanced materials, nanotechnology, and micro and nanoelectronics are called to be protagonists of such continuous monitoring scenarios and distributed intelligence paradigms.

Examples of topics to be covered by the symposium

- Materials and system issues for thermal energy microharvesters
- Materials and system issues for mechanical energy microharvesters
- Materials and systems issues for microbatteries
- Materials and system issues for micro supercapacitors

Scientific committee:

- Adrian Ionescu, EPFL, Switzerland
- Alberto Roncaglia, IMM-CNR, Italy
- Nathan Jackson, Tyndall, Ireland
- Eric Yeatmann, Imperial College, UK
- Albert Tarancón, IREC, Spain
- Yaniv Gelbstein, Ben Gurion University, Israel
- Aljoscha Roch, Fraunhofer IWS, Germany
- Alexander Bismarck, Vienna University, Austria
- Frédéric Le Cras, CEA, France

Invited speakers:

- Zhong L. Wang, Georgia Tech, USA (tentative)
- Robert Hahn, Fraunhofer IZM, Germany
- David Pech, LAAS, France
- Mika Prunnila, VTT, Finland
- Gabi Schierning, Duisburg University, Germany
- Marlies Van Bael, Hasselt University, Belgium
- Peter Woias, IMTEK, Germany
- Maziar Ahmadi, LEITAT, Spain
- Jan König, Fraunhofer IPM, Germany
- Ola Nilsen, University of Oslo, Norway
- Elie Lefevre, Université Paris-Sud, France

Publication:

Papers of this symposium will have the chance to be published in the Energy Harvesting and Systems Journal (De Gruyter)

Support:

This symposium is supported by the following EU projects that are receiving funding from the European Union Seventh Framework Programme: SINERGY (GA n°604169), NanoCaTe (GA n°604647), MATFLEXEND (GA n°604093), MANpower (GA n°604360)

deadline for abstract submission: 15 January 2016

Symposium X

Functional materials for environmental sensors and energy systems

About three quarters of the European population lives in urban areas. The urban environment has a profound effect on people's health and well-being. Environmental sustainability and energy efficiency of the urban society is a key issue in the era of smart cities and information services for the quality of life. Solid state sensors and energy systems based on advanced functional materials have been developed for several decades and recent improvements in nanotechnology and multifunctional materials have open up the possibility to develop a new generation of sensitive, selective and stable sensors integrated in autonomous systems, with largely improved capacity and enhanced performance to give relevant information both on a personal level and systems level.

Scope:

Air quality takes a prominent position in discussions on urban environment and health, and it is a concern for many inhabitants of urban areas. Nanotechnologies, including nanostructured materials for sensing, chemical sensors, portable systems and commercial devices, give a challenging opportunity to create a new generation of sensor-systems for air quality control and efficient energy systems. Functional nanomaterials (i.e., nanowires, nanotubes, graphene, nanoparticles of metal-oxides, carbon-nanostructures, large band-gap semiconductors, and metals) with new sensing properties (detection at ppb-level, high sensitivity and selectivity), self-heating and durable operations for low-powered (tens of mWatt to tens of mWatt) devices are key elements in air quality measurements at indoor and outdoor level.

Piezoelectric and/or thermoelectric materials are crucial for developing autonomous devices to be integrated in efficient stand-alone systems for energy harvesting. Advanced materials for energy applications are key enabling technologies in the field of energy efficiency and energy saving.

Modeling provides a tool for nanomaterials tailor-made for specific purposes and applications. In order to realize functional improvements in packaging, both testing and aging investigations are also very important and a focus area of this symposium as current research hot-issues.

Nanotechnologies offer a big challenge to create innovative low-cost sensors for air quality monitoring and energy systems applications. Functional nanomaterials (one- and two-dimensional nanostructures of carbon, graphene, metal-oxides, metals, polymers, supramolecular materials, self-organized materials, organic/inorganic materials, hybrid composites) with new tailored properties are key-issues for the development of low-powered devices for indoor and outdoor air quality monitoring, including practical applications such as geo-tagged database collected by networked stationary or mobile smart devices to address new sensing concepts for air quality monitoring and mapping techniques of gas molecules and particulate matter. These solid-state chemical sensors based on smart materials with autonomous operation and low-power consumption are useful for a real deployment and complementary to the existing official high-cost accurate air-quality monitoring stations used by public authorities. These new cost-effective sensor-systems will be beneficial for science community, policy makers and social networks.

Many worldwide investigators are involved in research in materials physics/chemistry and engineering, including nanosciences and nanotechnologies for chemical sensing and energy applications. Current international research includes the design and synthesis of organic, inorganic, polymers, and hybrid materials, the development of biomimetic materials and biomaterials, the discovery of new organometallic catalysts, the synthesis of nano- and mesoscopic materials including raw materials, the preparation of multilayers and multifunctional coatings, the study of chemistry of surfaces and interfaces, the exploration of the sensing properties of reactive materials, the characterization of the matter at nanoscale level for deep insights, the photo-physical study of supramolecular materials, the investigations of the new piezoelectric and thermoelectric materials for energy harvesting, and the demonstration of functional nano/micro systems.

Basic research on sensing mechanisms and gas/surface interaction, including new effects and concepts, is critical for advancements in materials science and sensors in order to address practical applications in the field of the environmental monitoring, energy efficiency, safety, security, healthcare, automation, green buildings, transportations, food quality, industrial process control.

Hot topics to be covered by the symposium:

- The specific scientific and technological areas are:
- Advanced gas sensing semiconducting materials
 - Hybrid materials and nanocomposites for chemical sensing
 - Catalytic sensing materials
 - Metal oxides for chemical sensing and/or energy applications
 - Carbon-based materials for chemical sensing and/or energy applications
 - Piezoelectric and/or thermoelectric materials for energy harvesting applications
 - New nanotech sensors for monitoring gaseous and liquid pollutants
 - Surface-sensitive spectroscopies for studying sensor/gas interaction
 - Modeling of materials, devices, sensor systems and energy systems
 - Functional applications of environmental sensors and/or energy systems

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deadline for abstract submission: 15 January 2016

Symposium Y

Graphene and related materials: from fundamental science to applications

Graphene and related materials possess unique properties due to their reduced dimensionality and they can be combined through material engineering. In this symposium, new developments in the growth, characterization, and device fabrication based on graphene and related materials will be addressed.

Scope:

The discovery of graphene and related materials was one of the major breakthroughs in the materials science during the last decade. Even though the initial driving force behind the research on these systems was the exciting fundamental physics and chemistry exhibited by the systems due to their reduced dimensionality, it was soon realized that these materials possess many unique properties, which could be used in various applications. Moreover, due to their nature, the graphene can also be assembled in vertical heterostructures with the desired characteristics; this opens completely new routes towards engineering materials properties, and offers tremendous opportunities for new applications in electronics, photovoltaics, light-emitting and optical applications.

In order to fully use the advances provided by the graphene and related materials, many fundamental and technological problems must be solved. These include preparation and characterization of materials in a sufficient quality, reliable manipulation of low-D structures in order to master their assembly into more complex structures; finally, fabrication of the nanodevices based on such systems and their further integration. These devices are expected to enter markets with wide range of electronic applications. Graphene, carbon nanotubes and related materials can also serve as fillers in bulk composites and in thin composite coatings and modify their electrical, thermal and mechanical properties.

In this symposium, new developments in the growth, characterization, and applications based on graphene and related materials will be addressed. Particular attention will be paid not only to the fundamental issues relevant to the science of low-D systems, but also commercialization. Health/toxicity and environmental issues pertinent to low-D materials will also be discussed.

One or more joint sessions with the parallel Symposium "Two dimensional crystals and van der Waals heterostructures for nanoelectronics" will be considered.

Hot topics to be covered by the symposium:

- Progress in the synthesis of graphene and related materials;
- Advances in assembly of graphene based artificial crystals;
- Mechanical, optical, electronic and magnetic properties of graphene and related materials;
- Theoretical modeling of properties of graphene and related materials;
- Electron, spin and thermal transport in graphene and related devices;
- Graphene and related materials for energy harvesting and storage;
- Novel characterization techniques;
- Applications and commercialization;
- Health/toxicity and environmental issues pertinent to graphene-based materials.

Tentative list of invited speakers:

- Philip Kim, «Atomically thin p-n junctions with van der Waals heterointerfaces»
- Eva Andrei, «Probing Dirac Fermions in Graphene by Scanning Tunneling Microscopy and Spectroscopy»
- Shahal Ilani, Weizmann Institute of Sciences, Rehovot, Israel, "Electronic Phases in One-Dimension"
- Alexander A. Balandin, University of California, Riverside, "Thermal transport in 2D materials"
- Jurgen Smet, "Magnetotransport in graphene bilayer" Max Planck Institute for Solid State Research, Stuttgart, Germany
- Oleg Yazyev, "Electronic transport in 2D materials" EPFL, Lausanne, Switzerland
- Thomas Michely, "Epitaxial graphene on metal substrates" University of Cologne, Germany
- Andrea Ferrari, "Resonant Raman spectroscopy of twisted multilayer graphene", University of Cambridge, UK
- Mark Hersam, "Inorganic 2D materials and their heterostructures", North Western University, USA
- Thomas Heine, "Electronic structure of 2D transition metal dichalcogenides from first-principles calculations" Jacobs University, Germany
- Jannik C. Meyer, "Irradiation induced modifications in 2D materials", University of Vienna, Austria
- Kazumoto Suenaga "In-situ engineering of the properties of inorganic 2D materials in TEM" AIST, Japan
- Sokrates Pantelides, "Defects in 2D materials" Vanderbilt University, USA
- Leonid Ponomarenko, "Hierarchy of Hofstadter states and replica quantum Hall ferromagnetism in graphene superlattices", Lancaster University, United Kingdom

Tentative list of scientific committee members:

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- Chris Ewels University of Nantes, France
- Francesco Bonaccorso, National Research Centre, Italy
- Manish Chhowalla, Rutgers University, USA
- Dmitry Golberg, NIMS, Japan
- Raul Arenal, Instituto de Nanociencia, Spain
- Oliver Gröning, EMPA, Switzerland
- Andrew Wee, University of Singapore
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Symposium Z

Two dimensional crystals and van der Waals heterostructures for nanoelectronics

Starting from the relatively recent rise of graphene, the family of two dimensional (2D) materials is rapidly expanding not only by including new elements and compounds, but also by paving the way to new functionalities and applications. Novel methods for the synthesis and functionalization are demanding to foster the 2D materials evolution, which will be the platform for future enabling technologies.

Scope:

The Symposium is intended to highlight the most recent advances on 2D materials and their applications. A large variety of 2D atomic crystals isolated in the recent years offers a rich platform for the creation of heterostructures, which combine several of these materials in one stack. The synthesis of novel 2D materials and the manipulation of their atomic properties (e.g. via doping, defect induction, chemical functionalization, strain engineering) allow for designing heterostructures that can be tailored to provide physical insight on particular phenomena or which can be exploited for multi-functional applications. The versatility of 2D materials to incorporate several functionalities and to adapt to multiple applications will be a key point to assess device integration and technological impact.

Emphasis will be given to the large-area and cost-effective synthesis (e.g. CVD, chemical exfoliation, etc.), characterization, and functionalization of 2D layered materials (including transition metal dichalcogenides such as MoS₂, WSe₂, etc. as well as black-phosphorus/phosphorene) and of van der Waals heterostructures fabricated by artificial stacking of different 2D materials with the specific focus on integration into electronic devices. The emerging class of 2D group IV materials (e.g. silicene, germanene, stanene, phosphorene, etc.) will be taken into account as a future option for long-term applications and for potentially exploitable exotic properties such as the emergence of topological insulator states. The identification of the physical properties of these materials will be linked to new methodologies for advanced characterization.

The recent advances on the characterization of the electronic, magnetic, and optical properties of these materials will be discussed as they constitute the basis to assess the implementation of electronic, optoelectronic, and photonic devices based on 2D materials beyond graphene. Discussions about emerging or explorative applications in the fields of the spin-valleytronics, straintronics, thermoelectrics or nanomechanics will be included in the Symposium programme. For instance, energy conversion in 2D materials can be accessed by taking benefit from materials-light interaction, while integration into sensor device or micro-electromechanical systems (MEMS) can leverage on the strong response against environmental excitation (chemical, mechanical, etc.) for energy harvesting applications.

The electronic transport will be referred to as a universal key-property to benchmark the 2D materials on the conventional technology. Both fundamental and technological issues will be taken into account. As for the former aspect, tuning the transport properties (e.g. band gap opening, ballistic transport, metal-insulator transitions) will be a focus of the Symposium. On the other hand, integration of 2D materials into the semiconductor technology will be the challenge for a post-Si era of devices. In particular, the Symposium will focus on the real performance of 2D against Si and III-V technologies, when exploited in digital applications (logic and memory devices), Radio Frequency amplifiers, and flexible electronics. Joint sessions with the parallel Symposium "Graphene and Related Materials: from Fundamental Science to Applications" will be taken into account.

A Special Issue of the symposium proceedings will be published in Physica Status Solidi – Rapid Research Letters (Wiley) upon peer-reviewed submission open to all the symposium contributors. Upon courtesy of Wiley, a limited number of highly selected papers may be upgraded for publication in Advanced Electronic Materials (Wiley).

Hot topics to be covered by the symposium:

- Synthesis, characterization and structural controls of 2D materials including transition metal dichalcogenides, phosphorene, etc.
- 2D van der Waals heterostructures
- Novel 2D honeycomb materials of group IV semiconductors: silicene, germanene, and stanene
- Electronic and spin transport in 2D materials
- Electronic, magnetic, optical properties of 2D materials
- Thermoelectrics, straintronics, and valleytronics in 2D materials

- 2D Materials for energy harvesting and photonics
- 2D Materials for sensor and MEMS devices
- 2D materials for Post-Si and III-V technology: Digital, Analog (RF) and flexible electronic applications
- Advanced characterization for 2D materials and van der Waals heterostructures

Preliminary list of invited speakers:

- R. Gorbachev (Univ. of Manchester, UK) "2D crystals based heterostructures for tunneling transistors and photovoltaics: fabrication and characterization"
- M. Chhowalla (Rutgers Univ., USA) "Synthesis and Phase Engineering of Transition Metal Dichalcogenides"
- J. Coleman (Trinity College, Ireland) "Chemical Exfoliation and Use of 2D Crystals Inks for Devices"
- A. Kis (EPFL, Switzerland) "MoS₂-based Electronics and Photonics"
- D. Akinwande (Univ. Texas, USA) "Novel 2D Materials in Transistors: the Case of Phosphorene and Silicene"
- M. Houssa (KU Leuven, BE) "Modelling of 2D Materials based on Group IV Semiconductors: from silicene to stanene"
- S. Roche (Unicat, Spain) "2D materials for spintronic applications"
- E. Pop (Stanford Univ., USA) "Thermal Transport and Devices with 2D Layered Materials"
- F. Koppens (ICFO, Spain) "Photodetection and Plasmonics with 2D Material Heterostructures"
- M. Lemme (Siegen Univ., Germany) "Exploiting 2D materials in Nano-Electro Mechanical systems"
- J. Garrido (Walter Schottky Institute and Munich Univ., Germany) "Graphene and 2D materials for biosensing and bioelectronics"
- F. Schwierz (Univ. of Illmenau, Germany) "Scaling issues for transistors based on 2D Materials"
- D. Neumaier (AMO, Germany) "Radio Frequency applications in the flatland"
- M. Ugeda (CIC Nanogune, Spain) "Scanning tunneling spectroscopy characterization of transition metal dichalcogenides"

Preliminary list of scientific committee members:

- L. Ponomarenko (Lancaster University, UK)
- F. Guinea (IMDEA Nanoscience, Spain and Manchester University, UK)
- L. Colombo (Texas Instruments, USA)
- A. Dimoulas (NCSR-D, Greece)
- V. Morandi (CNR-IMM, Italy)
- H.S.J. van der Zant (Delft University, Netherlands)
- G. Iannaccone (University of Pisa, Italy)
- G. Le Lay (University of Aix-Marseille, France)
- V. Palermo (CNR-ISOF, Italy)
- P. Samori (Strasbourg University, France)

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Symposium AA

Solution processing and properties of functional oxide thin films and nanostructures II

The aim of this symposium is to offer an overview and a forum for the interchange of information and expertise on the current state of research on synthesis and processing of solution-derived oxide and nanocomposite thin films, patterned surfaces and nanostructures, including their properties and applications.

Scope:

In recent years, significant progress has been made in the synthesis of a wide range of advanced inorganic materials using chemical solution routes. Solution-based processing is generally more flexible in terms of precursor or substrate selection and related processing procedures, and is faster and less expensive as compared to vapor deposition routes. These methods, such as sol-gel, metallo-organic decomposition, hydrothermal growth, colloidal synthesis, and chemical bath deposition, provide versatile and cost-effective manufacturing routes to large-area and high-quality inorganic films, nanocomposites, and functional entities like nanorods and nanoparticles.

Recent developments in synthesis and processing have opened new ways to achieve enhanced and/or novel functionalities for applications in electronics, photovoltaics, photoelectrochemical cells, sensors, actuators, energy harvesting and storage devices, memory devices, magnetic sensors, spintronics, etc. To name a few examples: the current technological advances in novel patterning methods (e.g. ink jet printing, soft lithography) allow faster and less expensive processing and represent bottom-up alternatives to established solution deposition of thin films in combination with top-down lithography; Novel synthesis routes yield well-defined optically active nanostructures for next generation photovoltaics; And the integration of oxides with temperature-sensitive substrates like flexible polymers requires rational design of novel low temperature processing schemes.

The symposium will address solution processing of nanostructured oxides and related hybrid materials with specific functionalities depending on processing conditions. Topics to be covered are solution synthesis, structure evolution and phase growth, fabrication of 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 considered.

Last but not least we have to mention the large success of last year (2014) symposium on the same subject. It attracted a large number of participants (in total, 257 accepted abstracts were presented), showing the broad interest among materials scientists inside and outside Europe in a dedicated platform on solution processing of inorganic (nano)materials.

Hot topics to be covered by the symposium:

- Solution chemistry and synthesis
- Low temperature processing
- Solution-derived epitaxial films
- Green processing
- Interfaces and nanoscale effects
- Nano-composites and hybrid materials
- Low-dimensional oxide nanostructures (particles, wires, sheets)
- Solution-based patterning, printing and self-assembly, including ink development
- Semiconductors, transparent conducting oxides
- Ferroelectric, dielectric, multiferroic heterostructures, and thin films
- Optical materials and nanostructures for photovoltaics
- Materials for energy conversion and storage
- Magnetic nanoparticles, thin films, composites, and applications
- Structure-property relations and engineered materials

Preliminary list of invited speakers:

- Pascal Buskens, TNO Nederland, "Nanoparticles and nanocomposite coatings with optical functionalities"
- Elisabetta Comini, University of Padova, "Metal oxides nanowires chemical sensors"
- Catherine Elissalde, Université de Bordeaux, "Nanostructured ferroelectric ceramics: fast processing, strain and interface issues"
- Johan E. ten Elshof, University of Twente, "Kinetics of exfoliation and

- restacking of 2-dimensional oxide nanosheets in solution and its influence on the formation of epitaxial Langmuir-Blodgett films"
- Nicola Hüsing, Salzburg University, "Mixed metal oxide nanostructures"
 - Jon Ihlefeld, Sandia National Laboratories "Identifying and minimizing extrinsic chemical contaminants in solution derived complex oxide thin films"
 - Maarit Karppinen, Aalto University, "Atomic/molecular layer deposited (ALD/MLD) oxide-organic superlattice thin films"
 - Maksym Kovalenko, ETH Zurich, "Modular design of functional thin films and nanostructures using colloidal nanocrystals as building blocks"
 - Mika Linden, University of Ulm, "Particulate mesoporous silica films as drug delivery matrices"
 - Vera Meynen, "Materials synthesis: the art of carefully controlling and understanding all materials aspects to create innovation and improve application"
 - Jooho Moon, Yonsei University, "Sol-gel derived functional oxide-metal nanowire nanocomposite films for photovoltaic applications"
 - Peter Müller-Buschbaum, Technical University Munich, "Tailoring titania nanostructures for solar cell applications"
 - Markus Niederberger, ETH Zurich, "Solution processing of nanoparticles into multicomponent films"
 - Francisco Rivadulla, CIQUS-USC, "Large area deposition of functional epitaxial thin films and multilayers by polymer assisted deposition"
 - Yaroslav Romanuk, EMPA, "Chemical bath deposition of doped ZnO thin films for photovoltaics applications"

Tentative list of scientific committee members:

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Symposium BB

Defect-induced effects in nanomaterials

Following a great success of two 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:

Extensive research of radiation-implantation-and growth-induced defects in materials has led to many important technological applications. Point and extended defects have been shown to notably affect the materials properties. The high sensitivity of modern technologies at 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 nanomaterials (2D structures, 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:

- Effects of grain boundaries and interfaces on the diffusion and transport processes in nanomaterials.
- Swift heavy ion irradiation as the means to tailor 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.
- Defects in low-dimensional materials
- 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.

Symposium organizers

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Symposium CC

In situ studies of functional nano materials at large scale facilities: from model systems to applications

Surfaces, interfaces and nanostructures possess an extended range of physical and chemical properties occurring at the nanoscale making them suitable for widespread applications ranging from catalysis to multifunctional devices. The investigation of the elementary mechanisms occurring at the nanoscale can largely benefit from the advanced techniques developed on large scale facilities such as synchrotrons and neutron sources. The symposium aims at presenting and discussing the state of the art materials science investigations at the nanoscale on timely topics with a particular emphasis on the contribution of large scale facilities including synchrotrons, neutron sources and free electron lasers. Studies considering oxides will be particularly welcome. Additional attention will be given to the role of techniques in the study of materials issues in the field of energy and environment.

Scope:

Large scale facilities like synchrotrons, free electron lasers and neutron centers propose a large range of techniques that have an increasing impact on the characterization of advanced and/or multifunctional materials. They allow a refinement in the usually non-destructive characterization of these materials - their surfaces, interfaces and nanoscale elementary compounds - which is often not attainable with laboratory sources or other techniques. Thanks to regular refurbishments programs and novel facilities, constant progress is being made in the application of X-rays and neutron methods to materials science issues due to the development of highly sophisticated experimental set-ups and data analysis schemes.

Large scale facilities are of particular use to address electronic properties (spectroscopy), structural properties (X-ray/neutron diffraction), interfaces (X-ray/neutron reflectivity and surface X-ray diffraction (SXRD)) and magnetic structure (X-ray dichroic measurements and neutrons). Novel time resolved experiments have also become recently possible using pump-probe approaches on synchrotrons as well as exploiting the light from XFELs. In addition large scale facilities are mandatory for in-situ and/or operando studies of the synthesis or chemical reactions like for oxide nanoparticles. Ever increasing beam brilliance and intensity and decreasing beam sizes along with an improved control of the space-time structure of the probing particles opens new avenues for genuine experiments. Great progress in source characteristics and instrumentation has enabled a new level in the quality of research.

The recent speed of progress makes this an appropriate time to hold a symposium with the objective to bring together large scale facility specialists and materials scientists to address common challenges and to improve existing and novel techniques, in particular in the context of studying materials issues in the field of energy and environment. Some (non-exclusive) emphasis is expected to be given to oxides. Oxide surfaces and nanostructures are of particular importance since they form interfaces with air, existing at ambient conditions. Moreover, they display an extremely wide range of properties including electrical and ionic conductivity, superconductivity, piezoelectricity, magnetism, multiferroic behavior, thermoelectricity etc. and are involved in various technologically important areas.

The topics covered include (and is not limited to) the materials microstructure of nanostructures and nanocomposites, texture and residual stress, surface and interface composition and structure, the use of micron and sub-micron beams for micro-diffraction and nano-spectroscopy, the use of the beam coherence and the development of 3D imaging techniques. Novel development and results arising from well-established techniques such as photoemission (vacuum or near ambient pressure), absorption, diffraction and fluorescence using state of the art large scale facility instruments are welcome.

Hot topics to be covered by the symposium:

The contributions can be experimental or/and theoretical. Studies including oxides will be particularly welcome but not exclusive. Contributions may be in following topics:

- Diffraction, scattering and absorption (x-rays and neutrons)
- Synthesis, structuring and manipulation of materials
- In situ and in operando measurements
- Generic properties of nanostructures

deadline for abstract submission: 15 January 2016

Symposium DD

Light interaction with nanomaterials

Light is one of the more common physical tools to fabricate, manipulate and characterize nano-particles. At the same time, nano-material advances allow new optical phenomena such as new sources, metamaterials, and resonance. Thus, their interaction is a major issue in modern physics.

Scope:

Ranging from fabrication processes to their characterization and to photonics applications, the symposium aims to exchange and discuss about the major role played by light in its interaction with nanomaterials. The symposium will consider nanomaterial fabrication methods from chemical to laser processes, in which the purity and size control are major issues. Nanoscopy, as highlighted by the recent Nobel prize for chemistry, will be addressed, covering the many new super-resolution and nano-detection methods. More generally, the many techniques that exist using light for nanomaterial characterization or localization will also be discussed. The fluorescence properties of nanomaterials useful for biomedical applications or for the conception of new light emitting diodes for example, will be considered as will be the ability to detect or manipulate nanomaterials using photonic nanojets or optical tweezers. The new possibilities opened by plasmonic resonance in metallic nanomaterials and the electromagnetic modelling of these complex interactions are major issues within the scope of the symposium: very sensitive high electric field localization, collective behavior to achieve metamaterials, or light management using nano-antennas. The symposium will also touch upon the potential applications of nanomaterials for healthcare, energy storage, and sensors.

Hot topics to be covered by the symposium:

- Processes for nano-fabrication and modification: chemical processes, laser processes
- Nano-material characterization and nanoscopy
- Nanomaterial plasmonic resonance
- Photonic nanojet/nanomaterial interaction
- Fluorescence of nanomaterials
- Nanomaterials for biomedical applications
- Nano-antennas and metamaterials

List of invited speakers:

- Barcikowski, Stephan, University of Duisburg-Essen, Essen, Germany - Laser synthesis of nanometals / nanocomposites
- Cigler, Petr, Institute of Organic Chemistry and Biochemistry AS CR, Prague, Czech Republic - Fluorescent nanoparticles
- Williams, Olivier, Cardiff University, Cardiff, UK - Micro/Nano electromechanical systems based on nanocrystalline films, nanostructures through CVD
- Liu, Laura, Max Planck Institute, Germany - Plasmonic origami
- Muskens, Otto, Southampton, UK - Active plasmonics
- Wenger, Jérôme, Institut Fresnel, France - Coupling of single quantum emitters with plasmonics, plasmon enhanced FCS, plasmon enhanced FRET
- McCloskey, David, Trinity Coll. Dublin, Ireland - Photonic nanojet
- Osten, Wolfgang, University of Stuttgart, Germany - Resolution Enhancement
- Degiron, Aloyse, IEF Paris, France, Nano-antennas
- Kabashin, Andrei, LP3, Marseille, France - Laser process for nanomaterials

List of scientific committee members:

- Iglič, Aleš, University of Ljubljana, Ljubljana, Slovenia - Biophysics and Biomechanics
- Mihăilescu, Ion, National Institute for Laser, Plasma, and Radiation Physics, Bucharest, Romania - Laser-Surface-Plasma Interactions
- David Grojo, LP3, Marseille, France - Nano particle synthesis by Laser
- Fogarassy, Eric, Télécom Physique Strasbourg, France - Laser Processes
- Habraken, Serge, University of Liège, Belgium - Microphotonics
- Montgomery, Paul, ICube, Strasbourg, France - Nanoscopy
- Stenger, Nicolas, DTU FOTONIK, Lyngby, Denmark - Metamaterial

Symposium organizers

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deadline for abstract submission: 15 January 2016

Symposium EE

Carbon-, or nitrogen-containing nanostructured thin films

The focus of this proposal is on multifunctional thin films. It continues the successful story of previous E-MRS Meeting Symposia. The major objective is to provide a fruitful exchange platform for scientists and engineers working in the multidisciplinary research field of design, synthesis, characterization and application of these films.

Scope:

Carbon- or Nitrogen-Containing Nanostructured Thin Films exhibit multifunctional properties, different from those of the constituents. These films offer a wealth of structures, e.g. based on metastable phases, nanocomposites or nanosized multilayers, giving rise to unique combinations of optical, optoelectronic, magnetic, electrical and mechanical properties. Metastable films can be designed consisting of plasma polymers, diamond-like carbon or CNx phases. Nanocomposite films can be tailored by adding either metallic (e.g. Ti), non-metallic (e.g. Si) elements with high C or N affinity, or metallic elements with no C or N affinity (e.g. Cu) in an amorphous or crystalline matrix.

The objective of this symposium is to highlight the experimental and theoretical progress in development of carbon- or nitrogen-containing nanostructured films consisting of nanocrystalline particles embedded in an inorganic and/or organic matrix. A multitude of matrixes can be imagined, e.g. C or Si based. Nanolaminated structures such as MAX-phases, plasma polymers, as well as carbon nanotubes, graphene or other low-dimensional structures embedded into a matrix, are also in the scope of this symposium. Contributions investigating plasma composition – material structure - films property – relationships by experimental and theoretical means will be considered. Films' synthesis by advanced processes, such as high power impulse magnetron sputtering, atmospheric plasma processes, and hybrid techniques are of interest. Papers elucidating mechanical, tribological, thermal, electrical, optical, optoelectronic and magnetic properties, biomedical compatibility, and correlations between these properties and deposition parameters, structure or films' composition are also encouraged.

Topics such as process modeling and diagnostic techniques, surface interaction and nucleation phenomena, investigation of degradation mechanisms e.g. phase and microstructure stability under different environments and coating-substrate interdiffusion, are also welcomed.

Engineering-oriented contributions including automotive, chemical, electrical, optical, magnetic/optical data storage, pharmaceutical or biomedical applications, and emerging applications as in energy systems, will also be considered.

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
- 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 energy-relevant fields.
- Development of methods for characterization of nanomaterials
- Biomedical and pharmaceutical applications of coated materials

deadline for abstract submission: 15 January 2016

Symposium organizers

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Symposium FF

Sustainable knowledge and preservation of Cultural Heritage for future generations

Cultural Heritage consists of tangible and intangible, natural and cultural, movable and immovable assets inherited from the past. It is our legacy from the past, what we live with today, and what we pass on to future generations. Access, preservation and education about Cultural Heritage(CH) are essential for the evolution of people and their culture, since our CH represents an irreplaceable source of life and inspiration (creativity).The challenging tasks are both managing cultural heritage while aiming for sustainable development and managing sustainability while redeveloping cultural heritage. There is a general need for further studies and research to better understand the dynamic relationship between heritage conservation and the various dimensions of sustainable development.

Scope:

The aim of this Symposium is to delineate those problems in arts, archaeology and ancient technology that can best be answered by the application of methodologies, techniques and solutions generally used in Materials Science. As well, the Symposium is applied to interdisciplinary expertise, resolving problems related to preservation and conservation science, weathering, dating and more, of movable and immovable CH, with the aim to understand and improve our understanding of material culture. The workshop will stimulate and encourage scientific research devoted to the sustainable development of cultural heritage and to the positive contribution of cultural heritage management towards a sustainable environment, by promoting innovative research and practices and improving the current materials and methods and the development and applications of the emerging ones. A large and varied community is involved in Cultural Heritage and Sustainable Development (built environment and sustainability fields) and it includes international experts from academics, as well as practitioners and students.Hence, the Symposium provides a multidisciplinary forum for scientific and technological issues in art, archaeology, building conservation and preservation.

Contributions for this symposium will explore 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.

Other related questions that can be reported are the dating of art objects, their authentication, characterization of the source of ancient materials and the range of variability of production processes.

Hot topics to be considered:

- Detection of first alteration stage- use of tailored methodologies
- Effects of Climate Change outdoor and indoor
- Monitoring the environmental conditions (outdoor and indoor contaminants and pollution, hydro-geological and seismic risks)
- Modelling
- Innovative protocols for investigation and study of CH
- Standardization
- New sustainable solutions in terms of methodologies and materials
- Current and emerging technologies and best practices
- Maintenance and sustainability
- Case History
- Cultural heritage and sustainable development – legislation, Cultural Heritage Impact Assessment, effects of climate change, ecological, social and economical sustainability
- Risks and ecological sustainability management
- Authentication

Tentative list of invited speakers:

- Demetrios Anglos (FORTH, Greece)
- Rocio Ortiz (Pablo de Olavide Univ., Seville, Spain)
- Filippo Ubertini (Univ. Perugia, Italy)

Tentative list of Scientific Committee

- C. Fotakis (FORTH, Greece)
- Anne Bouquillon (C2RMF, France)
- Michael Stuke (MPI, Germany)

Symposium organizers

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deadline for abstract submission: 15 January 2016

Workshops & Tutorials

Symposium GG

Advanced materials and technologies for renewable energies - AMREN-2 (5-6 May 2016)

The aim of the workshop AMREN is to present the state-of-the-art and the future perspectives for materials applied to the generation, storage and grid of renewable and sustainable energy. The event is organized as a dissemination activity of the European project EUROSUNMED (www.eurosunmed.eu). This is the second edition since the first one held during the E-MRS spring meeting in Lille in 2015.

Generation and storage of renewable and sustainable energy requires development of novel, innovative and very efficient materials and components. The workshop will gather the most recognized academic and industrial experts in the field of materials for energy to share their knowledge and expertise. This intend in merging physics, chemistry and engineering knowledge in several fields. Topics of the symposium are conventional and sustainable technologies, solar energy conversion (PV and thermal), thermoelectric energy conversion, solar fuels, fuel cells and storage. Joint sessions will be organized with other EMRS symposia of close topics.

Hot topics:

- Concentrated solar power
- Critical materials for energy
- Grid integration
- Photosynthesis
- Photovoltaics
- Storage (chemical, ...)
- Thermoelectricity/piezoelectricity

This workshop is organized in the frame of the Eurosundmed project, which has received funding from the European Union's Seventh Programme for research, technological development and demonstration under grant agreement No 608593.

deadline for abstract submission: 15 January 2016

Workshops & Tutorials

Symposium HH

Function-assembly of nano-materials towards electronics, energy and biological applications (one day symposium)

Scope:

Recent remarkable progress of science and engineering of nano-materials will be discussed aiming novel applications to electronic devices, solar and fuel cells, hydrogen energies, and also to biology-related technology. Examples will be shown that a variety of functions of nano-materials and systems can be realized by designing them from an atomic scale and by hierarchically integrating them. The new research trends of nano-materials emerging by collaboration of the WPI Institutes and the European researchers will be also introduced.

Hot topics:

- Nano-Energy Devices
- Hydrides and hydrogen materials
- Advanced porous materials
- Water energy through membrane
- Nano-carbon and nano-sheet
- Nano-ionic control of materials
- Computational approach for nano-materials

Tentative list of invited speakers:

- S. Samukawa - (AIMR, Tohoku University, Japan)
- S. Orimo - (AIMR, Tohoku University, Japan)
- A. Zettl - (EPFL, Switzerland)
- A. Fave - (INL, France)
- S. Kitagawa - (iCeMS, Kyoto University)
- E. Sivaniah - (iCeMS, Kyoto University)
- A. Staykov - (I2CNER, Kyushu University)
- T. Fujigaya - (I2CNER, Kyushu University)
- K. Tsuzaki - (Kyushu University, Japan)
- M. Osada - (MANA,Tsukuba, Japan)
- K. Terabe - (MANA,Tsukuba, Japan)
- D. Bowler - (UCL, UK)
- R. A. Fischer - (Ruhr University Bochum, Germany)

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Symposium organizers

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deadline for abstract submission: 15 January 2016

Practical information

A description of each symposium is given in this announcement. Any information regarding a specific symposium can be obtained by contacting the symposium organizers. For general information regarding the conference contact the E-MRS Headquarters or visit www.european-mrs.com

CONFERENCE SECRETARIAT

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Conference language is English.

CONFERENCE VENUE

The Conference will be held at the **Congress Center "Lille Grand Palais"**, 1 Boulevard des Cités-Unies, Lille, France **from May 2 to May 6, 2016.**

For more information about Lille Grand Palais please visit <http://www.lillegrandpalais.com/>
All the conference symposia will be held in the same building.

HOTEL RESERVATION

Génération Voyages is the **official and exclusive** agent appointed by the organiser of E-MRS to manage with hotel bookings.
For further information, www.congres-generationvoyages.com

VISA ASSISTANCE

Citizens 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 us your address, date and place of birth and your passport number and date of expiration):

By email nathalie.geyer@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.

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 online.

FINANCIAL SUPPORT

Limited possibilities for financial support exist within the budget of each symposium. For any request of funding, please contact directly the chairpersons of your symposium.

ABSTRACT SUBMISSION

Deadline for abstract submission: January 15, 2016. In fairness to all potential authors, late abstracts will not be accepted

Abstract Length: Web submissions are limited to 1500 characters. (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 Web site is easy and convenient. Follow the easy 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 sympo-

Practical information

sium 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 15. 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 February 25, 2016 at the latest.

REGISTRATION

Join us in Lille for the 2016 E-MRS Spring Meeting and Exhibition — a leading forum for scientists and engineers to exchange information and ideas at the forefront of materials research.

Online registration: www.european-mrs.com open from February 1 to April 18, 2016

EVERY ATTENDEE MUST REGISTER ONLINE (including symposium chairpersons, invited speakers, scientific committee members, presenting authors, authors, ...).

Abstract acceptance and conference registration are 2 separate things.

On-site payment hours

Monday May 2 / 7.30 - 18.00
Tuesday May 3 / 8.00 - 18.00
Wednesday May 4 / 8.00 - 18.00
Thursday May 5 / 8.00 - 18.00
Friday May 6 / 8.00 - 17.00

Please register online before April 18, 5 pm (CET)
If you do not have an E-MRS account on our website, you need to create one before registering to the Spring Meeting.

PRE-REGISTRATION IS COMPULSORY & PRE-PAYMENT IS RECOMMENDED to avoid a long queue. For organizational reasons, on-site registration will be limited.

REGISTRATION FEES

1. FULL RATE

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

BEFORE March 21, 2016: 560 Euro net

AFTER March 21, 2016: 660 Euro net

2. STUDENT RATE

Including: access to symposia, lunches, coffee breaks, social event, E-MRS membership for one year. Students have to give evidence of their university registration at the registration desk.

BEFORE March 21, 2016: 310 Euro net

AFTER March 21, 2016: 390 Euro net

E-MRS is a non-profit organization and is not subject to VAT.

ON-SITE REGISTRATION

Attendees can also register on-site at the Congress Center "Lille Grand Palais". On-site registration opens Monday May 2 at 7:30 am

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

On-site registration will be available for the duration of the meeting.

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)

- Bank transfer:

Bank: BANQUE POPULAIRE ALSACE LORRAINE CHAMPAGNE

Address: CRONENBOURG MITTEL

Account: ASS. EMRS CONFERENCES

IBAN : FR76 1470 7500 1111 1913 8543 942

BIC : CCPFRPPMTZ

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

- Purchase order (bon de commande) to be sent by April 4, 2016 at the latest

- 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 April 30, which will cause a €25 processing fee. No refunds will be issued on requests postmarked after April 18. 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.

CONFERENCE SCIENTIFIC PROGRAM

The complete scientific program will be available starting March 2016 on the E-MRS website: www.european-mrs.com

POSTER PRESENTATION

The maximum size for the poster is: vertical 1.10 m and horizontal 0.90 m. The poster board will be full white board. Pins are not allowed, please use tape. Attendees can preview the posters during the morning before the formal presentation.

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

quently, 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. A printing office will welcome you on site and will give you the opportunity to print your poster at reasonable cost.

GRADUATE STUDENT AWARDS

E-MRS announces the availability of awards (up to 2 per symposium) for graduate students conducting research and a topic to be addressed in the symposia planned for the E-MRS 2016 Spring Meeting. Each award will consist of a cash grant of 450 Euro, that will be offered during the plenary session jointly to a diploma.

Criteria for selection are:

- Participation at the E-MRS 2016 Spring Meeting as an attendee and author or co-author of a symposium paper.

- Outstanding performance in the conduct of this project and promise for future substantial achievement in materials research as judged by the faculty advisor.

- Significant and timely research results.

Application materials required:

- Application form under www.european-mrs.com

- Abstract of paper to be presented at the meeting

- Letter of support from research supervisor.

Submit the complete application to the E-MRS Secretariat. Deadline for complete application is April 5, 2016.

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.

EU-40 MATERIALS PRIZE

This E-MRS award is given to recognize outstanding contributions to materials research by a scientist under 40. 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 2016 Spring Meeting where the award will be presented.

Nominations should include:

- Curriculum Vitae including birth date
- List of key publications (including citations and impact factors)
- Letters of support from two well established scientists

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 the 29 February 2016.

The nominee shall not have reached his/her 40th birthday in the year in which the nomination is submitted (2015).

PLENARY SESSION

A plenary session is scheduled on Wednesday May 4, 2016 - afternoon.

During this session, the EU-40 Materials Prize as well as the Graduate Student Awards will be delivered.

CONFERENCE RECEPTION – SOCIAL EVENT

All participants are invited to attend the Conference reception on Wednesday May 4, 2016 at 19:30. 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.

IMPORTANT DEADLINES**• January 15, 2016:**

Deadline for abstract submission.

• February 25, 2016:

Notification of acceptance and mode of presentation.

• February 29, 2016:

Deadline for EU-40 Materials Prize nomination.

• March 21, 2016:

**Deadline for Pre-Registration fees.
(only applicable for REGISTRATION AND PAYMENT received by March 21, 2016).**

• After March 21, 2016:

Regular registration fees.

• April 5, 2016:

Deadline for completed Application for Graduate Student Awards.

• April 15, 2016:

**Deadline for Reach Out!
Award application.**

• April 18, 2016:

**Deadline for online registration.
(ATTENTION: on-site registration will be limited !!)**

By air:

- Roissy Charles de Gaulle International Airport: direct high-speed train between Paris and Lille in 50 mins
- Brussels South Charleroi and Brussels National Airport: train between Brussels and Lille in 15 mins
- London Heathrow: high-speed train between London and Lille in 50 mins

Notice: Lille has also an International Airport: Lille-Lesquin, located at 15 minutes from the City Centre, the business district and the two railway stations. Over 70 national and international destinations. Direct flights with Air France, Aigle Azur, Air Algérie, Easyjet, HOP!, Ryanair, Tunisair Transavia, twinjet, Volotea, Vueling...

More information on: www.lille.aeroport.fr



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* not available in certain countries

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deadline for abstract submission: 15 January 2016

By train:

Lille has two train stations, they are 400 metres apart and situated in the city centre:

- Lille Flandres: regional trains and direct TGV to Paris (58 mn).
- Lille Europe : Eurostar and direct TGV to London (1h20), Brussels (32mn), Lyon (2h55), Strasbourg (3h18), Marseille (4h42), Bordeaux (5h09)...

• Rail Europe allows you to book all types of European rail passes and tickets online. Eurail passes, Euro passes, Single country passes, Point to Point tickets, Rail 'n Drive passes, Night trains, Special trains, High Speed trains, Eurostar, etc. Online train schedules are also available: <http://www.raileurope.com/>

By road:

Lille Metropole is at the crossroads of France's densest freeway network. More than 500 km of motorway connect great European cities:

- 1h from Bruxelles (E429/E17)
- 2h from Paris (EA1 /E42)
- 3h from Luxembourg (A4/E17)
- 3h from Amsterdam (E17)
- 5h45 from Frankfurt (E42)

From the UK : Eurotunnel from Folkestone to Calais, then to Lille by the motorway A26.

- Parking at the Congress Center
- Public parking (500 car spaces)

TRAVEL WITHIN THE CITY

Lille Grand Palais is approximately 10-15 min feet from the historical center and thanks to Transpole, Lille Metropole has a comprehensive public transportation system:

- 2 automatic metro lines (the VAL: automatic light vehicle) The world's 1st automatic metro system (1983), 60 stations covering 45 km.
- 2 tramway lines serving over 36 stations, connecting Lille to Roubaix and Tourcoing.
- 60 bus lines.

Other modes of transport:

V'Lille: Bicycle on a self-service basis: 210 stations www.ville.fr

Bike and E-bike hire (electric pedal bike) Transpole: Oxygène station at Champ de Mars (Monday to Saturday from 7.00 am to 8.00 pm www.transpole.fr)

Alter Move : 89 rue Nationale - Lille www.altermove.com

Cycle-taxi Cycloville. A covered cycle-taxi service in the city centre. €1 per pick-up + €1 per km per person (up to 2 people). www.cycloville.com

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