



European Materials Research Society

# Spring Meeting 2019

IUMRS - ICAM International Conference  
on Advanced Materials

May 27-31 | Acropolis Congress Centre | Nice | France

## Call for Papers

deadline for abstract submission: 15 January 2019

[www.european-mrs.com](http://www.european-mrs.com)

# Announcement for 2019 Spring Meeting

It is with great pleasure that we announce the 2019 Spring Meeting of the European Materials Research Society (E-MRS) to be held in combination with the IUMRS - ICAM International Conference on Advanced Materials from May 27 to 31 at the Acropolis Congress Centre, Nice, France

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

The 2019 Spring Meeting will consist of parallel symposia with invited speakers, oral and poster presentations, assorted by two plenary sessions and a number of workshops and training courses. In parallel with the technical sessions, more than 90 international exhibitors are expected to display equipment, systems, products, software, publications and services during the meeting.

The high quality scientific program will address different topics organized into 28 symposia arranged in 6 clusters covering the fields of Materials for Energy; Bio- and Soft Materials; Nano-Functional Materials; 2-Dimensional Materials; Materials, Electronics and Photonics and Modelling and Characterization. The latest scientific results will be presented and authors are invited to submit papers in the selected journals that fit the scope of each symposium. It is worth noting that the papers are peer-reviewed at a high scientific level, according to a process and timetable that are at the discretion of the symposia organizers.

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

The focal point of the conference will be the two plenary sessions each consisting of two Nobel Laureate presentations given by Prof. Hiroshi Amano (Nobel Prize in Physics 2014) and Prof. Klaus von Klitzing (Nobel Prize in Physics for 1985) followed by two eminent presentations given by the 2018 MRS Mid-Career Award winner speaker in the one session and the winner of the EU-40 E-MRS 2019 Prize winner in the second. These assorted presentations demonstrate exceptional promise for leadership and have made outstanding and innovative contributions to Materials Research in Europe and the US.

Everyone who complies with the profile of the EU-40 E-MRS 2019 Prize is encouraged to apply by January 31, 2019. The presentation of Graduate Students Awards, delivered for each one of the run symposia, will conclude the plenary session. We encourage all junior researchers to apply to these awards.

Please note the deadline for abstract submission is set for January 15, 2019!

It will be our great pleasure to welcome you all in Nice next May.



**Prof. George KIRIAKIDIS**  
E-MRS President

## Presentation

### EUROPEAN COORDINATION GROUP

#### President

##### George KIRIAKIDIS

IESL/FORTH  
100, N. Plastira str. Voutes  
Heraklion 70013 Crete  
Greece  
Phone: +30 2810 391271  
kiriakid@iesl.forth.gr

#### General Secretary

##### Paul SIFFERT

E-MRS  
BP.20  
67037 Strasbourg cedex 2  
France  
Phone: +33 3 88 10 65 43  
emrs@european-mrs.com

#### Vice-President

##### Peter WELLMANN

Materials Department 6  
Electronic Materials  
and Energy Technology  
University of Erlangen  
Martensstr. 7  
91058 Erlangen  
Germany  
Phone: +49 9131 8527635  
peter.wellmann@ww.uni-erlangen.de

#### Vice-President

##### Valentin CRACIUN

National Institute for Laser,  
Plasma, and Radiation  
Physics Laser Department  
Bucharest  
Romania  
valentin.craciun@inflpr.ro

### CONFERENCE CHAIRS

#### Anke WEIDENKAFF

Universität Stuttgart  
Institut für Materialwissenschaft  
Chemische Materialsynthese  
Heisenbergstr. 3  
70569 Stuttgart  
Germany  
weidenkaff@imw.uni-stuttgart.de

#### Chinho PARK

Yeungnam University  
School of Chemical Engineering  
Korea  
chpark@ynu.ac.kr

#### Fu-Sheng PAN

Chongqing University  
National Engineering Research Centre  
for Magnesium Alloys  
P.R. China  
fspan@cqu.edu.cn

#### Motoko KOTANI

WPI - AIMR  
Tohoku University  
Room 4C  
AIMR Main Building  
Katahira Campus  
2-1-1, Katahira,  
Aoba-ku Sendai 980-8577, Japan  
m-kotani@m.tohoku.ac.jp

#### William TUMAS

National Renewable Energy Lab.  
Golden – CO  
USA  
Bill.Tumas@nrel.gov

### CONFERENCE SECRETARIAT

#### E-MRS Headquarters

BP.20  
67037 Strasbourg cedex 2  
France  
Phone: +33 3 88 10 63 72  
emrs@european-mrs.com  
www.european-mrs.com

## Presentation

### PLENARY SESSIONS

#### 1. TUESDAY MAY 28 from 11:15 to 12:30:

- Prof. Hiroshi Amano (Nobel Laureate in Physics 2014) - 45 mn  
- 2019 EU-40 Materials Prize winner - 30 mn

#### 2. THURSDAY MAY 30 from 11:15 to 12:30:

- Prof. Klaus von Klitzing (Nobel Laureate in Physics 1985) - 45 mn  
- 2018 MRS Mid-Career Award winner - 30 mn

### 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 2019 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](mailto:emrs@european-mrs.com) (subject: eu40materials) before **February 28th, 2019**.

The nominee shall not have reached his/her 40th birthday in the year in which the nomination is submitted (2018). Proposals will be evaluated shortly after and the candidates will be informed end of March 2019.

### 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 IUMRS ICAM 2019 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 2019 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](http://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 30th, 2019**.

Winners will be notified directly by the concerned symposium organizer. E-MRS Graduate Student Award Winners must be present during the social event 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 28-30 in the Convention Centre of Nice, 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](http://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:**

E-MRS Headquarters  
BP.20  
67037 Strasbourg Cedex 2  
France.  
Phone: +33 3 88 10 63 72  
Email: [emrs@european-mrs.com](mailto:emrs@european-mrs.com)

### SOCIAL EVENT

#### CONFERENCE RECEPTION

All participants are invited to attend the conference reception on Wednesday May 29, 2019 at 19:00.

**Symposium organizers and Graduate Student Award winners will be honored at the beginning of the social event**

Enjoy drinks and food while listening to live music! It is a chance to meet and renew relationships with colleagues. The participation is free of charge.

# Programme

## MATERIALS FOR ENERGY

- A** Latest advances in solar fuels
- B** Emerging photovoltaics: strategies for more stable devices
- C** Batteries and supercapacitors: fundamentals, materials and devices
- D** Advances in silicon-nanoelectronics, -nanostructures and high-efficiency Si-photovoltaics
- E** Earth-abundant next generation materials for solar energy - III
- F** Advanced materials, components & processes for integrated autonomous micro-power sources
- G** Halide perovskites: low dimensions for devices
- H** Materials for applications in photocatalysis and photoconversion
- I** Recent developments in thermoelectric materials and applications
- J** Nuclear materials

## BIO- AND SOFT MATERIALS

- K** Organic bioelectronics
- L** New strategies for smart biointerfaces
- M** Advanced carbon materials: electrochemical aspects

## NANO-FUNCTIONAL MATERIALS

- N** Nano-engineered coatings and thin films: from design to applications
- O** Synthesis, processing and characterization of nanoscale multi functional oxide films VII
- P** Dielectric nanocomposites for energy, environment and health: from fundamental to devices
- Q** Polar oxides: synthesis, science and applications
- R** Smart materials for green buildings and vehicles: towards energy efficiency, energy utilization, and a healthy interior environment
- S** ANIM 3: advances and enhanced functionalities of anion-controlled new inorganic materials

## 2 DIMENSIONAL MATERIALS

- T** 2D semiconductors: applications and perspectives
- U** Hybrid composites incorporating low dimension materials for sensors and clean energy applications

## MATERIALS, ELECTRONICS AND PHOTONICS

- V** Laser interactions with materials: from fundamentals to applications
- W** Semiconductor nanostructures towards electronic and opto-electronic device applications - VII
- X** Silicon carbide and related materials for energy saving applications

## MODELLING AND CHARACTERIZATION

- Y** Studying the materials chemistry in solution utilizing X-ray spectroscopic and scattering studies
- Z** Advanced quantitative transmission electron microscopy: materials research in several dimensions
- AA** Computations for materials – discovery, design and the role of data
- BB** Cultural heritage – science, materials and technologies

## SATELLITE EVENTS:

- Tutorial - Thin-film synthesis from the vapor phase: fundamentals of processes, growth evolution, and applications
- France-Japan joint workshop on molecular technology for advanced sensors

## MATERIALS FOR ENERGY

### Symposium A

## Latest advances in solar fuels

This symposium will provide an interdisciplinary forum for the latest R&D activities on sustainable solar hydrogen generation by addressing the latest advances in fundamental understanding as well as performance and stability of efficient catalytic systems by bringing together top world-wide academic scientists and engineers.

### Scope:

Staggering air pollution worldwide, now chronic in certain major cities in Asia and in the Western world, has become one of the most important problems that humanity is facing. It is therefore crucial to transition to new societies where environmental, energy, and economic policies are no longer based on fossil fuel technologies to substantially decrease our environmental and health impact. Without a doubt, using the two most abundant, free, and geographically balanced resources available on Earth, that is the sun and seawater, to make an unlimited amount of clean H<sub>2</sub> is the way forward. Indeed, it will provide a clean and sustainable energy resource while releasing only H<sub>2</sub>O in the atmosphere as an emission product from combustion and/or fuel cell use. With several decades of research, the scientific community still encounters great academic and technological challenges to efficiently generate hydrogen from water with sunlight at large scale and low cost. Recent developments based on novel system designs have led to significant advances in the fundamental understanding of light-induced charge dynamics and related interfacial chemical reactions and efficiencies as well as long term performance and stability of such new systems. This symposium aims to gather the most significant advancements in recent years for a sustainable generation of hydrogen from solar energy.

### Hot topics to be covered by the symposium:

Latest improvements in photoelectrode design and performance for (sea) water splitting and CO<sub>2</sub> reduction  
Novel hybrid molecular-semiconductor catalytic systems  
Progress in operando/in-situ spectroscopic techniques for energy science  
Advances in materials design for efficient plasmonic/hot electron/multiple exciton generation  
Status of long term performance and stability strategies and assessments  
Latest development in low cost and large scale fabrication techniques  
Atomic-scale understanding of mechanism and structural-performance relationships  
Multi-time scale dynamics of photogenerated charges and defects  
Modeling and simulation of photo(electro)catalytic solar fuels generation  
National and international solar fuel energy systems, projects, and networks

### Confirmed List of invited speakers:

Alceo Macchioni, Univ. Perugia, Italy  
Antoni Llobet, ICIQ, Spain  
Artur Braun, EMPA, Switzerland  
Bruce Koel, Princeton Univ., USA  
Bruce Parkinson, Univ. Wyoming, USA  
Chengxiang Xiang, California Institute of Technology, USA  
Chung-Li Dong, Tamkang Univ., Taiwan  
Clemens Heske, Karlsruhe Institute of Tech., Germany  
Daniel Esposito, Columbia Univ., USA  
Emily Carter, Princeton Univ., USA  
Gary Brudvig, Yale Univ., USA  
Gerko Oskam, CINVESTAV, Mexico  
Ghim Wei Ho, Natl Univ. Singapore  
Harry Tuller, Massachusetts Institute of Technology, USA  
Hicham Idriss, SABIC, Saudi Arabia  
Ian Sharp, TU Munich, Germany  
Jae-Sung Lee, UNIST, Korea  
Jan Augustynski, Warsaw Univ., Poland  
Jennifer Leduc, Koln Univ., Germany  
Jin Zhang, UC Santa Cruz, USA  
Jinghua Guo, Lawrence Berkeley Natl. Lab., USA  
Jozsef Pap, MTA, Hungary  
Juan Ramon Morante, IREC, Spain

Kazunari Domen, Univ. Tokyo, Japan  
Kevin Sivula, EPFL, Switzerland  
Lianzhou Wang, Univ. Queensland, Australia  
Mahendra Sunkara, Univ. Louisville, USA  
Mohammed Huda, UT Arlington, USA  
Ooman Varghese, Univ. Houston, USA  
Prashant Kamat, Notre Dame Univ., USA  
Renata Solarzka, Warsaw Univ., Poland  
Shaohua Shen, Xi'an Jiaotong Univ., China  
Song Jin, Univ. Wisconsin, USA  
Tim Lian, Emory Univ., USA  
Victor Batista, Yale Univ., USA  
Victor Klimov, Los Alamos Natl. Lab., USA  
Wolfram Jägermann, TU Darmstadt, Germany  
Yanfa Yan, Univ. Toledo, USA  
Yasuhiro Tachibana, RMIT, Australia  
Zetian Mi, Univ. Michigan, USA

### Confirmed List of Scientific committee members:

Thomas Hamann, Michigan State Univ., USA  
Nick Wu, West Virginia Univ. USA  
Yat Li, UC Santa Cruz, USA  
Heinz Frei, LBNL, USA  
Frank Osterloh, UC Davis, USA  
Kirk Bevan, McGill Univ., Canada  
Dongling Ma, INRS, Canada  
Csaba Janaky, Univ. Szeged, Hungary  
Liejun Guo, Xi'an Jiaotong Univ., China  
Ana Flavia Nogueira, IQ-UNICAMP, Brazil

### Publication:

Solar Energy Materials and Solar Cells (Impact Factor 2016: 4.784) (Approved)  
Journal of Materiomics (Approved)

### Symposium organizers

**Flavio Leandro DE SOUZA**  
**Universidade Federal do ABC**  
Avenida dos Estados, 5001, Santo Andre – SP, Brazil 09210-580  
Phone : +5511 4996 8353  
Mail : flavio.souza@ufabc.edu.br

**Lionel VAYSSIERES**  
**International Research Center for Renewable Energy-Xi'an Jiaotong University**  
School of Energy & Power Engineering; 28 Xianning West Rd; 710049 Xi'an, Shaanxi Province, China  
Phone : +86 298 266 4665  
Mail : lionelv@xjtu.edu.cn

**Samuel MAO**  
**University of California at Berkeley**  
Department of Mechanical Engineering; Etcheverry Hall, Hearst Ave, Berkeley, CA 94720, USA  
Phone : +1 510 2258210  
Mail : ssmao@berkeley.edu

**Sanjay MATHUR**  
**Institute of Inorganic Chemistry, University of Cologne**  
GreinstraÙe 6, D-50939 Cologne, Germany  
Phone : +49 221 470 4107/4657  
Mail : sanjay.mathur@uni-koeln.de

### Emerging photovoltaics: strategies for more stable devices

Photovoltaic devices applying solution-processed organic, inorganic and organo-inorganic hybrid materials, including polymer/small molecule semiconductors, colloidal quantum dots (QDs) and organic-inorganic halide perovskites, have shown remarkable progress in terms of efficiency over the past decade. Yet the Achilles heel of these devices lies in their modest environmental stability. The objective of this symposium is to highlight the newest developments in 3rd-generation solar cells based on solution processible systems with a focus on the fundamental aspects of their stability and innovative practical approaches to improve the lifetimes of such photovoltaic devices.

#### Scope:

Researchers in the field of photovoltaic devices based on organic, inorganic colloidal QDs and organic-inorganic perovskite halide materials have witnessed remarkable progress over the past decade. The majority of research efforts have been focused on the improvement of the power conversion efficiency of these devices, leading to a significant increase of this figure-of-merit to >13% for organics and QD and >22% for perovskites. This progress and additional advantageous properties, such as ease of processibility, low-cost, light-weight, flexibility and semi transparency make these devices a contender for potential new industrial applications. However, when compared to silicon-based solar panels, which typically have a lifespan of 25 years, most solution-processed 3rd generation solar cells suffer from various degrees of material degradation related to the environment they are exposed to. Degradation, thus currently represents one of the utmost pressing issues preventing their largescale application and exploitation.

The fundamental reasons for organic and hybrid material deterioration to a large extent originate from the same properties that make these materials attractive. Soft, flexible character of organic and hybrid semiconductors make them susceptible to morphological changes, and may facilitate precipitation of oxidation agents into the photovoltaic device. Moreover, device architecture with large interfacial areas may be prone to undesirable photochemistry and promote changes in the device over time. For these reasons, addressing the stability aspect of organic and hybrid photovoltaic devices requires an interdisciplinary approach and should be assessed in the context of the specific photoconversion mechanism for every type of 3rd-generation solar cells.

This symposium aims to bring together international key researchers working on organic, inorganic QD, hybrid organic-QD, and perovskite halide materials to discuss fundamental knowledge, new concepts, material and device design strategies towards the goal of more stable and better performing 3rd -generation solar cells. The understanding of degradation mechanisms and solving of the degradation issues both from materials and device structure are indispensable for their future real application. In particular, knowledge regarding the interplay between material design (synthesis, doping), device structure, materials/device processing, interfaces, charge transport, and novel characterization techniques is highly desirable in order to promote these emerging photovoltaic technologies to real consumer products.

#### Hot topics to be covered by the symposium:

Degradation mechanisms in organic photovoltaics and new non-fullerene acceptor materials  
 Surface trap formation in colloidal QD and hybrid (organic-QD) photovoltaics  
 Degradation mechanisms in perovskite photovoltaics  
 Observation of degradation effects through device photophysics  
 Role of extraction layers and electrodes in device stability  
 Mitigation strategies  
 Use of encapsulation layers and blocking layers for stability enhancement  
 Photochemistry and photophysics of hybrid semiconductors  
 Water and oxygen precipitation in soft semiconductors  
 New device structures for enhanced lifetime

#### Tentative List of invited speakers:

M. Saiful Islam – University of Bath, UK  
 Gerasimos Konstantatos – ICFO – The Institute of Photonic Sciences, Spain  
 Neil Greenham – University of Cambridge, UK  
 Thomas Riedl – University of Wuppertal, Germany  
 Christoph Brabec – University of Erlangen, Germany  
 Nam-Gyu Park – Sungkyunkwan University, South Korea  
 Qingbo Meng – Chinese Academy of Sciences, China  
 Michael D. McGehee – Stanford University, USA  
 Zhijun Ning – Shanghai University of Technology, China  
 Xudong Yang – Shanghai Jiaotong University, China  
 Wanli Ma – Soochow University, China  
 Lionel Hirsch – CNRS/Université de Bordeaux, France  
 Dongling Ma – INRS, Canada  
 Dieter Neher – University of Potsdam, Germany  
 Robert Lovrincic – TU Braunschweig, Germany  
 John B. Asbury – Penn State University, USA  
 Maria Antonietta Loi – University of Groningen, Germany

#### Tentative List of Scientific committee members:

Ni Zhao – Chinese University of Hong Kong, China  
 Henry Snaith – Oxford University, UK  
 Nir Tessler – Israel Institute of Technology, Israel  
 Ted Sargent – University of Toronto, Canada  
 Huagui Yang – Huadong University of Science and Technology, China  
 Thomas Kirchartz – Universität Duisburg-Essen, Germany  
 Nicolas Mercier – Université Angers, France  
 Peter Reiss – CEA Centre de Grenoble, France  
 Mario Caironi – Center for Nano Science and Technology @PoliMi, Istituto Italiano di Tecnologia, Italy  
 Annamaria Petrosza – Center for Nano Science and Technology @PoliMi, Istituto Italiano di Tecnologia, Italy

#### Symposium organizers

**Artem BAKULIN**  
**Imperial College London**  
 Department of Chemistry, South Kensington Campus, London SW7 2AZ, U.K.  
 Phone : +44 (0) 757 831 3163  
 Mail : a.bakulin@imperial.ac.uk

**Baoquan SUN**  
**Soochow University**  
 Institute of Functional Nano & Soft Materials (FUNSOM), 199 Ren-Ai Road, Suzhou Industrial Park, Suzhou, Jiangsu 215123 China  
 Phone : +86 512 65880951  
 Mail : bqsun@suda.edu.cn

**Yana VAYNZOF**  
**Heidelberg University**  
 Kirchhoff Institute for Physics, Im Neuenheimer Feld 227, 69120 Heidelberg, Germany  
 Phone : +49 6221 54 9276  
 Mail : vaynzof@uni-heidelberg.de

**Zhuoying CHEN**  
**CNRS – ESPCI Paris**  
 Laboratoire de Physique et d'Etude des Matériaux (LPEM), UMR 8213, 10 Rue Vauquelin, 75005 Paris, France  
 Phone : +33 (0)1 40 79 45 84  
 Mail : zhuoying.chen@espci.fr

### Batteries and supercapacitors: fundamentals, materials and devices

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

#### Scope:

Electrochemical energy storage is a rapidly advancing field building on a continuous stream of innovative ideas. Driven by the impulse for vehicle electrification and energy autonomy for residential use, improving the performance of batteries and supercapacitors has attracted intense interest over the past decades. While much effort has been oriented towards increasing the power and energy density at the cell level, research focused on system-level energy metrics, cost and safety characteristics of advanced batteries has received less attention but is urgently needed to facilitate the “wireless electrification” process. Chemistry, materials and cell design barriers in the areas of safety, cost and robustness of the power systems need to be overcome for the large-scale adoption of batteries, supercapacitors and their hybrids.

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

The topics to be covered by the symposium are firmly consistent with the Batteries & Supercaps (Wiley vch) scope and the conference proceedings/manuscripts of this symposium will have the opportunity to get published in a special issue of this journal.  
 Symposium Sponsored Best Graduate Student Poster and Oral Presentation Awards.

#### Hot topics to be covered by the symposium:

The symposium will cover a wide range of topics relating to electrochemical energy storage science and technology including, but not limited to:

High-energy Li-ion materials: intercalation, conversion and alloying electrode materials.  
 Materials for non-Li battery chemistries (Na+, K+, Ca2+, Mg2+, Al3+, etc.)  
 Advances in Lead-acid, Ni-Cd, Ni-MH and other Metal-Ion systems.  
 Organic materials and polymers for energy storage.  
 Novel redox couples and materials for flow batteries.  
 Supercapacitors, Li-ion capacitors and hybrid configurations.  
 Ionic liquids, solid and liquid electrolytes.  
 Electrode/electrolyte interface processes.  
 Binders, separators, electrolytes and additives.  
 Safety, reliability, cell design and system integration.  
 Industry view on production for P/H-EVs, stationary storage and others.  
 Characterization, modeling and theoretical advances.  
 Recycling

#### List of invited speakers:

Artem Abakoumov (Skolkovo Innovation Center, Russia)  
 Fanny Bardé (Toyota Motor Europe, Belgium)  
 Will Chueh (Stanford University, USA)  
 Jeffrey Dahn (Dalhousie Univ, Canada)  
 Robert Dominko (NIC, Slovenia)  
 Liangbing Hu (Univ. Maryland, USA)  
 Patrik Johansson (Chalmers University, Sweden)  
 Stefano Passerini (Karlsruhe Institute of Technology, Germany)  
 Philippe Poizat (IMN, France)  
 Tobias Placke (University of Muenster, Germany)  
 Patrice Simon (Université Paul Sabatier, France)  
 Farouk Tedjar (Recupyl SAS, France)  
 Claire Villeveille (PSI, Switzerland)  
 Atsuo Yamada (University of Tokyo, Japan)  
 Yan Yao (UT Houston, USA)  
 Gleb Yushin (Gatech, USA)

#### Tentative List of Scientific committee members:

P. Adelhelm (Jena University, Germany)  
 M. Becuwe (UPJV, Amiens, France)  
 D. Bresser (Helmholtz Institute Ulm, Germany)  
 P. Canepa (Bath University, UK)  
 F. Dolhem (UPJV, Amiens, France)  
 O. Fontaine (University Montpellier, France)  
 S. A. Freunberger (Graz University of Technology, Austria)  
 A. Grimaud (Collège de France, France)  
 M. Salanne (Sorbonne Université, France)  
 C. Villeveille (PSI, Switzerland)

#### Symposium organizers

**Alexandre PONROUCH**  
**Institut de Ciencia de Materials de Barcelona**  
 Campus UAB E-08193 Bellaterra Catalonia, Spain  
 Phone : +34 935801853  
 Mail : aponrouc@icmab.es

**Alexandru VLAD**  
**Université Catholique de Louvain**  
 Place L. Pasteur 1, Lavoisier Bldg. b.208, 1348 Louvain-la-Neuve, Belgium  
 Phone : +32 10 47 25 55  
 Mail : alexandru.vlad@uclouvain.be

**Bruce DUNN**  
**University of California**  
 3121B Engineering V, Los Angeles, CA 90095-1595, USA  
 Phone : +1 310 825 1519  
 Mail : bdunn@ucla.edu

**Mathieu MORCRETTE**  
**Université de Picardie Jules Verne**  
 33 Rue Saint Leu - 80039 Amiens Cedex, France  
 Phone : +33 3 22 82 57 70  
 Mail : mathieu.morcrette@u-picardie.fr

## Symposium D

### Advances in silicon-nanoelectronics, -nanostructures and high-efficiency Si-photovoltaics

Silicon in various bulk forms remains a fascinating material allowing for solar cell efficiency records by ultimate passivation of the bulk, surfaces, and contacts. In parallel Si nanostructures emerge as capable building blocks in diverse fields ranging from nano-electronics and photonics to sensing. This symposium aims to share the latest research in these fields and to create new interdisciplinary ideas.

#### Scope:

Silicon is an omnipresent semiconductor material that can be implemented in multifarious applications and that represents the foundation of modern electronics and energy harvesting. Silicon-based microelectronics, which is nowadays better described as nanoelectronics, will reach the sub-10nm technology nodes in the near future. At these dimensions, nano-size effects comprising for instance quantum confinement, statistical issues of doping, surface states, etc., come into play and deteriorate the performance and reliability or even cause complete failure of the transistors. Several of these nano-size effects were already investigated on deliberately fabricated Si nanostructures and the findings obtained there, might be essential to circumvent the problems that occur when FETs reach single-nanometer dimensions. Furthermore, unconventional and novel approaches of Si nanostructures are of interest as they could provide alternative workarounds that help preventing further delays in implementing future technology nodes with the goal to provide more performance at reduced power consumption.

In addition to transistors for electronics, Si nanostructures such as nanowires and nanoparticles open a whole new vista for various interdisciplinary applications in the fields of sensors, quantum-devices, manipulators, actors, optoelectronics, biomarkers, etc. Due to their high surface-to-volume ratios Si nanostructures are dominated by their surface, which requires new physics and chemistry to understand their properties. This knowledge is yet to be completed and transferred to modern transistor technology.

In the field of energy harvesting, Si photovoltaics has seen a boost in efficiency by replacing diffused p/n-homojunctions with heterojunctions that act as carrier-selective and highly passivated (recombination-free) contacts. This concept allows for a range of novel materials to be investigated as contacts but requires the precise understanding on their interface properties with Si. Despite reports about impressive conversion efficiencies, at least on lab-scale solar cells, the ideal hetero-contacts combining the right electronic and optical properties and being compatible with industrial mass-production, are yet not found. Further interdisciplinary research must find or develop materials that combine suitable Si-surface passivation with carrier-selective tunneling, long-term stability plus reliable and cost-efficient fabrication.

#### Hot topics to be covered by the symposium:

Si nanoelectronics: fabrication, metrology & characterization, device simulations (TCAD, etc.)  
Advanced electronic devices (FinFET, T-FET, GAA-FETs, thin-film FETs, ferroelectric memories, etc.)  
Integration challenges towards technology node N5: epitaxial growth, impact of defects, scaling limits, novel contact and doping techniques  
Recent developments in electrical and chemical mapping of materials at the nanoscale (KPFM, SCM, C-AFM, SSRM, APT, TOFSIMS, SIMS) as well as optical measurements ( $\mu$ Raman, s-SNOM) and TEM related methods (HRTEM, EFTEM, CBED, EELS, E-holo, E-tomo)  
Si-alloys (SiGe, SiC)  
Si nanostructures (nanowires, quantum dots, nanocrystals, silicene): theory, synthesis, fabrication, properties  
Doping, surface effects, surface functionalization  
Nano-scale effects and defects in bulk silicon: O-nanoprecipitates, interaction with vacancies and interstitials, B-O-H complexes, effects on photocarrier lifetime  
Applications of Si nanostructures: e.g. gas- and bio-sensing, electronics, photonics, energy harvesting  
High-efficiency Si-photovoltaics by passivating tunneling contacts  
Passivated Si-solar cell contacts based on poly-Si, a-Si, TCO, Si-oxides, -nitrides, -carbides, metal oxides and transition metal oxides, etc.  
Bulk and nanostructured Si as anode material for lithium batteries and its Solid-Electrolyte-Interphase (SEI) formation

#### Confirmed List of invited speakers:

Asen Asenov (Univ. of Glasgow, UK): «Advances in the simulation of silicon nanowire transistors»  
James Bullock (UC Berkeley, USA): "Materials based surveying of selective-contacts for silicon solar cells"  
James F. Cahoon (Univ. of North Carolina at Chapel Hill, USA): «Bottom-up synthesis of rectifying silicon nanostructures: From asymmetric electron ratchets to decouple-junction photovoltaics»  
Jean-Pierre Colinge (CEA-LETI, France): "The MOSFET at the end of Moore's law"  
Stefaan De Wolf (KAUST Solar Center, Saudi Arabia): «Passivating contacts for high-efficiency silicon and perovskite solar cells»  
Bram Hoex (UNSW Sydney, Australia): «Nanoscale thin films for enabling the ultimate efficiency of silicon solar cells»  
Tzahi Cohen-Karni (Carnegie Mellon Univ., USA): «Multiscale synthesis of highly-controlled hybrid-nanomaterials from a single one-dimensional (1D) building block to a three-dimensional (3D) mesh»; prefers May 28  
Dirk König (UNSW Sydney, Australia): «Introducing n- and p-Type Behaviour in VLSI Silicon Without Dopants While Maintaining CMOS-Compatibility»  
Jan Linnros (KTH Stockholm, Sweden): title tba  
Thomas Mikolajick (NaMLab, TU Dresden, Germany): «Reconfigurable nanowire field effect transistors with volatile and nonvolatile configuration modes»  
Oded Millo (Univ. of Jerusalem, Israel): title tba  
Alessandro Molle (CNR-IMM, Agrate Brianza, Italy): «Silicene and two-dimensional Xenos for nanotechnologies»  
Hele Savin (Aalto Univ., Finland): title tba  
Hiroshi Sugimoto (Kobe Univ, Japan): «All-Inorganic Colloidal Si Quantum Dots Codoped with Boron and Phosphorus»  
Jan Valenta (Charles Univ., Prague, Czech Republic): «Luminescence decay kinetics as a clue to understand Si nanoparticles and their ensembles»  
Wilfried Vandervorst (IMEC, Leuven, Belgium): title tba  
Floris A. Zwanenburg (Univ. of Twente, The Netherlands): «Silicon quantum electronics»  
Fernando Gonzalez Zalba (Univ. of Cambridge, UK): «Silicon transistors for quantum computing: From bits to qubits»

#### Confirmed List of Scientific committee members:

Yonder Berencén (HZDR Dresden, Germany)  
Kaining Ding (FZ Jülich, Germany)  
Sergey Dyakov (Skolkovo Institute, Russia)  
Pierre Eyben (IMEC, Belgium)  
Benjamin Lee (Hanwha Q-Cells GmbH, Germany)  
Enrico Napolitani (Univ. Padova, Italy)  
Keita Nomoto (Univ. of Sydney, Australia)  
Lourdes Pelaz (Univ. Valladolid, Spain)  
Manuel Schnabel (NREL, USA)

#### Publication:

Selected papers will be published in a Special Issue of «Physica Status Solidi» (Wiley-VCH).

#### Symposium organizers

**Daniel HILLER**  
Research School of Engineering, Australian National University (ANU)  
32 North Road, Acton ACT 2601, Australia  
Mail : daniel.hiller@anu.edu.au

**Paul STRADINS**  
National Renewable Energy Laboratory (NREL)  
Denver West Parkway, Golden, CO 80401, USA  
Phone : +1 303 384 6774  
Mail : pauls.stradins@nrel.gov

**Ray DUFFY**  
Tyndall National Institute / University College Cork  
Lee Maltings, Dyke Parade - Cork T12 SRCP, Ireland  
Phone : +353 21 234 6644  
Mail : ray.duffy@tyndall.ie

**Steffen STREHLE**  
Institute of Electron Devices and Circuits, Ulm University  
Albert-Einstein-Allee 45, 89081 Ulm, Germany  
Phone : +49 731 50 26159  
Mail : steffen.strehle@uni-ulm.de

## Symposium E

### Earth-abundant next generation materials for solar energy - III

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

#### Scope:

This symposium will address fundamental and applied aspects of materials suitable for earth abundant solar energy production. Relevant technologies include photovoltaics, thermal solar, water splitting and solar fuel production. Recent developments in both experimental and theoretical/computational approaches will be addressed making this symposium an ideal platform for researchers working on all stages of development of earth abundant and newly emerging materials for thin film solar materials.

The focus will be on issues that are relevant to development of solar devices and solar fuel technologies outside of those already well developed industrially, i.e. materials other than Si, CdTe and CIGS.

The symposium will target all the material layers of importance for solar devices: solar cell absorbers, electron and hole transport layers, water splitting photoelectrodes, transparent conductors, electrocatalysts for oxygen and hydrogen evolution, buffers and other components of importance to thin film photovoltaics and solar fuel devices. Absorber materials will include but will not be limited to CZTS and related multinary compounds, hybrid organic/inorganic perovskites, SnS, Cu<sub>2</sub>O, FeS<sub>2</sub>, Zn<sub>3</sub>P<sub>2</sub>, ZnSnN<sub>2</sub>, ZnSnP<sub>2</sub>, Cu<sub>2</sub>S, Cu<sub>3</sub>N, WSe<sub>2</sub> etc.

Novel experimental techniques for synthesis of all the relevant layers are of interest combined with characterization methods for defects, surfaces and interfaces, charge carrier dynamics and doping strategies. Theoretical calculations of interest include high throughput methods for new materials, defect calculations combined with the search for new defect tolerant materials and numerical device simulations to better understand the current limitations in device performance of the emerging devices.

#### Hot topics to be covered by the symposium:

Emerging earth abundant solar absorbers  
Novel p-type transparent conducting oxides  
Computational design for photovoltaics  
Defects analysis of absorber materials and nano-materials  
Interface and surface properties  
Novel solar cell devices  
Integrated solar fuel devices  
Thermal solar materials  
Water-splitting materials, nanomaterials and devices  
Metal oxide photoelectrodes

#### List of invited speakers:

Scanlon, UCL, UK  
Stefan, NREL, USA  
Adryi Zakhutaiev, NREL, USA  
Arca, NREL, USA  
Joel Varley, LBNL, USA  
David Fenning, UCSD, USA  
Wolfram Jaegermann, TU Darmstadt, Germany  
Ken Durose, Liverpool, UK  
Jacqueline Cole, Cambridge, UK  
Bernard Wenger, Oxford, UK  
Caterina Ducati, Cambridge, UK  
Philip Dale, University of Luxembourg  
Levent Gütaý, Oldenburg University, Germany

#### Tentative List of Scientific committee members:

Steve Durbin, Western Michigan University, USA  
Tim Veal, University of Liverpool, UK  
Igor Shvets, University of Dublin, Ireland  
Vladan Stevanovic, Colorado School of Mines, USA  
Bart Vermang, IMEC, Belgium  
Edgardo Saucedo, IREC, Spain  
Deep Jariwala, Caltech, USA  
Charles Hages, University of Florida, USA  
Levcento Sergiu, HZB Berlin, Germany  
Ndione Paul, NREL, USA  
Glen Teeter, NREL, USA

#### Symposium organizers

**Alex REDINGER**  
University of Luxembourg  
164A, avenue de la Faiencerie, L-1511 - Luxembourg  
Phone : +352 4666 44 6358  
Mail : alex.redinger@uni.lu

**Geoffroy HAUTIER**  
Université Catholique de Louvain  
NAPS, Chemin des Etoiles 8 / b7 L7.03.01, 1348 Louvain-la-Neuve, Belgium  
Phone : +32 10 47 35 01  
Mail : geoffroy.hautier@uclouvain.be

**Patrice MISKA**  
CNRS - University of Lorraine  
Jean Lamour Institute, FTS boulevard de Aiguillettes, 54510 Vandoeuvre les Nancy, France  
Phone : +33 (0)6 30 04 32 38  
Mail : patrice.miska@univ-lorraine.fr

**Robert PALGARVE**  
University College London  
20 Gordon St. London WC1H 0AJ, U.K.  
Phone : +44 (0)20 3108 5085  
Mail : r.palgrave@ucl.ac.uk

## Symposium F

### Advanced materials, components & processes for integrated autonomous micro-power sources

The increasing demand for autonomous micro-systems in the fields of IoT, healthcare, defense, etc is raising the need for miniaturized power sources. Combinations of energy harvesting and energy storage micro-devices open the way to optimized, possibly 'perpetual', energy supply. The symposium will focus on new material developments & material processing related to these micropower sources, their design and integration on shapeable substrates, with the objective to gather scientists working in complementary areas.

#### Scope:

The availability of efficient energy sources has always conditioned the development of off-grid electronic devices. In return, the emergence of new applications has always been a motivation for the development of new energy supply solutions. While the number of applications of stand-alone sensors and active RFID tags networks is booming, the need for well-adapted micro-power sources in terms of autonomy, power, shape/size or resistance to the surrounding environment is becoming essential. Extended autonomy is expected to be provided by harvesting energy from different sources in the local environment by means of specific miniaturized transducers: photovoltaic cells, thermo-, piezo- or magneto-electric micro-generators, micro-biofuel cells... Due to the intermittent, unpredictable and possibly unsuitable character of the electric signal delivered by these micro-harvesters, the interposition of an energy storage micro-device such a microbattery or a micro-capacitor able to absorb and to deliver the appropriate energy profile might be quite compulsory. The achievement of a suitable integrated micro-power module (few cm<sup>2</sup>/3 <), optimized for a given application, is certainly conditioned by the synthesis and the shaping of high performance functional materials, possibly nanostructured, and specific designs for each component and device, but is an even more complex challenge when constraints related to maximized integration, coupling of multiple transducers, device flexibility, additive manufacturing processes or reduced production costs have to be considered simultaneously. The symposium will therefore address advanced solutions in terms of functional materials, (micro-)manufacturing processes, integrated design and coupling of energy components for stand-alone micro-energy modules, with a particular, but not exclusive, interest for flexible devices.

#### Hot topics to be covered by the symposium:

- Triboelectric micro-generators
- Piezoelectric micro-generators
- Thermoelectric micro-generators
- Miniaturized photovoltaic cells
- Micro-batteries
- Micro-supercapacitors
- Micro bio-fuel cells
- Thin film materials for energy
- Advanced materials and processes for integration on flexible substrates
- Printed electronics dedicated to stand-alone micro-systems

#### Tentative List of invited speakers:

Zhong Lin Wang, (zhong.wang@mse.gatech.edu; zlwang@gatech.edu), Georgia Institute of Technology, Atlanta, USA  
 Patrice Simon, (simon@chimie.ups-tlse.fr), CIRIMAT, Université Paul Sabatier, Toulouse, France  
 Nathan M. Jackson, (njack@unm.edu), University of New Mexico, Albuquerque, USA  
 Jürgen Brugger, (juergen.brugger@epfl.ch), École Polytechnique Fédérale de Lausanne, Lausanne, Switzerland  
 Philippe M. Vereecken, (vereeck@imec.be), IMEC, Leuven, Belgium  
 Christophe Lethien, (christophe.letien@iemn.univ-lille1.fr), IEMN, Lille, France  
 Minbaek Lee, (mlee@inha.ac.kr), Inha University, Incheon, South Korea

#### Tentative List of Scientific committee members:

Guylaine Poulin-Vitran, (guylaine.poulinvitran@univ-tours.fr), Université de Tours, France  
 Albert Tarancón, (atarancon@irec.cat), Catalonia Institute for Energy Research IREC, Barcelona, Spain  
 Thierry Djenizian, (thierry.djenizian@mines-stetienne.fr), IMT Mines Saint-Etienne, Gardanne, France  
 Pool See Lee, (pslee@ntu.edu.sg), Nanyang Technological University, Singapore City, Singapore  
 Margreet de Kok, (margreet.dekok@tno.nl), TNO/Holst Centre, Eindhoven, The Netherlands  
 Jean Le Bideau, (jean.lebideau@cnsr-imm.fr), Nantes University, Nantes, France  
 Luis Fonseca, (luis.fonseca@imb-cnm.csic.es), CSIC - Instituto de Microelectrónica de Barcelona (IMB-CNM), Barcelona, Spain  
 Brigitte Pecquenard, (brigitte.pecquenard@icmcb.cnrs.fr), Institut de Chimie de la Matière Condensée de Bordeaux (ICMCB), Bordeaux, France  
 Rob Van Schaijk, Philips Innovation Services, Eindhoven, The Netherlands

#### Symposium organizers

**Frédéric LE CRAS**  
**CEA, LETI**

17 avenue des Martyrs, F-38054 Grenoble cedex 9, France  
 Phone : +33 (0)540 006 638  
 Mail : frederic.lecras@cea.fr

**Gonzalo MURILLO**  
**Institute of Microelectronics of Barcelona**

IMB-CNM (CSIC), Tillers s/n, UAB Campus, 08193-Bellaterra (Barcelona), Spain  
 Phone : +34 93 594 77 00 (ext. 2102)  
 Mail : gonzalo.murillo@imb-cnm.csic.es

**Peter ZALAR**  
**TNO**

Holst Centre, PO BOX 8550, 5605 KN Eindhoven, The Netherlands  
 Phone : +31 40 402 05 13  
 Mail : peter.zalar@tno.nl

## Symposium G

### Halide perovskites: low dimensions for devices

Halide Perovskites form a class of solid state materials that have recently gained renewed interest from an ever increasing and scientifically broader community of scientists. Since 2012 almost all flavors of structures and properties of Halide Perovskites have become a hot topic. This symposium aims at gathering experts to discuss the most recent advances related to low-dimensional structures (below 3D), from fundamental aspects to issues relevant for industrial sectors.

#### Scope:

In the last few months, the range of possible real-life applications, the nature of the nanoscale structures investigated as well as the fundamental issues related to halide perovskites have considerably expanded. The scope of this symposium is to focus on the most recent breakthroughs related to halide perovskites that fall beyond the initial focus of 3D frameworks for photovoltaic applications. The lower dimension halide perovskite structures show increased confinement effects, strong exciton binding energies and unique opportunities to manipulate transport and recombination of charge carriers and ions. From the structural point of view, symposium G will focus on (i) layered perovskites with novel 2D/3D structures that are discovered by analogy with the Ruddlesden-Popper and Dion-Jacobson series of oxide perovskites, (ii) nanostructures such as quantum dots/nanocrystals, nanoplatelets and nanowires, (iii) colloidal nanocrystals, and (iv) low dimensional single crystal structures. From an application standpoint, the scope will extend to, among others, light emission including lasing, photo- and radiation- detectors, catalysis (for instance water splitting), optical modulators and transistors, to name a few. More, the symposium aims at gathering scientists drawn from vastly different backgrounds from those involved in fundamental investigations (excitons, polarons, confinement,...) to scaled printable devices, with skills ranging from empirical modeling and atomic-scale simulations, through synthetic chemistry, up to large-scale devices. Thus, the scope covers topics important for industry while also covering fundamental materials science, physics, chemistry and engineering.

#### Hot topics to be covered by the symposium:

Advances in Perovskite Solar Cells: Low-dimensional compounds (joint session with symposium B)  
 Optoelectronics beyond photovoltaics: FET, LED, detectors, spintronics, etc.  
 Interaction between theory and experiment: Dynamic disorder, lattice anharmonicity, Rashba effect, halide perovskite liquids  
 Natural quantum wells and dots: quantum and dielectric confinement  
 Quasiparticles : excitons, polarons, etc.  
 Perovskite nanocrystals in devices: Synthesis and chemical stability  
 Mechanism of perovskite degradation: From ion-mobility to ferroelectricity  
 Growth techniques for improved Single-Crystal devices  
 Lead-free halide perovskite devices

#### Confirmed invited speakers:

Osman Bakr, KAUST (SA)  
 Maryna Bodnarchuk, ETH-Zürich (CH)  
 Filippo De Angelis, CLHYO, CNR-ISTM (IT)  
 Harald Hillebrecht, Freiburg University (DE)  
 Hemamala Karunadasa, Stanford University (US)  
 Alexandra Navrotsky, UC Davis (US)  
 Qingbo Meng - Chinese Academy of Sciences, (CH) (joint session with symposium B)  
 David Mitzi, Duke University (US)  
 Aditya D. Mohite, Rice University (joint session with symposium B)  
 Richard Schaller, Argon National Laboratory (US)  
 Henry Snaith, Oxford University (GB) (joint session with symposium B)  
 George Volonakis, Oxford University (GB)

#### Confirmed scientific committee members:

Jacky Even, FOTON (FR)  
 Endre Horvath, EPFL (CH)  
 Maria Antonietta Loi, Groningen University (DE)  
 Nripan Mathews, NTU (SG)  
 Nicolas Mercier, MOLTEH-Anjou (FR)  
 Paulina Plochoka, LNCOMI (FR)  
 James Rondinelli, Northwestern University (US)  
 Sergei Tretiak, LANL (US)  
 Patrick Woodward, Ohio University (US)  
 Kai Zhu, NREL (US)

An Energy Focus article for ACS Energy Letters will highlight the energy-related developments from around the world discussed at the occasion of the symposium.

#### Confirmed Sponsors:

GDR HPERO (CNRS-French research think-tank on halide perovskites)

#### Symposium organizers

**Claudine KATAN**  
**ISCR - Institut des Sciences Chimiques de Rennes**

Campus de Beaulieu Bât. 10B, Case 1009, F-35042 Rennes, France  
 Phone : +33682580335  
 Mail : claudine.katan@univ-rennes1.fr

**Constantinos C. STOUMPOS**  
**Northwestern University**

2145 Sheridan Road, Evanston, IL 60208, USA  
 Phone : +1 847 525 7062  
 Mail : konstantinos.stoumpos@northwestern.edu

**Samuel STRANKS**  
**University of Cambridge**

JJ Thomson Avenue, Cambridge CB3 0HE, UK  
 Phone : +44 1223 337288  
 Mail : sds65@cam.ac.uk

## MATERIALS FOR ENERGY

### Symposium H

## Materials for applications in photocatalysis and photoconversion

Following on the successful symposia on the topic "Photocatalytic materials for energy and environment", Symposium B, E-MRS Spring Meeting 2015 (165 abstracts received) and "Materials for applications in water treatment and water splitting", Symposium F, E-MRS Spring Meeting 2017 (177 abstracts received), the topics of this symposium have been further enlarged to cover Dye-sensitized solar cells. This may attract a larger part of the community.

### Scope:

In the last decade, a lot of effort has been devoted to the elaboration and optimization of advanced materials for photocatalytic and photoconversion applications, like solar fuels, water, air and surfaces purification and decontamination. The focus of this proposed symposium is on Materials for applications in photocatalysis and photoconversion and more precisely on i) environmental applications: water and air treatment and purification, self-cleaning surfaces, ii) healthcare applications: water and air decontamination and disinfection, self-decontaminating surfaces, iii) solar fuels: water-splitting for hydrogen production and conversion of CO<sub>2</sub> to fuels and iv) Dye-sensitized solar cells. The suggested range of topics are:

Photoresponsive nanomaterials elaboration: synthesis of different semiconductor morphologies (2D, 1D, ...), architectures and hierarchisation, self-assembly.

Advanced characterizations, in-situ and operando characterizations  
Surface functionalization to achieve photocatalytic substrates for environmental or healthcare applications

Visible and IR-light responsive nanomaterials doping, heterojunction formation, addition of plasmonic nanoparticles, photosensitization  
Water treatment

Solar Fuels: H<sub>2</sub> production, CO<sub>2</sub> conversion

Dye-sensitized solar cells

Simulation and modeling approaches

Dye-sensitized solar cells

Up-scaling, pilot plants and prototypes

### Hot topics to be covered by the symposium:

Nanostructured oxides semiconductors (eg. TiO<sub>2</sub>, ZnO, Fe<sub>2</sub>O<sub>3</sub>, Cu<sub>2</sub>O, ...) and non-oxides semiconductors (g-C<sub>3</sub>N<sub>4</sub>, CdS, GaP, ZnS, ...)

Composite semiconductors, heterojunction formations

Semiconductors modifications: eg. by noble and non-noble metal, by nanocarbons (graphene, CNTs, nanodiamonds, ...)

Hybrid photocatalysts, molecular approaches

Air treatment

Water treatment

Photocatalytic surfaces

Transformation of cellulose substrates assisted by photocatalysis

CO<sub>2</sub> reduction

H<sub>2</sub> production

Kinetics and modeling

### Tentative List of invited speakers:

L. Santinacci (Center for Interdisciplinary Nanoscience of Marseille, France)

J. Faria (University of Porto, Portugal)

V. Artero (CEA Grenoble, France)

H. Garcia (University of Valencia, Spain)

B. Lotsch (Max Planck Institute for Solid State Research, Stuttgart, Germany)

B. Ohtani (Institute for Catalysis, Hokkaido University, Japan)

Michael Nolan (Tyndall National Research Centre, Ireland)

Y. Paz (Israel Institute of Technology, Israel)

A. Di Mauro (CNR-IMM, Italy)

D. Dionysiou (University of Cincinnati, USA)

M. Bowker (Cardiff University, UK)

P. Peterson (Queens University Belfast, UK)

V. Privitera (CNR-IMM, Italy)

B. G. Svensson (University of Oslo, Norway)

L. Meda (ENI, Italy)

L. Palmisano (University of Palermo, Italy)

S. Perathoner (University of Messina, Italy)

D. Bahnemann (Leibniz University Hannover, Germany)

P. Fernández-Ibáñez (Ulster University, Ireland)

A. Nattestad (University of Wollongong, Australia)

E. Gyorgy (Instituto de Ciencia de Materiales de Barcelona, Spain)

S. Malato (University of Almeria, Spain)

G. Li-Puma (Loughborough University, UK)

### Symposium organizers

#### Anne MORRISSEY

Dublin City University

Dublin 9, Ireland

Mail : anne.morrissey@dcu.ie

#### Giuliana IMPELLIZZERI

CNR - IMM

Via Santa Sofia 64, 95123 Catania, Italy

Mail : giuliana.impellizzeri@ct.infn.it

#### J. Anthony BYRNE

Ulster University

25B10 NIBEC, Newtownabbey Co. Antrim., BT37, 0QB, UK

Phone : +44 28 90368941

Mail : j.byrne@ulster.ac.uk

#### Valérie KELLER

CNRS / University of Strasbourg

Institute of Chemistry and Processes for Energy, Environment and Health; 25, rue Beccquerel, 67087 Strasbourg cedex 2, France

Phone : +33 671843648

Mail : vkeller@unistra.fr

## MATERIALS FOR ENERGY

### Symposium I

## Recent developments in thermoelectric materials and applications

Rapid progress has been made worldwide in both application and fundamental understanding of thermoelectric materials, including testing of prototype thermoelectric generators, and discovery of topological invariants that has set off an intense search for new materials with higher figure of merit. This symposium will cover recent developments.

### Scope:

Recently, rapid progress has been made worldwide in discovery, fundamental understanding, and applications of thermoelectric materials. For example, prototype thermoelectric power generators have been tested in commercial vehicles; thermoelectric figure of merit – a key factor measuring thermoelectric materials' performance – has been doubled; discovery of topological invariances in the electronic structures of many well-known thermoelectric materials has set off an intense search for new materials with even higher figure of merit. However, challenges remain to increase overall thermoelectric performance for applications and to correlate interplay between structure, electronic and lattice properties in these materials on micro-, meso-, and nanoscales for understanding the electron and phonon transport mechanism. This symposium will cover recent developments in the following areas: 1) processing of thermoelectric materials (bulk, thin film, heterostructures, and nanocomposites) including new routes, such as combusive and explosive methods recently demonstrated; 2) improved performance via electronic and lattice optimization, in particular the recent advances in electrical and thermal transports in complex compounds and nano-composite materials and associated physical measurements providing in-depth characterization of those properties; 3) a new direction in topological thermoelectric materials research, particularly in understanding unconventional thermoelectricity in Dirac/Weyl semimetals and prospect in harness the power of electronic topology for exceptional performance; 4) Development and status of applications, and associated materials science drivers and issues will be addressed.

### Hot topics to be covered by the symposium:

Synthesis and nanostructure, including (a) de-construction of practical thermoelectric modules to solve problems; (b) basic requirements for modules made from emerging materials

Unconventional thermoelectricity in topological materials, including Dirac/Weyl semimetals, Nernst effect, and thermal Hall effects

Phonon and electron transport properties: (a) intrinsic behavior within grains, crystals, and oriented films; (b) anisotropy; (c) electron correlation; (d) interface properties

Novel synthesis routes, atomic layer control, self-assembly, combusive and explosive methods

Waste-heat recovery, energy harvest, refrigeration, and other applications

### Symposium organizers

#### Antoine MAIGNAN

CNRS

ENSICAEN/CRISMAT Laboratory, 6, Boulevard du Maréchal Juin,

14050 Caen Cedex 4, France

Phone : +33 2 31 45 26 34

Mail : antoine.maignan@ensicaen.fr

#### Qiang LI

Brookhaven National Laboratory

Condensed Matter Physics and Materials Science Department,

Bldg. 480, Upton, New York, 11973-5000, USA

Phone : +1 631 344 4490

Mail : qiangli@bnl.gov

#### Takao MORI

National Institute for Materials Science (NIMS)

WPI International Center for Materials Nanoarchitectonics

(WPI-MANA) Namiki 1-1, Tsukuba 305-0044, Japan

Phone : +81 29 860 4323

Mail : MORI.Takao@nims.go.jp

#### Wenjie XIE

University of Stuttgart (IMW)

Heisenbergstr. 3, 70569 Stuttgart, Germany

Phone : +49 711 685 61957

Mail : xie@imw.uni-stuttgart.de

deadline for abstract submission: 15 January 2019

deadline for abstract submission: 15 January 2019



### Nuclear materials

Nuclear energy production requires materials that are very resistant under demanding environment: temperature, pressure and irradiation field. These materials act as barriers and their structural properties are investigated with emphasis on mechanical performance, durability, plasticity and stability. The symposium J includes sessions dealing with materials ranging from structural components of fission thermal or fast reactors, fuel materials to waste forms. Production of these materials at the industrial level is discussed on the basis of economical and safety considerations. Macro – properties such as quality, thermodynamics thermophysical and mechanical as well as micro-structural analysis are studied from the atomic scale to the materials within a multi-scale approach.

#### Scope:

The component materials for Gen II and III, as well as for Gen IV reactors are tested for their behaviour under irradiation with particles (neutrons, protons, deuterons ...) of high energy and large flux. These are structural materials such as alloys (steels) or composites (cermet, cermet ...) or are the coolant e.g. liquid metals or molten salts. The session concerns the R&D for high temperature gas reactors and molten salt reactors.

The fuels consist of solids (or liquids) with their components (homogeneous/heterogeneous, matrices, fissiles, burnable poisons, fertile and additives). These fuel materials (oxides, nitrides, carbides, silicides / solid, or fluoride, chloride / liquid ...) are presented in a comprehensive way with emphasis of their intrinsic properties (thermal conductivity, high melting points). The new accident tolerant fuels and the inert matrix fuels shall be discussed in specific sub sessions. This section also includes liquid fuels such as molten fluorides (thermal) or chlorides (fast) for the molten salt reactors. Other liquids may also be investigated if acceptable. Again key properties such as melting points, thermal capacity, ... are discussed in this session.

The waste forms must finally be recognized for their stability, durability, low solubility or leachability over geological time scale. The research includes materials such as homogeneous amorphous (glass) crystalline (spent UO<sub>2</sub> fuels) or heterogeneous (Synroc, spent MOX fuel).

In all cases irradiation with accelerator guide the investigators in choosing optimal components prior irradiation in reactor. The challenge this century will be to work with much reliable and robust materials that make their use safer in nuclear system. Specific attention shall be given on the cost in Energy (EJ) during their production and their performance in term of retention of contaminants. The symposium shall contribute in enhancing the safety of the nuclear systems.

#### Hot topics to be covered by the symposium:

- Green uranium/thorium mining
- Extraction U from seawater
- Green fuel production (energy cheaper routes)
- 'Stronger' structural materials
- Liquid fuel reactor components
- New nuclear industrial applications
- More performing waste forms
- Integrated Computational Materials Engineering
- Education in Nuclear Materials

#### Tentative List of invited speakers:

- Eva Uribe – Sandia National Laboratories, USA: the proliferation resistance of the Th fuel cycle
- Lumin Wang – Nuclear Engineering at University of Michigan, USA: Status of Nuclear Energy in China
- Mark Sarsfield - NNL, Penrith, UK: Americium in Mars mission
- Elsa Merle-Lucotte - INP, Grenoble, France: Impact of molten salt reactor materials on its performance
- David Leblanc - Terrestrial energy Toronto, Canada: SMR-MSR Small modular- Molten salt reactor

#### Tentative list of scientific committee members:

- Christine Delafoy, Framatom, France
- Peng Xu, Westinghouse, USA
- Liu Tong, China General Nuclear, China
- Lingfeng He, Idaho National Laboratory, USA
- Daniel Shepherd, National Nuclear Laboratory, UK
- Michael Ojovan, IAEA, Vienna, Austria
- Eric Simoni, Uni Orsay, France
- Rory Kennedy, INL, USA
- Christina Trautmann, GSF, Germany
- Yongsun Yi, El Kahlifa Uni, Abu Dhabi, UAE
- Motoyasu Kinoshita, CRIEPI, Japan
- Xu Hongjie, SINAP, CAS, Shanghai, China
- Stephane Bourg, CEA Marcoule, France
- Thierry Stora, ISOLDE, CERN, Switzerland
- Rudi Konings, ITU JRC, EU
- Sergey Stefanovsky, Frumkin Institute, Moscow, Russia
- Eric Vance, ANSTO, Australia

#### Symposium organizers

**Chaitanyamoy GANGULY**  
**University Gandhinagar**  
 Department of Nuclear Science and Technology, Gujarat 382007, India  
 Phone : +91 8008222016  
 Mail : chaitanya.ganguly@gmail.com

**Claude DEGUELDRE**  
**Lancaster University**  
 Engineering Department, Lancaster, UK  
 Phone : + 44 1524 592716  
 Mail : c.degueldre@lancaster.ac.uk

**Gregory R. LUMPKIN**  
**ANSTO**  
 Locked Bag 2001, Kirrawee DC, NSW 2232, Australia  
 Phone : +61 2 9717 3742  
 Mail : grl@ansto.gov

**Rodney C. EWING**  
**Stanford University**  
 Center for International Security and Cooperation, University of Stanford, CA, USA  
 Phone : +1 650 725 8641  
 Mail : rewing1@stanford.edu

### Organic bioelectronics

Organic bioelectronics is a fast-rising interdisciplinary field encompassing organic electronic devices that exhibit mixed electronic and ionic conductivity, thus making them especially suited for operations in electrolyte solutions. These devices are capable of ultra-high sensitivity and stable low-voltage operations, their properties (including the interactions with living matter) can be tailored by chemical design, and they can be manufactured into flexible biocompatible plastic foils. All these features make them extremely attractive tools for the investigation of biologically-relevant scenarios and for providing solutions to a variety of medical problems, from label-free diagnostics at point of care, to minimally invasive implants for neuronal recordings and stimulation, to device-assisted loco-regional treatments. Hence, organic bioelectronics represents a truly unique communication bridge across the technology gap existing between living systems and digital electronics.

#### Scope:

During the last two decades, Organic bioelectronics have emerged in a vast collection of electronic devices, promising low-cost, flexible, and easily manufactured systems. The same concepts also offer features that make them unique in applications, where electronic signals are translated into biosignals and vice versa.

Key to these new technologies is a fundamental understanding of the interface between electronic materials and biology. Organic electronics seems to be ideally suited for the interface with biology. The "soft" nature of organic materials offers better mechanical compatibility with tissue than traditional electronic materials, while their natural compatibility with mechanically flexible substrates suits the non-planar form factors often required for biomedical implants. More importantly, their ability to conduct ions in addition to electrons and holes opens up a new communication channel with biology.

Among the major challenges that are still limiting the development, implementation, and industrialization of highly reliable organic bioelectronic devices are: i) organic electronic concepts require a thorough multidisciplinary background; ii) studies describing organic electronic devices are predominantly phenomenological, and a thorough understanding of the molecular events underlying signal transduction is still lacking, hampering the fine tuning of device performances and the development of tailor-made materials solutions; iii) the exceptional performances of many biosensors (in terms of selectivity, sensitivity, stability) in test solutions for research demonstrations need to be transferred and assessed to end-use scenarios with real biological samples, and finally, iv) the potential of organic electronics, e.g., for personalized diagnostics (customized, wearable sensors and monitoring systems) is yet to be shown.

It is the aim of this proposed symposium to bring together expertise in organic electronics and biology. We aim at elucidating the fundamentals of the electronic materials/biology interface and to present and discuss new bioelectronic technologies and applications.

#### Hot topics to be covered by the symposium:

- Flexible, stretchable electronics
  - Bioelectronic textiles
  - Wearable sensors
  - Electronic skin
  - Printed paper electronics

- In vivo and in vitro diagnostics
  - Novel concepts in biorecognition, transduction, signal amplification, recording
  - Electrochemical, electrical, electronic
  - Label-free
  - Application to clinical, food, feed, environmental and process monitoring

- Cell and tissue actuating and manipulating
  - Neuroengineering

- Electronic plants
- Surfaces & interfaces, sample preparation, lab-on-a-chip, microTAS
- Biocompatible materials and systems
- Bioelectronic materials

#### Tentative List of invited speakers:

- Annalisa Bonfiglio, Cagliari, Italy
- Zhenan Bao, Stanford University, CA, USA
- Alex K.-Y. Jen, University of Washington, Seattle, WA, USA
- Fabio Biscarini, Life Science Dept, University of Modena and Reggio Emilia, Modena, Italy
- Howard Katz, Johns Hopkins University, Baltimore, USA
- Sahika Inal, King Abdullah University of Science and Technology (KAUST), Korea
- Anitha Devadoss, Swansea University, Swansea SA2 8PP, UK
- Jose A. Garrido, Technische Universität München, Germany
- Vincent Bouchiat, Institut Néel, Université Grenoble, France

#### Tentative List of Scientific committee members:

- Daniel Simon, Linköping University, Sweden
- Angel Kaifer, Department of Chemistry, University of Miami, USA
- Andreas Offenhäusser, Peter Grünberg Institute, Forschungszentrum Jülich, Jülich, Germany
- Maria Minunni, Dipartimento di Chimica "Ugo Schiff", University of Florence, Italy
- Tai Hyun Park, School of Chem. and Biol. Eng., Seoul National University Seoul, Korea
- Ioannis Kymissis, Columbia University, New York, USA
- Omar Azzaroni, Universidad Nacional de La Plata – CONICET, Argentina
- Bo Liedberg, Nanyang Technological University, Singapore

#### Symposium organizers

**Luisa TORSI**  
**Università degli Studi "A. Moro"**  
 Dipartimento di Chimica, Bari, Italy  
 Phone : +39 080 5442092  
 Mail : luisa.torsi@uniba.it

**Sabine SZUNERITS**  
**University Lille - IEMN**  
 Cité Scientifique, Avenue Poincaré - 59652 Villeneuve d'Ascq, France  
 Phone : +33 3 62 53 17 25  
 Mail : sabine.szunerits@univ-lille.fr

**Wolfgang KNOLL**  
**AIT Austrian Institute of Technology, Vienna, Austria**  
 and CEST Competence Center for Electrochemical Surface Technology, 2700 Wiener Neustadt, Austria  
 Phone : +43 664 235 1720  
 Mail : wolfgang.knoll@ait.ac.at

## New strategies for smart biointerfaces

This symposium will bring together the diverse community of materials scientists, chemists, biologists and bioengineers focused on synthesis, characterization and design of smart biointerfaces. The most recent advances in fundamental studies, nano-bio material synthesis and biodevice design will be presented, offering unique opportunities for dissemination and synergy development.

### Scope:

Interfacial interactions between solid surfaces and biomolecules and cells underpin function and performance of materials in wide ranging applications, from implantable biodevices, to sensors, bioreactors and theranostic agents. Frontier research in this field focuses on achieving a deeper understanding of fundamental solid-bio interactions, while also on developing novel strategies for eliciting desirable bioresponses. Therefore, research in biointerfaces is cross-cutting and integrates multifaceted expertise in materials synthesis and modification, heterogeneous reactivity and charge transfer, nanoengineering, biochemistry, cell adhesion and biofilm regulation among others.

This symposium will bring together this diverse community of researchers to share progress on novel methodologies for the creation of smart biointerfaces with specific functionality and to disseminate the latest advances on our understanding of the solid-bio interface. Advanced methods for nanomaterial synthesis and modification have enabled new tools for regulating biomolecule conformation and cell adhesion at surfaces with nanoscale resolution through the control of topography, chemistry and morphology. Recent progress in selective surface modification of nanostructures, such as hot-spot functionalization, as well as the integration of tools from synthetic biology and electrochemistry have further contributed to our toolkit for the creation of tailor-made biointerfaces. Such progress in turn opens the door to the development of novel model systems for probing interactions of biomolecules, cells and tissues with solid materials, which are amenable to modelling via computational approaches, thus bridging the gap between theory and experiment. This symposium will explore synergies among these focal areas of research bringing together the latest advances in synthetic, device and modelling aspects of biointerfaces with the aim of catalysing the advent of the next generation of smart biomaterials.

### Hot topics to be covered by the symposium:

The symposium will focus on the following themes in the area of biointerfaces:

Nanostructured biointerfaces: including nano-bio, nanomedicine, nanoinstrumental characterization, nanoplasmonics  
Surface-cell interfaces and biofilms: including biofilm regulation, cell-electrode interfaces, bioelectrocatalysis, cell adhesion and proliferation at surfaces, smart antibacterial surfaces.

Adaptive and responsive biomaterials: including smart polymers, stimuli responsive materials, controlled release, biosensing.

Bioinspired materials: including functional biopolymer surfaces, supported biomimetic membranes, nano-biomolecule interface.

Novel fabrication strategies for smart biointerfaces: including wetting modulation, bioconjugation, biosensing, bioactive functionality, array surface design.

### List of invited speakers:

Matthew R. Lockett (Department of Chemistry, University of North Carolina at Chapel Hill, USA; confirmed): Healthy tissue to tumor models: using cellulose-based materials as scaffolds for 3D cell cultures

Nicolas Brun (Institut Charles Gerhardt Montpellier, France; confirmed): Enzymes at carbon electrodes: when porosity matters

Seiya Tsujimura (Division of Materials Science, Faculty of Pure and Applied Sciences; Univ. of Tsukuba, Japan; confirmed): Enzyme-based bioelectrocatalysis and its application to enzymatic biofuel.

Klaus Jandt (Institute of Materials Science and Technology (IMT); Friedrich Schiller University Jena, Germany, confirmed): Towards multifunctional and smart biointerfaces.

Lia Addadi (Department of Structural Biology; Weizmann Inst. Israel, confirmed): Pending title.

Paolo Netti (Center for Advanced Biomaterials for Health Care; IIT - Istituto Italiano di Tecnologia, Italy, confirmed): Pending title.

Henk Busscher (Faculty of Medicine; University of Groningen, Netherlands, confirmed): Pending title

### Symposium organizers

#### Frédéric BARRIERE Université de Rennes 1

Institut des Sciences Chimiques de Rennes, Campus de Beaulieu, 35042 Rennes, France

Phone : +33 2 23 23 59 43

Mail : frederic.barriere@univ-rennes1.fr

#### Giovanni MARLETTA University of Catania

Laboratory for Molecular Surfaces and Nanotechnology V.IE A.Doria 6 Catania Italy

Phone : +39 95 7385130

Mail : gmarletta@unict.it

#### Mathieu ETIENNE Université de Lorraine

Laboratoire de Chimie Physique et Microbiologie pour les Matériaux et l'Environnement, CNRS - LCPME, 405, rue de Vandoeuvre, F-54600 Villers-lès-Nancy, France

Phone : +33 3 72 74 73 82

Mail : mathieu.etienne@univ-lorraine.fr

#### Paula COLAVITA Trinity College Dublin

School of Chemistry, CRANN and AMBER Research Centres - School of Chemistry, College Green, Dublin 2, Ireland

Phone : +353 1 8963562

Mail : colavitp@tcd.ie

## Advanced carbon materials: electrochemical aspects

This symposium is about electrochemical aspects of advanced carbon materials (e.g., diamond, CNTs, graphene, carbon dots, and derived carbon composites, etc), ranging from their electrochemical synthesis, properties, and applications (e.g., sensing, energy storage and conversion, electrocatalysts, electrosynthesis, etc).

### Scope:

Advanced carbon materials covered in this symposium include novel carbon films (e.g., conductive diamond, fullerenes, DLC, CNTs, graphene, etc.), carbon nanoparticles (e.g. diamond nanoparticles, carbon dots, carbon powders, graphene dots, etc.) and micro-fabricated and CVD grown carbon structures (e.g., carbon foam, diamond nanowires, porous diamond, carbon nanofibers, etc.) as well as carbon nanocomposites (e.g., diamond/SiC nanocomposite films, carbon nitride, etc.). The topics of this symposium will consist of mainly electrochemical aspects of these advanced carbon materials, starting from their electrochemical synthesis, characterization and property investigations. The production of various carbon nanostructures or carbon composites will be included. Of particular focus will be the applications of these advanced carbon materials as the electrodes for electrochemical/biochemical sensing, as the metal-free catalysts for electrocatalytic reactions, as well as for electrochemical energy storage and conversion, electrosynthesis, and environmental degradation. In vivo and in vitro electrochemical sensing with novel carbons, electrocatalytic reactions (e.g., hydrogen evolution reaction, oxygen reduction reaction, CO<sub>2</sub> reduction reactions) using advanced carbon materials, organic synthesis using diamond electrodes, photoelectrochemical degradation of environmental pollutants, the construction of supercapacitors and batteries using various bulk/nanostructured/porous carbon nanomaterials will be hot topics of this symposium. The fabrication, characterization, and application of advanced carbon material based electrochemical devices and setups (e.g., all-diamond electrode arrays, etc.), the novel sensing platform for single molecular detection (e.g., graphene nanopore sequencing, etc.) will be also highlighted.

### Hot topics to be covered by the symposium:

Synthesis of carbon materials from various carbon composites  
Carbocatalysts for water electrolysis  
Carbocatalysts for CO<sub>2</sub> and N<sub>2</sub> reduction  
Advanced carbon materials for supercapacitors  
Carbon materials for battery applications  
Single molecule detection using carbon nanopores  
Advanced carbon materials for chemical sensing  
Bio-interfaces using carbon materials  
Advanced carbon material based electrochemical devices

### Tentative List of invited speakers:

Hua Zhang (Nanyang Technological University, Singapore)

2D Materials

Patrice Simon (Université Paul Sabatier, France)

Electrochemistry in carbon nanopores for energy storage (supercapacitors) applications

Christoph Nebel, (Fraunhofer IAF, Germany)

Electron emission from diamond for solvated electron chemistry

Zijian Zheng (Hong Kong Polytechnic University, HK, China)

Textile-enabled high energy, flexible and stable lithium batteries

Chen Wei (National University of Singapore)

Functionalized graphene for Li-O<sub>2</sub> battery

Karin Larsson (Uppsala University, Sweden)

Combined effect of dopants and terminating species on diamond surface band gap states

Quan-Hong Yang (Tianjin University, China)

Capillary shrinkage of graphene oxide hydrogel: a novel approach for well designed carbon materials

Hyacinthe Randria (University of Paris-7th, France)

Functional carbon materials for energy applications

Carlos Alberto Martinez Huitte (Universidade Federal do Rio Grande do Norte, Brazil)

Diamond for electrosynthesis

Yuwu Chi (Fuzhou University, China)

Carbon dots: from synthesis to electrochemical applications

### Tentative List of Scientific committee members:

J. Wang, University California San Diego (UCSD), USA

H. Dai, Stanford University, USA

R. Hurt, Brown University, USA

J.A. Garrido, Catalan Institution for Research and Advanced Studies, Spain

M. Stutzmann, Walter Schottky Institute, TUM, Germany

H. Kawarada, Waseda University, Japan

S.T. Lee, Soochow University, China

F. Treussart, ENS Cachan, France

J.M. Feliu, University of Alicante, Spain

M. Opallo, Institute of Physical Chemistry, Poland

J. Chen, University of Fukui, Japan

R. Harmers, University of Wisconsin, USA

C. Fan, Shanghai Institute of Applied Physics, CAS, China

G.M. Swain, Michigan State University, USA

### Symposium organizers

#### Dai-Wen PANG

Wuhan University

Wuhan 430072, China

Phone : +86 27 68756759

Mail : dwpang@whu.edu.cn

#### Nianjun YANG

University of Siegen

Institute of Materials Engineering, Paul-Bonatz Stra. 9-11, 57076

Siegen, Germany

Phone : +49 2717402531

Mail : nianjun.yang@uni-siegen.de

#### Xinliang FENG

Technische Universität Dresden

01062 Dresden, Germany

Phone : +49 35146343250

Mail : xinliang.feng@tu-dresden.de

#### Yasuaki EINAGA

Keio University

Yokohama 223-8522 Japan

Phone : +81 455661704

Mail : einaga@chem.keio.ac.jp

### Nano-engineered coatings and thin films: from design to applications

The proposed symposium is organized biannually since 1993. For 2019, we propose a symposium with the title "Nano-engineered coatings and thin films: from design to applications" to address aspects ranging from fundamental understanding of thin film growth using combined experimental and theoretical routes to coating design for application in the areas of e.g., surface protection, optics, catalysis, energy storage, conversion and saving.

#### Scope:

Extensive research in the areas of surface science and surface engineering over the past 30 years has enabled knowledge-based design and development of thin films and functional coatings with attributes tailored to desired applications for e.g., surface protection, optics, catalysis, energy storage, conversion and saving, and interaction with biological systems. The increasing demand for new materials with combined innovative functionalities necessitates control of thin film microstructure and architecture at the nanoscale. Nano-engineering has, thus, become the cornerstone of contemporary material design and the aim of this symposium is to provide an overview and a forum for the exchange of information and expertise on the cutting-edge research, advanced technology and industrial applications of nano-engineered coatings and thin films. Areas of interest will include, but will not be limited to, the following topics:

Fundamentals and modelling of vapor-based thin film synthesis processes (PVD, CVD/ALD, hybrid processes, HiPIMS) including fundamentals of low temperature/non-equilibrium plasmas.

Thin film growth dynamics and atomic-scale processes (including residual stress generation and evolution) by means of in situ growth monitoring, ex situ characterization, and computational modelling (both stochastic and deterministic).

Novel approaches for design of self-organized nanostructures (e.g., metal-ceramic nanocomposites, supported nanoparticles on 2D crystals) using, e.g., cluster beam deposition, glancing angle deposition, patterning processes; surface modification by ion beams.

Functional coatings, including multilayers, metastable alloys, high-entropy alloys.

High-end spatially-resolved characterization microscopic and spectroscopic techniques, e.g., TEM, scanning-probe microscopies, x-ray-based techniques (GISAXS, XPS), including in situ and operando studies to uncover structure-property relations under operating conditions

Hard, wear-resistant, and tribological thin films and coatings.

Thin films for energy storage, saving and conversion, including thermoelectrics and supercapacitors.

Thin films for photonic, microelectronic, and optical devices

Thin films for catalytic and sensing applications

#### Hot topics to be covered by the symposium:

Fundamentals and modelling of vapor-based thin film synthesis processes. Stress generation and evolution during thin film growth.

Thin film growth dynamics and atomic-scale processes. Effect of time- and energy-domain on film growth.

Vapor-based synthesis of self-organized nanostructures, multilayers, metastable alloys, high-entropy alloys.

High-end nanoscale microscopic and spectroscopic characterization techniques, including in situ and operando techniques

Hard, wear-resistant, and tribological thin films and coatings.

Thin films for energy storage, saving and conversion.

Thin films for photonic, microelectronic, optical devices, and catalytic and sensing applications.

#### List of invited speakers:

Matjas Panjan, Jozef Stefan Institute, Slovenia - Magnetron sputtering: understanding plasma physics for more reliable deposition of thin films

Celia Polop, Autonomous University of Madrid, Spain - Resolving the stress puzzle in polycrystalline films by surface stress mapping at the nanoscale

Jiri Houska, University of West-Bohemia, Czech Republic - Pathways for the growth of technologically important metal oxides

Harm Knoop, University of Eindhoven, The Netherlands - The effect of gas residence time and ion energy on plasma atomic layer deposition processes

Daniel Gall, Rensselaer University, USA - Transition metal nitride layers: New phases, new properties, new applications

Bärbel Krause, Karlsruhe Institute of Technology, Germany - Monitoring growth processes with synchrotron radiation: structure formation during reactive and non-reactive sputter deposition

Juan-Carlos Sanchez Lopez, Institute of Materials Science of Sevilla, Spain - Understanding the high-temperature oxidation behavior of CrAlYN-based protective coatings

Oliver Kappertz, Fraunhofer Institute for Surface Engineering and Thin Films IST, Germany - New materials and processes for large-area coatings

Jérôme Plain, Université de Technologie de Troyes, France – Zeptogram weighing scale based on metallo-dielectric nanostructures

#### List of Scientific committee members:

C. Mitterer (AUT), V.V. Uglov (BLR), D. Depla (BEL), S. Konstantinidis (BEL), N. Radic (BIH), P.C. Kelires (CYP), L. Zajickova (CZE), J. Vlcek (CZE), T. Belmonte (FRA), P. Steyer (FRA), P.-Y. Tessier (FRA), D. Babonneau (FRA), J.F. Pierson (FRA), M. Fenker (DEU), S. Kassavetis (GRC), G. Radnoczi (HUN), N. Laidani (ITA), S. Muhl (MEX), A. Cavaleiro (PRT), F. Vaz (PRT), M. Braic (ROU), M. Cekada (SVN), T. Kubart (SWE), H. Pedersen (SWE), J-H. Huang (TWN), R. Tietema (NLD)

#### Symposium organizers

**Gregory ABADIAS**  
Université de Poitiers-CNRS-ENSMA

Institut Pprime, Département Physique et Mécanique des Matériaux, SP2MI, Téléport 2, 86962 Futuroscope-Chasseneuil, France  
Phone : +33 5 49 49 67 48  
Mail : gregory.abadias@univ-poitiers.fr

**Kostas SARAKINOS (Main organizer)**  
Linköping University

Nanoscale Engineering Division, Department of Physics, Chemistry and Biology, SE-58183, Linköping, Sweden  
Phone : +46 13 281241  
Mail : kostas.sarakinos@liu.se

**Panos PATSALAS**  
Aristotle University of Thessaloniki

Department of Physics, GR-54124 Thessaloniki, Greece  
Phone : +30 2310 998298  
Mail : ppats@physics.auth.gr

### Synthesis, processing and characterization of nanoscale multi functional oxide films VII

Good control of oxide films thickness, composition and structure offers the possibility to integrate in heterostructures new functionalities. Progress in synthesis, processing and characterization of multifunctional oxide films plays a key role for the development of new devices, from microelectronics to energy and environment applications.

#### Scope:

Oxides can present a vast range of functional tunable properties, such as ferroelectricity, ferromagnetism, multiferroicity, electrical conductivity, superconductivity, thermoelectricity, optical transparency, catalytic behavior, high temperature barriers, or thermochemical protection among others. These properties can lead to innovative applications, which in many cases will require thin films with controlled properties suitable to offer high performance devices.

The functional properties of the oxides are extremely dependent on changes in the crystal structure, composition, and defects. The complexity of oxides and the relevance of their microstructure on the properties make the deposition of thin films critical. The control of thin films growth, coupled with accurate characterization tools for structure, composition and properties, modeling, and theoretical understanding, are prerequisites for further development of new high performance oxide-based materials for device applications. In this respect, the effects of strain, interfaces, defects, composition and doping, which are key parameters allowing the tuning of properties must be fully understood at the microscopic as well as at the macroscopic level. Interface phenomena between oxides but also between oxides and other materials, are also relevant as new properties can emerge. In concert with sustainable development, the avoidance of polluting, toxic, or scarce chemical elements is another major technological objective. Moreover, many applications require the use of low cost deposition methods while others require the integration of the oxides on suitable platforms, such as semiconducting wafers or flexible substrates.

This symposium follows a series of six very successful and well attended E-MRS symposia organized from 2006 to 2017. The symposium intends to continue the established tradition of an interdisciplinary forum that will bring together scientists involved in various aspects of the synthesis, processing characterization, device integration and theoretical modeling of multi-functional oxide-based thin films, multilayers and nanostructures to discuss the latest developments and future trends and challenges.

#### Hot topics to be covered by the symposium:

Growth of oxide thin films by physical & chemical methods, including advanced & novel techniques.

Growth and properties of complex heterostructures, including superlattices

Growth and properties of nanocomposite or hybrid oxide based thin films

Integration of oxides on semiconductors

Oxide nanosheets, & films on flexible substrates

Epitaxial stabilization of metastable phases

Defects in oxide thin films and at interfaces

In situ characterization of oxide film growth

Advanced characterization by microscopies & spectroscopic techniques

Ferroelectric, ferromagnetic, & multiferroic oxides

Oxide films for energy generation & conservation

Transparent conducting oxides

#### Symposium organizers

**Florencio SÁNCHEZ**  
Institut de Ciència de Materials de Barcelona (ICMAB-CSIC)

Campus de la UAB Bellaterra E-08193 Spain  
Phone : (+34) 935801853  
Mail : fsanchez@icmab.es

**Maryline GUILLOUX-VIRY**  
University of Rennes 1

Institut des Sciences Chimiques, Solid State Chemistry and Materials Group, Bat 10A, Campus de Beaulieu, 35042 Rennes Cedex, France  
Phone : +33 2 23235655  
Mail : maryline.guiloux-viry@univ-rennes1.fr

**Valentin CRACIUN**  
National Institute for Lasers, Plasma and Radiation Physics

Atomistilor 409- P.O. Box MG-36 - RO-077125 Magurele, Romania  
Phone : +40 746 100 140  
Mail : valentin.craciun@infllpr.ro

**Zoe BARBER**  
University of Cambridge

Materials Science Dept.- 27 Charles Babbage Road, Cambridge, CB3 0FS, U.K.  
Phone : +44 1223 334326  
Mail : zb10@cam.ac.uk

## Symposium P

### Dielectric nanocomposites for energy, environment and health: from fundamental to devices

The intent of this symposium is to provide a unique exchange platform for interdisciplinary interactions on dielectric nanocomposites, from synthesis to device, connected to energy, environment and health. This includes semiconductor, metallic and polymeric nanoparticles and nanofillers embedded within oxide and non-oxide as well as polymeric matrices.

#### Scope:

The possibility to incorporate sub-micron structures or fillers into a host matrix allows designing and creating nanocomposite materials with new physical properties, novel behaviors and improved physical, chemical and mechanical properties. As this research field requires a large range of skills ranging from chemistry, to physics, from material science to polymer science and biology, the symposium has the ambition to be a cross-road for researchers interested in new frontiers in dielectric nanocomposite systems connected to energy, environment and health.

In particular, the research topics discussed within the symposium will include nano-electronics and transport properties, nano-photonics and plasmonics, biosensing, energy harvesting, sensors, and additive manufacturing.

During each session, experimental and theoretical approaches as well as advanced characterization techniques will be combined in order to present the state of the art developments and strategies to fabricate and to improve the performance as well as potential applications of dielectric nanocomposites.

#### Hot topics to be covered by the symposium:

Synthesis of nanoparticles in dielectric matrices, e.g. oxide and non-oxide ceramics and polymers;  
Optical properties: emission, absorption, scattering, luminescence, waveguiding, light confinement, plasmonics, plasmoelectronics;  
Electronic properties: injection, transport, charge trapping, capacitance, memristance, photocurrent, electroluminescence, single electron effects;  
Biomedical and sensing applications;  
Bio-based additive manufacturing;  
Modeling of precipitation, transport, quantum confinement, doping, electronic structure;  
Devices: LEDs, optical amplifiers, waveguides, memristors, biosensors;  
Advanced techniques for structural and chemical characterization at the nano- and sub-nanoscale, e.g. (S)TEM, advanced spectroscopies, synchrotron techniques, APT techniques.

#### Confirmed List of invited speakers:

Caroline Bonafos, CEMES (France)  
Vincenzo Giannini, Imperial College (UK)  
Jennifer Dionne, Stanford University (USA)  
Tom Gregorkiewicz, University of Amsterdam (The Netherlands)  
Christophe Delerue, Université de Lille (France)  
Jean-François Dayen, Université de Strasbourg, (France)  
Pietro Gucciardi, Università di Messina (Italy)  
Carita Kvarnström, University of Turku (Finland)  
Ignazio Roppolo, Politecnico di Torino (Italy)

#### Confirmed List of Scientific committee members:

Riccardo Sapienza, Imperial College (UK)  
Jan Linnros, KTH Royal Institute of Technology (Sweden)  
Fabrice Gourbilleau, CIMAP (France)  
Antonio Terrasi, University of Catania (Italy)  
Hervé Rinnert, Institut Jean Lamour (France)  
Rosalia Serna, Instituto de Óptica (Spain)  
Abdallah Slablab, Saarbrücken (Germany)  
Marco Sangermano, Politecnico di Torino (Italy)

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#### Symposium organizers

**Domenico PACIFICI**  
**Brown University**  
School of Engineering, 184 Hope St, Providence RI 02906, USA  
Phone : +1 401 863 2637  
Mail : Domenico\_Pacifici@brown.edu

**Giancarlo RIZZA**  
**Laboratoire des Solides Irradiés (LSI) - Ecole polytechnique**  
Route de Saclay, 91128 Palaiseau Cedex, France  
Phone : +33 (0)1 69 33 45 10  
Mail : giancarlo.rizza@polytechnique.edu

**Minna HAKKARAINEN**  
**KTH Royal Institute of Technology**  
Fibre and Polymer Technology - School of Engineering Sciences  
in Chemistry, Biotechnology and Health, Teknikringen 56-58,  
10044 Stockholm, Sweden  
Phone : +46 (0)8 79 08 271  
Mail : minna@kth.se

**Simona BONINELLI**  
**IMM-CNR**  
Strada VIII n.5, 95121 Catania, Italy  
Phone : +39 349 1890259  
Mail : simona.boninelli@ct.infn.it

## Symposium Q

### Polar oxides: synthesis, science and applications

The polar oxides constitute a particular group of functional materials depicting properties related to their intrinsic charge unbalance such as ferroelectricity, piezoelectricity, pyroelectricity, but also other properties such as magnetic or orbital orders. The term "polar oxides" shows a rapidly increasing trend since 10 years, illustrating the growth of scientific interest in the field of oxide properties and their applications.

#### Scope:

Polar oxides are of critical importance for energy, optoelectronic, catalytic, as well as storage and information processing in nanoelectronics. The purpose of the symposium is to cover a wide range of topics, including the characterization and investigation of structural, dielectric and piezoelectric properties of bulk materials and thin films, as well as phase transitions, properties coupled to deformation, charge and optical responses, and microscopic investigations. The properties of polar oxides will also be apprehended in order to be exploited in actual and future applications with optimized and new functionalities. A novel interesting class of polar oxides is based on doped Hf(Zr)O<sub>2</sub> with non-centrosymmetric orthorhombic structure, a Si-compatible ferroelectric material which could be used for manufacturable and scalable embedded FeRAM applications as well as steep slope switching devices.

The goal of this symposium is to bring together scientists working in various fields of fundamental concepts and applications from material synthesis, crystal and defect structure, characterization, physico-chemical properties, modelling, and device design in the framework of polar oxides. Theoretical and experimental concepts (including fabrication, characterizations and structuration/patterning) exploiting ferroelectrics, antiferroelectrics and related polar media as materials for:

Embedded memories (ferroelectric-based, e.g. doped HfO<sub>2</sub>), negative capacitance steep slope switches  
Tunneling based devices  
Multistate junctions for neuromorphic electronic synapses  
Energy storage (supercapacitors), energy harvesting, calorimetry  
IR imaging, electro-optics, non-linear and other photonic applications  
Catalytic activities

#### Hot topics to be covered by the symposium:

Synthesis and crystal growth of bulk and low-dimensional oxide materials  
Polar surfaces simulation, patterning and characterizations  
Design of materials of desired properties, theory and modeling  
Structure-properties relationships, phase diagrams  
Tuning the polar oxide properties from intrinsic and extrinsic approaches  
Interfaces, electronic transport and photovoltaics  
Domain walls, polar vortices and topological features in ferroics  
Other fundamental phenomena: flexoelectricity, antiferroelectricity  
Advanced characterization  
Applications using polar oxides

#### Tentative List of invited speakers:

Ana Sanchez [Warwick University], UK  
Stephen Jesse [Oak Ridge National Laboratory], USA  
Marty Gregg [Queen's University], Canada  
Tae-Won Noh [Seoul National University], South Korea

#### Tentative List of Scientific committee members:

Gang Niu (Xi'an Jiaotong University, China)  
Marie-Paule Besland (IMN-CNRS, Nantes, France)  
Hitoshi Tabata (The University of Tokyo, Japan)  
Mohamed Chaker (INRS, Varenne, Canada)  
Lucian Pintilie (NIMP, Romania)  
Ingrid C. Infante (INL-CNRS, France)  
Hidekazu Tanaka (Osaka University, Japan)  
Nick Barrett (IRAMIS-CEA, France)  
Run-Wei Li (NIMTE, China)  
Igor Stolichnov (EPFL, Switzerland)

#### Symposium organizers

**Athanasios DIMOULAS**  
**NCSR DEMOKRITOS**  
Patriarchou Grigoriou & Neapoleos Str.1, 15310, Aghia Paraskevi,  
Athens, Greece  
Phone : +30 210 650 3340  
Mail : a.dimoulas@inn.demokritos.gr

**Bertrand VILQUIN**  
**INL UMR5270 CNRS ECL INSA UCBL CPE**  
Ecole Centrale de Lyon - F7 building, 36 avenue Guy de Colongue, F-69134 Ecully cedex - France  
Phone : +33 (0)4 72 18 62 54  
Mail : bertrand.vilquin@ec-lyon.fr

**Gustau CATALAN**  
**ICREA and ICN2**  
Campus Universitat Autònoma de Barcelona, Bellaterra 08193,  
Barcelona, Spain  
Phone : +34 937373618  
Mail : gustau.catalan@icn2.cat

**Marin ALEXE**  
**University of Warwick**  
Gibbet Hill Rd. Coventry, CV4 7AL, UK  
Phone : +44 24 765 26083  
Mail : m.alex@warwick.ac.uk

## NANO-FUNCTIONAL MATERIALS

### Symposium R

## Smart materials for green buildings and vehicles: towards energy efficiency, energy utilization, and a healthy interior environment

This symposium will cover smart materials for future green buildings that can contribute to a comfortable and healthy environment and that solve counteracting problems of energy efficiency and performance.

### Scope:

People in industrialized countries spend as much as 90% of their time indoors. This environment is fraught with problems from energy and health perspectives, and new materials and methodologies are needed to solve many of these problems. Today's buildings are responsible for 40% of the global use of primary energy. New paradigms in building technology, where materials play a central role, can lead to massive energy savings and can be instrumental to improve air quality, as well as providing a platform for renewable energy technologies and sinks for greenhouse gases. This session presents the state-of-the-art in materials science and technology that address these needs and challenges; it includes novel glazing, façade elements, solar cells, energy conversion systems, water cleaning units, and sensor systems that may be integrated in functional units, either as add-on functions or as multi-functional, embedded systems. For example, many functional and multifunctional materials belong to the large family of materials for which advancements in nanoscience and nanotechnology have contributed to novel material combinations, structures and properties that can lead to sustainable and cost-effective technology. The symposium will be devoted to new materials, and combinations of materials and methodologies, with applications in buildings and vehicles for improved comfort and energy savings, which can be based on bulk crystals, thin films, nanowires, quantum dots, heterostructures, nanoparticles, etc.

The presentations will cover:

Synthesis and growth of functional materials, where physicochemical properties can be tuned by composition, temperature, pressure, external fields, defects, film orientation and nanoparticle size.  
Materials and technology for glazings and façades and solar cells.  
Materials for air cleaning, water collection and cleaning  
Sensor materials and sensor devices  
Multi-functional and embedded materials and technologies  
Structure-property-functionality relationships  
Improved energy-efficiency in buildings & vehicles

We expect presentations of experimental studies, theoretical modelling, and prediction of properties. The goal of this symposium is to bring together scientists working in various fields of materials science and engineering sciences, such as synthesis, modelling and measurement of physicochemical properties with applications in green building technology, and provide an overview of new materials for human well-being, and energy-efficient buildings and vehicles.

### Hot topics to be covered by the symposium:

New materials for energy efficiency and thermal management in buildings & vehicles  
New materials for solar energy harvesting in buildings  
New filtering materials and technologies for air cleaning  
New materials and technologies for water collection, filtering and recycling in the built environment  
Sensors for fast and accurate air quality monitoring  
Multi-functional and embedded smart materials and technologies for green buildings & vehicles

### Tentative List of Scientific committee members:

Martyn Pemble, Tyndall National Institute, Ireland  
Volker Sittinger, Fraunhofer IST, Germany  
Katarzyna Zakrzewska, AGH University of Science and Technology, Poland  
Gunnar Niklasson, Uppsala University, Sweden  
Sylvie Lacombe, IPREM UMR CNRS, Université de Pau et Pays de l'Adour, France  
G. L. Guerrini, HeidelbergCement Group, Global Products Innovation Department, Italy  
Georg Pucker, FBK, Trento, Italy  
Teresa Andreu Arbella, IREC, Spain  
G. Westin, Uppsala University, Sweden

### Symposium organizers

#### Janusz SMULKO Gdańsk University of Technology

Department of Metrology and Optoelectronics, Faculty of Electronics, Telecommunications and Informatics, ul. G. Narutowicza 11/12, 80-233 Gdańsk, Poland  
Phone : +48 58 347 1484  
Mail : jsmulko@eti.pg.edu.pl

#### Lars ÖSTERLUND Uppsala University

Engineering Sciences, The Ångström Laboratory, Box 534, SE-751 21 Uppsala, Sweden  
Phone : + 46 18 4716383  
Mail : lars.osterlund@angstrom.uu.se

#### Thomas FISCHER University of Cologne

Greinstr. 6, 50937 Cologne, Germany  
Phone : +49 221 470 1979  
Mail : t.fischer@uni-koeln.de

## NANO-FUNCTIONAL MATERIALS

### Symposium S

## ANIM 3: advances and enhanced functionalities of anion-controlled new inorganic materials

Based on the success of the 1st (E-MRS symposium T, Spring 2013) and 2nd edition (E-MRS GG, Spring 2015), this symposium will focus on the solid state chemistry and physics of mixed anion materials. Their vast application prospects and huge innovative potential will be promoted. Compared to the widely investigated oxides, they offer tremendous possibilities to tune the chemical bonding through multiple anions and the subsequent properties. ANIM 3 aims to cover a large domain from the synthesis to the understanding of the fundamental properties of novel devices based on enhanced properties offered by such materials.

### Scope:

The present E-MRS symposium aims creating a European forum for the different types of researchers necessary to promote this field (materials scientists, solid state chemists and physicists, analytical scientists and device design engineers – experimentalists and theoreticians). The symposium will facilitate interdisciplinary discussions within and between these "core groups", thereby stimulating collaboration and thus it will strengthen the European and Worldwide activities in this expanding and particularly promising field.

The symposium's scope will survey the mixed-anion materials landscape with emphasize on the following aspects:

Searches for new perovskites, related materials, but also more exotic phases with the goal to expand and tune their functionalities and electronic properties from anion control (e.g. photocatalytic, luminescent materials, nonlinear optical materials, ferroelectric, ferromagnetic, semiconductive, thermoelectric, electroresistive, magnetoresistive, conductive transparent high temperature stable electrodes, solid state electrolytes, ionic conductors, dipole glasses, quasi-2-dimensional electron gases (Q2-DEG) in insulating hetero-interfaces etc...).

Advances in synthesis techniques that have enabled the development of mixed anion materials, with emphasize on more efficient and environmental friendly methods.

Computational approaches to accelerate new mixed anion materials discovery for various applications, to guide experimentalists. Theoretical studies to help current and future design of new (multi)functional materials. Theoretical concepts for novel physics expected to be derived from new functions and properties of coordinate covalent-bonding engineered ceramic material systems, epitaxial and polycrystalline thin films, glasses, single crystals, quantum size effects in nanoparticles and nanosized powders.

Overviewing of anion-substituted inorganic materials in device development activities: state-of the-art characterization and electronic properties improvement based on heterostructures, interface phenomena, electrode interactions and various device prototypes demonstrations.

### Hot topics to be covered by the symposium:

Innovative synthesis routes for Anion-substituted New Inorganic Materials (ANIM) oxynitrides, oxyfluorides, oxyhydrides and other mixed anion materials (powders, nanomaterials, bulk ceramics, glasses, thin films and single crystals).

Structural features and anion order of ANIM.

ANIM-based (photo)catalyst materials.

Optical properties: luminescence, nonlinear optical properties of ANIM materials.

Ferromagnetic, paramagnetic; paraelectric, high-K gate, ferroelectric, multiferroic properties of ANIM materials. ANIM-type semiconducting and highly conducting electrode materials.

ANIM-based energy materials for production and storage of energy: solid

electrolytes, fuel cell materials electrode materials, supercapacitor materials, battery materials, hydrogen storage materials, ionic conductor and thermoelectric materials.

Band gap and electronic structure engineering from anionic substitution: Applications

Theory, simulations and combinatorial approaches for design of new anion-controlled materials and prediction of their functionalities.

Technical challenges in the analytical and functional properties characterization of ANIM materials

### Tentative List of invited speakers:

Evgeny V. Antipov (Lomonosov Moscow State University, Russia)  
Simon Clarke (University of Oxford, UK)  
Joke Hadermann (University of Antwerp, Belgium)  
Katsuro Hayashi (Kyushu University, Japan)  
Hideo Hosono (Tokyo Institute of Technology, Yokohama, Japan)  
Alain Demourgues (ICMCB, Bordeaux, France)  
Andries Meijerink (Utrecht University, The Netherlands)  
Wolfgang Schnick, (Ludwig-Maximilians-Universität München, Germany)  
Aron Walsh (Imperial College London, UK)  
Patrick Woodward (The Ohio State University, USA)

### Tentative List of Scientific committee members:

J. Paul Attfield (University of Edinburgh, UK)  
Laurence Croguennec (ICMCB, Bordeaux, France)  
Shiv Halasyanami (University of Houston, USA)  
Mike Hayward (University of Oxford, UK)  
Shinichi Kikkawa (Hokkaido University, Japan)  
Olivier Mentre (UCCS, Lille, France)  
Kenneth Poeppelmeier (Northwestern University, USA)  
Franck Tessier (ISCR, Rennes, France)

### Symposium organizers

#### Hirosaki KAGEYAMA Kyoto University

Department of Energy and Hydrocarbon Chemistry - Graduate School of Engineering - Nishikyoku-ku, Kyoto, 615-8510, Japan  
Phone : +81 75 383 2506  
Mail : kageindex.gifscl.kyoto-u.ac.jp

#### Houria KABBOUR CNRS

Unité de Catalyse et de Chimie du Solide (UCCS), Cité Scientifique, ENSCL, bâtiment C7, Avenue Mendeleiev, 59650 Villeneuve d'Ascq - France  
Phone : +33 (0)3 20 33 64 34  
Mail : houria.kabbour@univ-lille1.fr

#### James RONDINELLI Northwestern University

Department of Materials Science and Engineering - McCormick School of Engineering - 2220 Campus Drive Cook 2036 Evanston, IL 60208-3109, USA  
Phone : +1 847 491 3198  
Mail : jrondinelli@northwestern.edu

#### Songhak YOON Universität Stuttgart - Institut für Materialwissenschaft - Chemische Materialsynthese

Heisenbergstr. 3 - 70569 Stuttgart, Germany  
Phone : +49 711 685 61974  
Mail : yoon@imw.uni-stuttgart.de

deadline for abstract submission: 15 January 2019

deadline for abstract submission: 15 January 2019

## 2 DIMENSIONAL MATERIALS

### Symposium T

## 2D semiconductors: applications and perspectives

The symposium will cover all relevant aspects of layered semiconductor materials: synthesis and chemical functionalization of these materials, their characterization with advanced techniques, and their applications in various fields. Special emphasis will be dedicated to a tuning of the electronic structure of these materials and to approaches for doping them.

### Scope:

Since the first reports on the exfoliation of an elemental layered semiconductor appeared in 2014, few-layer black phosphorus, as well as its monolayer, called phosphorene, has attracted great interest in the scientific community because of its direct band gap, which can be tuned with the number of layers, pressure, and electric field. Its high reactivity and puckered structure, which leads to anisotropic transport properties, have also drawn much research interest.

The field has seen rapid progress, and the family of layered semiconductors is continuously growing with new members, thereby bringing novel functionalities and increasing the variety of 2D-based semiconductor devices. These materials have been studied from a chemistry, material science, and physics point of view, with more to come.

The symposium includes sessions on various aspects of these 2D semiconductor materials: new developments in their synthesis, their characterization, their functionalization, and their theoretical modeling via DFT and other techniques. Applications of these materials in various fields (optoelectronics, catalysis, flexible electronics) will be given ample space, as well as for enabling technologies like functionalization, doping, and band gap tuning. Finally, the combination of these materials in van der Waals heterostructures will be included in the symposium.

The symposium has the dual aim of sharing recent results on novel layered semiconductor materials, as well as discussing the future road-map for the development of these materials. We strongly invite you to submit an abstract on your recent work on 2D materials. Abstracts will be selected with respect to the multidisciplinary intention of this symposium, which places itself at the focus of chemistry, physics, materials science, and device applications.

The symposium on '2D semiconductors: applications and perspectives' at the 2019 E-MRS Spring Meeting will include a scientific workshop on black phosphorus and related materials, co-organized by the principle investigator of the EU Horizon 2020 ERC Project PhosFun (Dr. Maurizio Peruzzini).

### Hot topics to be covered by the symposium:

Synthesis and Growth  
Van der Waals Heterostructures  
Electronic Transport Properties  
Devices  
Optoelectronic Properties  
Chemical Functionalization  
Catalysis  
Surface Science of 2D Materials

### Tentative List of invited speakers:

Alessandro Molle, CNR IMM, Italy: Fabrication of Xenon (confirmed)  
Thomas Michely, University of Cologne, Germany: Van der Waals heterostructures (confirmed)  
Li-Dong Zhao, Beihang University, Beijing, China: Thermoelectric technology in SnSe (tbc)  
Herre van der Zant, Delft University, The Netherlands: Bottom-up nanoelectronics (confirmed)  
Tony F. Heinz, Stanford, USA: Excitons in TMDCs (tbc)  
Andreas Hirsch, University of Erlangen, Germany: Functionalization of 2D Materials (tbc)  
Valeria Nicolosi, Trinity College Dublin, Ireland: Processing of 2-dimensional Nanomaterials (tbc)  
Keun Su Kim, Yonsei University, Seoul, Korea: Dirac Fermions in black Phosphorus (confirmed)

### Tentative List of Scientific committee members:

Cinzia Casiraghi, University of Manchester, UK  
Martin Pumera, Nanyang Technological University, Singapore  
M. O. Goerbig, Université Paris-Sud, France  
F. Javier Garcia de Abajo, ICFO, Barcelona, Spain  
Mercuri G. Kanatzidis, Northwestern University, USA  
Danil W. Boukhvalov, Hanyang University, Seoul, Korea  
Alexander A. Khajetoorians, Radboud University, Nijmegen, The Netherlands  
Paul K. Chu, City University of Hong Kong, China  
Thomas Nilges, TU Munich, Germany  
Barbaros Özyilmaz, National University of Singapore  
Giuseppe Nicotra, CNR IMM, Italy  
Fengnian Xia, Yale, USA  
I.V. Grigorieva, University of Manchester, UK  
Etienne Gaufres, CNRS-ONERA, France  
Gianluca Fiori, University of Pisa, Italy  
Alex Zunger, University of Colorado, USA  
Antonio Castro Neto, Centre for Advanced 2D Materials, Singapore  
Luigi Ambrosio, CNR IPCB, Naples, Italy

### Symposium organizers

#### Alexander GRÜNEIS Universität zu Köln

II. Physikalisches Institut - Zülpicher Str. 77, 50937 Köln, Germany  
Phone : +49 221 4703461  
Mail : gruneis@ph2.uni-koeln.de

#### Maria CAPORALI Consiglio Nazionale delle Ricerche (CNR)

Istituto di Chimica dei Composti Organometallici (ICCOM) - Via Madonna del Piano 10, 50019 Sesto Fiorentino (FI), Italy  
Phone : +39 055 522 5249  
Mail : maria.caporali@iccom.cnr.it

#### Stefan HEUN NEST, Istituto Nanoscienze-CNR and Scuola Normale Superiore

Piazza San Silvestro 12, 56127 Pisa, Italy  
Phone : +39 050 509 472  
Mail : stefan.heun@nano.cnr.it

#### Thomas SZKOPEK McGill University

Dept. of Electrical and Computer - 3480 University Street, rm 643, Montreal, Canada  
Phone : +1 514 398 3040  
Mail : thomas.szkopek@mcgill.ca

## 2 DIMENSIONAL MATERIALS

### Symposium U

## Hybrid composites incorporating low dimension materials for sensors and clean energy applications

This symposium aims at bringing together scientists to discuss different issues related to the application of 2D and hybrid composites materials for sensors and clean energy applications. The objective is to cover the major aspects from materials synthesis, functionalization and fabrication techniques with specific focus on their integration into devices.

### Scope:

Proposed symposium heads for gathering together expertise from different fields, such as physics of matter, synthetic chemistry, materials science, materials and device engineering, focused on the preparation of 2D and hybrid composites with enhanced functionalities. We wish to make this symposium a forum for scientist engaged in the study of 2D materials and their composites where meeting, sharing their results and networking to empower the field.

In particular, we aim to discuss the state-of-the-art approaches to enable a large-scale production of high quality heterostructures featuring aligned van der Waals planes, heading for enhanced functionalities, such as FET, diodes, sensors and energy devices.

We are also interested in discussing the recent developments in the field of light-matter interaction spurred by the tuning of charge carrier density in structures like graphene and transition metal dichalcogenides, looking for reliable alternatives to plasmonics sensing devices based on metal nanostructures.

Excitonic effects promoted by layered structures will be as well of great interest, focusing on both seeking for phenomena hard to observe in bulk semiconductors, like biexcitons, and in enabling long living photogenerated charges potentially promoting useful processes at the interface with the surrounding environment for the exploitation in sensing and energy devices.

Last, but not least, the symposium will be also dedicated to the field of coupling 2D materials with a variety of other species, both organic molecules and 0D (quantum dots), 1D (like carbon nanotubes) and 3D (semiconductors) structures. This latter field is still in its infancy, despite the large scientific production in terms of papers we have faced over the last 6-7 years: much is still to understand in terms of interface fabrication and modulation of opto-electronic properties of the resulting composites, which aim at breaking down the current limits in functional application such as light energy exploitation, light emitters, photodetection and sensors.

We are thus interested in hearing from scientists expert in the fields of materials preparation and assembly, advanced characterization tools with space and time resolution at the state-of-the-art, functional characterization, device fabrication.

### Hot topics to be covered by the symposium:

Materials and fabrication

Chemical routes for materials synthesis  
Physical deposition processes  
Functionalisation of surfaces, interfaces and materials  
Hybrid and nanostructured materials  
Integration of 2D materials with 0D, 1D and 3D structures  
Production of large scale horizontal and vertical van der Waals heterostructures  
Environmentally friendly fabrication  
Large area fabrication and manufacturing  
New technologies for the integration of nanomaterials into functional devices

Devices and applications

Autonomous devices and systems  
Biosensors and bioelectronics  
Chemical sensors, microfluidics, lab-on-chip

Physical sensors, actuators, micro and nanosystems  
Flexible substrates, devices and printed electronics  
Integration of nanostructures into flexible devices  
Materials and fabrication processes for energy harvesting, stretchable electronics, smart textiles  
Environmental technologies such as solar energy conversion, catalytic removal of water pollutants, clean chemical fuels production  
Applications of materials and fabrication methods in sensors, actuators and micro and nanosystems  
Applications of hybrid structures in photodetectors, photovoltaics, diodes  
Plasmonics alternative to metal nanostructures

### Tentative List of invited speakers:

Manish Chowalla, Rutgers University (USA)  
Vincenzo Guidi, University of Ferrara (Italy)  
Lance Li, King Abdullah University of Science and Technology (Saudi Arabia)  
Zhang Hua, Nanyang Technological University (Singapore)  
Mickaël Dollé, Université de Montréal (Canada)  
Renata Solarzka, Renewable Energy Center, Warsaw (Poland)  
Luca Ottaviano, University of L'Aquila (Italy)  
Martin Pumera, University of Prague (Czech Republic)

### Tentative List of Scientific committee members:

Seyed Mohammad Rozati, University of Gulian (Iran)  
Gilles Lerondel, Troyes University of Technology (France)  
Eric Wang Diao, National Chiao Tung University (Taiwan)  
Julio Cesar Rimada Herrera, La Habana University (Cuba)  
Artur Braun, EMPA (Switzerland)  
Arthur Yelon, Polytechnique Montréal (Canada)  
Beatrice Fraboni, University of Bologna (Italy)  
Nurit Ashkenasy, Ben Gurion University (Israel)  
Davide Barreca, University of Padova (Italy)  
Luca Ottaviano, University of L'Aquila (Italy)  
Dario Zappa, University of Brescia (Italy)

### Symposium organizers

#### Clara SANTATO

**Polytechnique Montréal, Génie physique**  
2500, Ch. De Polytechnique, H3T 1J4, Montreal, QC, Canada  
Phone : +1 514 3404711 ext 2586  
Mail : clara.santato@polymtl.ca

#### Daniel CHUA

**National University of Singapore**  
Department of Materials Science & Engineering, Block EA-03-09,  
9 Engineering Drive 1, Singapore 117575  
Phone : +65 6516 8933  
Mail : msechcd@nus.edu.sg

#### Elisabetta COMINI

**University of Brescia**  
via branze 38 25133 Brescia, Italy  
Phone : +390303715877  
Mail : Elisabetta.comini@unibs.it

#### Isabella CONCINA

**Luleå University of Technology**  
Division of Materials Science, Department of Engineering Science  
and Mathematics, SE-971 87 Luleå, Sweden  
Phone : +46 76 832 28 76  
Mail : isabella.concina@ltu.se

deadline for abstract submission: 15 January 2019

deadline for abstract submission: 15 January 2019

## Laser interactions with materials: from fundamentals to applications

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

### Scope:

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

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

### Hot topics to be covered by the symposium:

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

### List of invited speakers:

Alfred Vogel - University of Lübeck (Germany) - keynote in symposium with 45 min  
Florent Calvo - Université Joseph Fourier (France)  
Astrid Müller - Caltech (USA)  
Leonid Zhigilei - Univ. of Virginia (USA)  
Changhao Liang - Chinese Academy of Sciences (China)  
David Amans - Institut Lumière Matière (France)  
Paolo Maria Ossi - Politecnico di Milano (Italy)  
Guus Rijnders - University of Twente (The Netherlands)  
M. Cernaianu - Extreme Light Infrastructure, Nuclear Physics (Romania)  
Guillaume Baffou - Institut Fresnel Marseille (France)  
V. Venkatesan - University of Singapore (Singapore)

### Tentative List of Scientific committee members:

V. Amendola - Univ. of Padova (Italy), S. Amoroso - CNR-INFM Napoli (Italy), C.B. Arnold - Princeton University (USA), C. Boulmer-Leborgne - GREMI Université d'Orléans (France), I.W. Boyd - London Brunel University, N.M. Bulgakova - Institute of Thermophysics SB-RAS (Russia), C. Champeaux - Université de Limoges (France), B. Chichkov, Laser Zentrum Hannover (Germany), F. Costache - Fraunhofer Institute for Photonic Micro-systems (Germany), V. Craciun - University of Florida (USA), M. Dinescu - National Institute for Laser Plasma and Radiation Physics (Romania), R. Eason - University of Southampton (UK), Q. Feng - Univ. of Science and Technology Beijing (China), E. Fogarassy - ENSPS Strasbourg (France), F. Garelie - Université Jean Monet Saint Etienne (France), D. Geohegan, Oak Ridge (USA), B. Gökce University Duisburg-Essen (Germany), J. Krüger - BAM Federal Institute for Materials Research and Testing (Germany), J.G. Lunney - Trinity College Dublin (Ireland), E. Millon - Université d'Orléans (France), S. Orlando - CNR-IMIP/PZ (Italy), A. Palla Papavlu - National Institute for Lasers, Plasma and Radiation Physics (Romania), N. Pryds - Risoe National Laboratory (Denmark), J. Perriere - INSP Paris (France), M. Pervolaraki - University of Cyprus (Cyprus), J. Schou - Risoe National Laboratory (Denmark), P. Schaaf - Technische Universität Ilmenau (Germany), Ekaterina Barmina - General Physics Institute, Moscow (Russia), R. Serna, J. Solis - CSIC, Instituto de Optica (Spain), M. Stratakis - FORTH-IESL (Greece), K. Zimmer - IOM Leipzig (Germany).

### Symposium organizers

**Mihaela FILIPESCU**  
National Institute for Lasers, Plasma and Radiation Physics  
409 Atomistilor Street, Magurele, 077125, Romania  
Phone : +40 214 574 414  
Mail : mihaela.filipescu@infpr.ro

**Stephan BARCIKOWSKI**  
University of Duisburg-Essen  
Technical Chemistry I - Universitaetsstraße 7, 45141 Essen, Germany  
Phone : +49 201 183 3150  
Mail : stephan.barcikowski@uni-due.de

**Tatiana ITINA**  
UMR CNRS 5516 / UJM / University of Lyon  
Laboratoire Hubert Curien, Campus Manufacture, 18 rue du Pr. B. Laurus, 42000 Saint-Etienne, France  
Phone : +33 477915829  
Mail : tatiana.itina@univ-st-etienne.fr

**Thomas LIPPERT**  
Paul Scherrer Institut  
OFLB U110, CH-5232 Villigen PSI, Switzerland  
Phone : +41 56 310 4076  
Mail : thomas.lippert@psi.ch

## Semiconductor nanostructures towards electronic and opto-electronic device applications - VII

This symposium is the 7th installment of a highly successful biennial series that began in 2007. It brings together chemists, physicists, materials scientists, and engineers to discuss the latest advancements in semiconductor nanostructures and their application in electronic, optoelectronic and photonic devices. It covers both the fundamental nanomaterial building blocks, as well as their structural and spectroscopic characterization, and integration into functional devices.

### Scope:

Semiconductor nanostructures form a leading class of materials, with a large degree of freedom to design optoelectronic properties through variations in composition, size and dimensionality. They are contributing to the development of disruptive technology, for instance in lighting and displays, telecommunication, (quantum) information processing and (quantum) sensing.

In this symposium, we aim to present upcoming and potentially leading nanomaterials and -structures, at various stages of their application in optoelectronics and photonics. Topics will include recent developments of inorganic, hybrid, and organic nanostructure synthesis, as well as their use in lasers, LEDs, quantum light sources, photodetectors, optical amplifiers and switches. It will provide insight into the different material and interface parameters that play a role in device functionality, as well as the overall device design and associated chemistry and physics. To stimulate discussions at both applied and fundamental level, we will also include fundamental studies of their optoelectronic properties and structure-property relations.

Toward this outcome, topical sessions on different materials and applications will be organized, where we combine experimental, and computational presentations, in order to provide complementary views and create opportunities of long-lasting scientific interaction between attendees. This symposium will help to strengthen the semiconductor nanomaterials and -structures community in unraveling new directions of research, which is key for their ultimate success in electronic and optoelectronic device applications.

### Hot topics to be covered by the symposium:

Synthesis of 0D quantum dot, 1D nanowire or 2D nanosheet/quantum well semiconductors by chemical or physical methods.  
Synthesis of novel nano-semiconductors, -perovskites and 2D layered materials.  
Characterization of nanostructures using advanced experimental techniques.  
Carrier dynamics and photophysics in semiconductor nanostructures and -devices.  
Applications in nano-electronics, -optoelectronics, or -photonics: lasers, LEDs and displays, plasmonics, photodetectors, light converters, quantum emitters, flexible devices, organic, or hybrid nanodevices.

### List of invited speakers:

Dario Ballarini: Strong light-matter coupling in monolayer transition metal dichalcogenides and 2D perovskites  
Stéphane Bercaud: Exciton dynamics and valley-contrasting properties in atomically-thin graphene-transition metal dichalcogenide heterostructures.  
Brandi Cossairt: Innovations in indium phosphide chemistry and characterization for emissive applications.  
Anna Fontcuberta I Morral: III-V nanowires on Si for applications in next generation photovoltaics and quantum information  
Feng Gao: Design rules for high-voltage organic solar cells.  
Malte Gather: Biocompatible organic and inorganic micro and nano lasers integrated as optical barcodes and sensors into live cells  
Manus Hayne: Novel compound semiconductor devices for non-volatile,

random-access memories with ultra-low switching energies.  
Pieter Kik  
Gerasimos Konstantatos: Empowering infrared optoelectronics with colloidal quantum dots: infrared sensing, harnessing and emission.  
Johann Reithmaier: InP-based quantum dot materials and devices for fiber-based optical communication.  
Heike Riel ()  
Richard Schaller: Transient heating of nanoparticles.  
Alexander Urban: Carrier dynamics in halide perovskite nanocrystals.

### Scientific committee members:

Raffaella Buonsanti, Ecole polytechnique Fédérale de Lausanne, Switzerland  
Fabrice Charra, CEA-Saclay, France  
Zeger Hens, Ghent University, Belgium  
Chennupati Jagadish, Australian National University, Australia  
Dong-Wook Kim, Ewha Womans University, Korea  
Jiseon Kim, Imperial London College, UK  
Gregor Koblmüller, Technische Universität München, Germany  
Frank Koppens, ICFO - The Institute of Photonic Sciences, Spain  
Stephen Kuebler, University of Central Florida, USA  
Annamaria Petrozza, Italian Institute of Technology, Italy  
Peter Skabara, University of Strathclyde, UK  
Peter Smowtown, Cardiff University, UK  
Jens W. Tomm, Max-Born Institute - Berlin, Germany  
Anatoly V. Zayats, King's College London, UK

### Publication:

Symposium proceedings will be published in Physica Status Solidi (a) - Applications and materials science (Wiley-VCH).

### Symposium organizers

**Iván MORA-SERO**  
Universitat Jaume I  
Institute of Advanced Materials (INAM), Avda. Vicente Sos Baynat s/n, 12006 Castelló, Spain  
Phone : +34 964 387552  
Mail : sero@uji.es

**Iwan MOREELS**  
Ghent University  
Krijgslaan 281-S3, 9000 Ghent, Belgium  
Phone : +32 (0)9 264 44 18  
Mail : iwan.moreels@ugent.be

**Jean-Charles RIBIERRE**  
Zhejiang University  
State Key Laboratory of Modern Optical Instrumentation, College of Optical Science and Engineering, Hangzhou 310027, China  
Phone : +86 15968857176  
Mail : jcribierre@zju.edu.cn

**Sergio BROVELLI**  
University of Milano-Bicocca  
Department of Materials Science - Via R. Cozzi 55, 20125 Milano, Italy  
Phone : +39 02 6448 5027  
Mail : sergio.brovelli@unimib.it

## Symposium X

### Silicon carbide and related materials for energy saving applications

Electronic materials for energy saving are of particular interest to meet the accelerating demand of the worldwide energy consumption. Engineering of the wide band-gap semiconductor silicon carbide plays a key role because it provides excellent physical properties that go beyond the semiconductor silicon.

#### Scope:

The symposium has the aim to touch four important topics in the field of the application of SiC in energy saving:

(i) Bulk and epitaxial materials growth and defects: Crystal growth and epitaxy of SiC need elevated temperatures that push the processing apparatus and processing conditions to the limit of current technology. In this context, control of defect density is a key challenge.

(ii) Processing of SiC electronic devices: SiC device technology offers a number of similarities to the standard semiconductor silicon and, to a certain extent, even allows device fabrication in a shared lab environment. Nevertheless, a number of device building blocks like the metal oxide semiconductor interface or Ohmic contacts still need to be significantly improved in the case of SiC.

(iii) Energy saving systems based on SiC: The real benefit of the wide bandgap SiC for energy applications needs to be demonstrated at a system level, where SiC based device components, in particular, show their advantage in terms of application benefit and reliability over its silicon counterpart.

(iv) Related materials and novel applications: Beside power electronics, SiC exhibits a number of superior applications for energy saving in the electro-optical application field. In addition, SiC may be combined with and could benefit from other novel (semi-)conductor materials like GaN, b-Ga<sub>2</sub>O<sub>3</sub> and graphene.

#### Hot topics to be covered by the symposium:

Bulk growth and epitaxy of SiC  
Defect characterization and defect engineering in SiC processing  
device fabrication (diodes, MOSFETs, bipolar switches and others)  
power electronic systems (e.g. AC-DC, DC-DC converters and others for e-drive, photovoltaics and wind energy)  
Interfaces of SiC to GaN and Graphene, novel electro-optical applications

#### Tentative List of invited speakers:

Noboru Ohtani (KWANSEI, Japan), ohtani.noboru@kwansei.ac.jp, Review on bulk growth of SiC (confirmed)  
Phillippe Godignon (CNM, Spain), philippe.godignon@imb-cnm.csic.es, Devices and processing of SiC devices  
Haiyan Ou (DTU, Denmark), haou@fotonik.dtu.dk, Novel optical applications - SiC LEDs and waveguides (confirmed)  
Fabrizio Roccaforte (CNM, Italy), fabrizio.roccaforte@imm.cnr.it, Related wide bandgap materials (GaN processing and devices) (confirmed)  
Ekaterine Chikoidze (Univ. Paris-Saclay, France), ekaterine.chikoidze@uvsq.fr, Gallia: Surprising electronic properties (confirmed)

#### Symposium organizers

**Francesco LAVIA**  
**CNR-IMM sezione di Catania**  
Strada VIII 5 - Zona Industriale, I-95121 Catania, Italy  
Phone : + 39 095 5968229  
Mail : laviafrancesco@gmail.com

**Mike JENNINGS**  
**University of Warwick**  
School of Engineering, Coventry, CV4 7AL UK  
Phone : +44 2476 522266  
Mail : m.r.jennings@warwick.ac.uk

**Peter WELLMANN**  
**Friedrich-Alexander University of Erlangen-Nürnberg**  
Materials Department 6, Martensstr. 7, D-91058 Erlangen, Germany  
Phone : +49 9131 8527635  
Mail : peter.wellmann@fau.de

## Symposium Y

### Studying the materials chemistry in solution utilizing X-ray spectroscopic and scattering studies

The newest generation X-ray synchrotron sources and FELs provide opportunity to study chemistry of materials with an ultra high temporal-, energy- and spatial-resolution, thereby enabling the scientific investigation not covered by textbooks. The aim of this symposium is to overarch the cutting edge research in this vigorously emerging field of X-rays scattering and spectroscopy.

#### Scope:

The two days symposium will focus on research making use of modern large-scale research facilities like synchrotrons, X-ray free electron lasers for studying chemistry of organic, inorganic and bio-inorganic materials. It would be an excellent opportunity to bring together scientists from different communities employing novel X-rays spectroscopic and scattering techniques to study wide range of chemical transformations in solution.

The ultimate goal of the symposium is to highlight how the modern methods can be utilized in identifying and resolving the central questions related to colloidal nano-materials, photo-, electro- and biological catalysis and to the lesser extends on the methods themselves.

In this context, the symposium will allow to establish the fundamental knowledge, which in the future will leverage the discovery of the new chemical reactions, efficient catalytic processes and nano-materials with unique novel properties.

Moreover, symposium will particularly showcase the chemical processes at different time scales ranging from ultrafast molecular movies, which are visualizing the bond formation during catalytic or biological processes to the relatively "slow" kinetics of nanoparticles growth.

#### Hot topics to be covered by the symposium:

The proposed symposium will cover the X-ray synchrotron and FEL scattering and spectroscopic studies related to the research areas related to Bio- & Nano Inorganic Materials, particularly:

Bio-inorganic molecules, clusters and complexes  
Inorganic clusters, colloidal synthesis of nanoparticle and complex nano-structures,  
Synthesis and properties of colloidal 2D materials  
Hydrothermal, solvothermal and supercritical reactions and synthesis of nanoparticles and metal-organic-frameworks  
Nucleation, growth and phase transition of nanoparticles in solution  
Assembly inorganic building blocks into complex structures & bio-mineralization  
Ferrofluids and their theranostic application  
Light-driven chemical reactions in solution  
Photo-catalytic materials and reactions  
Photo-electrochemical reactions incl. flow batteries, electrolytes for Li-ion batteries  
Reactors and micro-reactors for time resolved studies in solution

#### List of invited speakers (confirmed):

Majed Chergui, EPFL, Switzerland  
Mari-Ann Einarsrud, NTNU, Ålesund, Norway  
Yoshihisa Harada, The University of Tokyo, Japan  
Bo Iversen, Aarhus University, Denmark  
A. Platero-Prats, Universidad Autónoma de Madrid, Spain  
David M. Tieder, Argonne National Laboratory, USA  
Moniek Tromp, University of Groningen, The Netherlands  
Junko Yano, Lawrence Berkeley National Laboratory, Physical Biosciences Division, USA

#### Symposium organizers

**Dorota KOZIEJ**  
**University of Hamburg, Center for Hybrid Nanostructures**  
Institute for Nanostructure and Solid-State Physics, Luruper Chaussee 149, 22761 Hamburg, Germany  
Mail : dorota.koziej@physnet.uni-hamburg.de

**Karena CHAPMAN**  
**Argonne National Laboratory**  
9700 S Cass Avenue, Lemont, Illinois, 60439, USA  
Phone : +1 6302520127  
Mail : chapmank@aps.anl.gov

**Kirsten JENSEN**  
**University of Copenhagen, Department of Chemistry**  
Universitetsparken 5, 2100 Copenhagen Ø, Denmark  
Phone : +45 40517636  
Mail : kirsten@chem.ku.dk

**Serena DE BEER**  
**Max Planck Institute for Chemical Energy Conversion**  
Stiftstr. 34-36, D-45470 Mülheim an der Ruhr, Germany  
Phone : +49 (208) 306 3605  
Mail : serena.debeer@cec.mpg.de



## Symposium Z

### Advanced quantitative transmission electron microscopy: materials research in several dimensions

By highlighting the recent advances in scanning/transmission electron microscopy as a multidimensional tool on the atomic scale this symposium aims at fostering collaborative research between the electron microscopy and materials science communities. Current topics will be highlighted in keynote presentations given by leading invited experts.

#### Scope:

Scanning/transmission electron microscopy has developed to a multi-dimensional tool, i.e. (simultaneous) acquisition of atomic structure images, chemical composition, bonding information, internal electromagnetic fields, optical information and time-resolved processes become feasible, also under an external stimuli (such as stress, electric biasing, heating, light,...). The wealth of information on physical, chemical, electronic, optical and magnetic properties on the atomic scale is a key to materials research and future technological developments. However, precisely correlating physical properties of materials with their nanofeatures requires a multidisciplinary approach of method development in electron microscopy, input of macroscopic data and ab-initio theory.

The symposium will address but is not limited to the following topics of interest:

advanced quantitative electron microscopy (EM) methods – strategies and applications: In-situ EM measurements, electron tomography, scanning-transmission EM, diffractive imaging and diffraction, aberration-corrected EM, electron holography, electron nanospectroscopic techniques for local bonding and elemental mapping and determination of optical properties, quantitative comparisons (experiment versus theory)  
electron microscopy for the characterization of the growth and structure of nanoscale materials, such as nanowires, nanotubes, particles, thin films and interfaces  
in-situ manipulation and characterization of nanomaterials and processed by external stimuli  
electron microscopy of functional nanocomposites, energy materials and quantum materials  
electron microscopy of organic-inorganic interfaces for molecular and electronic applications

Important topics will be highlighted in keynote presentations given by leading invited experts. Contributions are solicited that feature applications of quantitative electron microscopy to all different classes of materials.

#### Hot topics to be covered by the symposium:

The scientific sessions (incl. poster sessions) are grouped into the following clusters covering state-of-the-art characterization / using quantitative electron microscopy (EM) for topic areas of materials science:

3D imaging: From soft matter to functional materials.  
In-situ microscopy on battery materials, catalysts and growth phenomena  
Magnetic and piezoelectric materials: Measuring fields and charges  
Spectroscopy with electrons: phonons, plasmons and bonding  
(2D) Quantum materials

#### Tentative List of invited speakers:

Sara Bals (Antwerp, BE) 3D imaging: tomography  
Frances Ross (MIT, USA) in-situ microscopy in liquids  
Sarah Haigh (Manchester, UK) 2d-Quantum Materials  
Quentin Ramasse (Daresbury, UK) Functional imaging  
Josef Zweck (Regensburg, DE) Magnetic field distributions

#### Tentative List of Scientific committee members:

Hamish Fraser  
Ferdinand Hofer  
Joachim Mayer  
Maria Varela  
Wayne Kaplan  
Barry Carter  
Jo Verbeek  
David Bell  
Miran Ceh  
Aleksandra Czyska-Filemonowicz

#### Symposium organizers

**Eva OLSSON**  
**Chalmers University of Technology**  
Department of Physics, 412 96 Gothenburg, Sweden  
Phone : +46 31 772 3247  
Mail : eva.olsson@chalmers.se

**Martina LUYSBERG**  
**Research Centre Jülich**  
Ernst Ruska-Centre, Wilhelm-Johnen-Str, D-52425 Jülich, Germany  
Phone : +49 2461 612417  
Mail : m.luysberg@fz-juelich.de

**Mathieu KOCIAK**  
**CNRS**  
Laboratoire de Physique des Solides, Bâtiment 510, Université Paris Sud, 91405 Orsay, France  
Phone : +33 169155361  
Mail : Mathieu.kociak@u-psud.fr

**Paul MIDGLEY**  
**University of Cambridge**  
Department of Materials Science and Metallurgy, 27 Charles Babbage Road, Cambridge, CB3 0FS, UK.  
Phone : +44 1223 334561  
Mail : pam33@cam.ac.uk

## Symposium AA

### Computations for materials discovery, design and the role of data

The integration of theory, computation and data is transforming modern materials design and discovery. This symposium brings together global leaders in theory, computation and data driven materials research as well as renowned experimentalists to present and discuss the latest achievements in the field.

#### Scope:

The large-scale deployment of first-principles electronic structure calculations in combination with the ever-increasing power and availability of massively parallel supercomputers launched in the last couple of decades an entirely new paradigm in modern materials science. Intuition and serendipity that were the hallmarks of materials discovery and design are now complemented by computationally guided searches and collaborative theory-experiment efforts. Furthermore, availability of the data that is generated in the process generates unprecedented opportunities to further advance and accelerate design and discovery of novel materials at a scale that has not been seen before.

The main goal of this symposium is to gather leading scientists and engineers from academia, national labs and industry to discuss the status and the outlook for research and applications of computation and data driven materials science, with an emphasis on the experimental validation and the integration of theory, computations and experiment. The common challenges and opportunities will be at the focus of the discussions. The symposium will cover a wide range of studies including advancements in theory, computational methods (including high-throughput), the role of data in modern materials science, and materials synthesis and characterization for accelerated design and discovery.

#### Hot topics to be covered by the symposium:

Materials design and discovery  
Designing magnetism and strongly correlated systems  
Metastability and metastable materials  
Materials thermodynamics and thermochemistry  
Defects, doping and transport  
Structure predictions, applications and recent advancements  
The role of data: data mining and machine learning  
The role of data: the Rise of experimental databases  
Modeling of interfaces  
Materials synthesis and characterization for accelerated design and discovery

#### Symposium organizers

**Ivano CASTELLI**  
**Technical University of Denmark**  
Department of Energy Conversion and Storage, Fysikvej 309, DK-2800 Kgs. Lyngby, Denmark  
Phone : +45 53538491  
Mail : ivca@dtu.dk

**Vladan STEVANOVIC**  
**Colorado School of Mines**  
1500 Illinois St., Golden, CO 80401, USA  
Phone : +1 720 236 3534  
Mail : vstevano@mines.edu

### Symposium BB

## Cultural heritage – science, materials and technologies

This will be the 9th Symposium dedicated to Cultural Heritage (CH) within the E-MRS Spring Meeting Conferences. CH is defined by the Council of Europe "as a resource inherited from the past which people identify, independently of ownership, as a reflection and expression of their constantly evolving values, beliefs, knowledge and traditions". This shared resource of testimonies, values and know-how constitutes the driving force for promoting identity, cohesion and creativity. The awareness, preservation and dissemination of CH depends strongly on scientific and technological expertise on materials in a dynamic and fruitful cycle within the different scientific fields.

### Scope:

The symposium gives voice to the challenges that Cultural Heritage faces in contemporary societies, in relation to memory and knowledge, social change, sustainability, management and the projection of the future. Within the framework of the current complexity of the economic and social context, globalization and new emerging paradigms, the symposium intends to address the most relevant issues posed to CH and to point to possible new routes, crossing all areas of knowledge, presenting updated reflections, alongside the dissemination of good practices.

By promoting a close cooperation between CH researchers, professionals, students, policy makers, authorities and people in general for the understanding of our common memory and identity and its rich national, regional and local diversity, we intend to encourage the debate around the importance, diversity, preservation, valorization and reuse of Cultural heritage in an integrated cross-sectoral and interdisciplinary perspective. The forum will permit to highlight the contributions of CH to society, economy, cultural creation and education and to increase a citizen-centric approach by disseminating innovative models of Cultural Heritage science and its inclusive role.

To explore and enhance the importance of Materials Science for Cultural Heritage, this Symposium will provide a multidisciplinary common ground for cutting-edge scientific and technological issues in all cultural heritage concerns and perspectives involving the large and varied community of international experts in art, archaeology, ancient technology, new and improved materials for preservation and conservation, weathering, restoration strategies, climate change and anthropic pressure.

### Hot topics to be covered by the symposium:

Archaeometry;  
Characterization techniques;  
New materials and methodologies;  
Multi-scale imaging;  
Monitoring and remote sensing;  
Conservation;  
Dating and authenticity;  
Alteration and ageing;  
Risk assessment;  
Climate impact;  
Case studies;  
Modelling and theoretical approaches;  
Nautical and underwater archaeology;  
Ecological solutions;  
Cultural landscape;  
Geoarchaeology;  
Best practices and legislation;  
Social impact;  
Historical studies;  
Tourism and economy;  
Maintenance and sustainability;  
Data management.

### Symposium organizers

**Anne BOUQUILLON**  
C2RMF, Paris, France  
Mail : anne.bouquillon@culture.gouv.fr

**Giuseppina PADELETTI**  
CNR, Rome, Italy  
Mail : pad@milib.cnr.it

**João Pedro VEIGA**  
Universidade Nova de Lisboa, Portugal  
Mail : jpv@fct.unl.pt

31<sup>st</sup> of May 2019

## France-Japan joint workshop on molecular technology for advanced sensors

### Introduction

Sensors have become indispensable in many domains of the society including health, technology, environment, and biological research. Recently, "Molecular Technology" as an emerging research discipline, involves the incorporation of synthetic molecular building blocks including electronic, optical, mechanical, and biological components into function systems. The workshop focuses on the cutting-edge sensors development for biomaterials, ions, gas, light that include the concept of «molecular technology».

### Scopes:

Molecular, gas, light and bio detection  
Organic field effect transistors  
Organic and polymeric based device  
Electrical, electrochemical and optical transduction

### Tentative list of invited speakers:

Volkan Kilinc - CINaM, CNRS, Aix-Marseille Université, France: Confirmed  
Christine Vidélot - CINaM, Aix-Marseille Université, France: Confirmed  
Jérôme Brunet - Université Blaise Pascal, Clermont-Ferrand, France: Confirmed  
Thomas Heiser - ICube, University of Strasbourg, France  
Catherine Branget - MAPIEM, University of Toulon, France  
Nicole Jaffrezic - Renault, ISA, Claude Bernard University, Lyon, France: Confirmed  
Jin Kawakita – NIMS, Japan: Confirmed

### Conference Chairpersons

**Anne CHARRIER**  
Center for Interdisciplinary Nanoscience of Marseille (CINaM)  
CNRS, Aix-Marseille Université, Campus de Luminy, Marseille, France  
Phone : +33 6 62 92 28 35  
Mail : charrier@cinam.univ-mrs.fr

**Yutaka WAKAYAMA**  
International Center for Materials Nanoarchitectonics (WPI-MANA)  
National Institute for Materials Science (NIMS), 1-1 Namiki, Tsukuba 305-0044, Japan  
Phone : +81 29 860 4403  
Mail : WAKAYAMA.Yutaka@nims.go.jp

## SATELLITE EVENTS:

# Tutorial Thin-film synthesis from the vapor phase: fundamentals of processes, growth evolution, and applications

### General description:

The tutorial aims at providing an overview of: (i) thin-film vapor-based synthesis techniques, (ii) fundamental atomic-scale processes and phenomena encountered during vapor-based film deposition, (iii) theoretical and computational tools used for thin-film design, and (iv) modern and emerging applications of nanoengineered thin films and coatings. The primary audience of the tutorial is Ph.D. and M.Sc. students working in the field, but also scientists and engineers. Lectures will be given by the organizers of the Symposium "Nano-engineered coatings and thin films: from design to applications" but also by experts in the field, as detailed in the following.

### Schedule and modules:

Date/time	Lecture topic	Lecturer
Monday, May 27, 2019 9:00-10:00	Physical vapor deposition and reactive sputtering	<b>Tomas Kubart</b> Uppsala University, Sweden.
Monday, May 27, 2019 10:00-11:00	Chemical vapor deposition	<b>Panos Patsalas</b> Thessaloniki University, Greece
Monday, May 27, 2019 11:15-12:15	Thin film nucleation and growth	<b>Kostas Sarakinos</b> Linköping University, Sweden
Tuesday, May 28, 2019 16:00-17:00	Stress generation and evolution during film growth	<b>Gregory Abadias</b> University of Poitiers, France
Tuesday, May 28, 2019 17:00-18:00	Optical properties of thin films and plasmonic materials	<b>Panos Patsalas</b> Thessaloniki University, Greece
Tuesday, May 28, 2019 18:00-19:00	Computational tools for design of thin films	<b>David Holec</b> Montanuniversität Leoben, Austria

### Module description:

#### 1. Physical vapor deposition and reactive sputtering

Physical vapour deposition (PVD) techniques are widely used for synthesis of various thin films from laboratory to industrial scale. This module aims at understanding principles of the different PVD techniques and highlights the relation between the process conditions and properties of the resulting films. Special focus is paid to plasma-based techniques, the effect of plasma chemistry and ion assistance is discussed. To illustrate various physical processes, challenges related to low temperature synthesis of photocatalytic materials, high deposition rate of compounds, and growth of transparent conducting oxides are discussed.

The specific aspects to be covered in this module are:

- PVD –definition, vapour generation (evaporation and sputtering), material flux characteristics
- Examples of PVD materials and applications, main challenges for processing
- Plasmas in PVD- plasma chemistry and ion assistance
- Magnetron sputtering
- Reactive sputtering

#### 2. Chemical vapor deposition

Chemical methods for synthesis of nanoengineered films and coatings, such as chemical vapor deposition (CVD), plasma-enhanced CVD (PECVD), and atomic layer deposition (ALD), are in the forefront of the thin film science and technology, due to their potential of accurate control of the film chemistry, process scalability, and cost effectiveness. In this module, an introduction to these techniques will be presented; it will include the basic principles, reactor design considerations, reactor optimization, and the role of kinetics on the film microstructure. A review of the nanoengineered films and coatings grown by these techniques, with emphasis to metal nitrides, will be provided. The formation of multicomponent nitride films and coatings by these techniques will be considered, and the factors that are used to produce nanocomposites or ternary and quaternary nitride alloys will be critically evaluated. Finally, a critical comparison with the corresponding PVD films and coatings in view of the potential industrial applications will conclude the module.

#### 3. Thin film nucleation and growth

Thin-film technology is pervasive in many applications, including microelectronics, optics, magnetics, hard and corrosion resistant coatings, micro-mechanics, etc. Progress in each of these areas depends upon the ability to selectively and controllably deposit thin films (thickness ranging from tens of angstroms to micrometers) with specified physical properties. This, in turn, requires control – often at the atomic level – of film microstructure and microchemistry. In this module, the fundamental mechanisms that control vapor condensation, atomic diffusion, island nucleation and growth, island coalescence and coarsening, and continuous film formation will be described briefly discussed. Experimental results and simulation data related to growth in homoepitaxial systems, as well as to growth in polycrystalline weakly-interacting film/substrate systems, will be used as illustrative examples. The effect of energetic bombardment on film microstructural evolution will also be highlighted.

#### 4. Stress generation and evolution during film growth

The presence of stress in thin films and functional coatings constitutes a major concern in many technological applications, as excessive residual stress levels can dramatically affect the performance, reliability, and durability of material components and devices. This module will start with a description of residual stress sources in PVD thin films, with focus placed on intrinsic stress. Stress evolutions during film growth and post-deposition treatments will be presented, and the underlying atomistic and microscopic mechanisms will be discussed in the framework of a kinetic model. Experimental methods for measuring stress in thin films will be reviewed, based on recent advances in optical, X-ray diffraction and FIB-based techniques, allowing a depth-sensitive determination, as well as real-time diagnostics. The influence of microstructure (grain size, texture) and deposition process parameters on the stress development in PVD hard coatings will be outlined. The role of energetic species, which are typically present during magnetron sputtering or ion-beam assisted deposition, on the compressive stress build-up will be highlighted. Finally, strategies to control and mitigate stress and stress engineering for specific applications will be proposed.

#### 5. Optical properties of thin films and plasmonic materials

Plasmonics has emerged as a dynamic research field that is a direct manifestation of nanoscience, due to the feature sizes of the relevant materials, although their basic theory is classical; as a field it promises radical innovations in biotechnology, in terms of both biosensing and therapeutics, photocatalysis, and telecommunications. Plasmonics are based on nanostructured conductors. Conductive nitrides have emerged as important candidates for this technology, due to their exceptional stability, despite of some drawbacks. In this module an introduction to the theory of plasmonics will be presented. The optical properties of noble metals, along with other metals and conductive ceramics will be critically reviewed and their potential as plasmonic materials will be cross-evaluated. Based on this comparison, the potential of conductive nitrides as plasmonic materials will unravel and the potential applications, that are specifically tailored for their optical performance, will be proposed. Finally, the techniques for the formation of nitride plasmonic nanostructures following either the top-down approach (such as e-beam lithography) or the bottom-up approach (such as self-assembly growth) will be presented and assessed.

#### 6. Computational tools of design of thin films

Without doubt, modelling represents an integral part of materials science. It can be used for proving experimental hypotheses, to provide insights beyond the experimental capabilities (resolution in space and time, separating various effects etc.) Importantly, it has now reached stage where modelling can be effectively used to guide experiments. In this module, we will review various techniques spanning from continuum mechanics and classical thermodynamics, over mesoscale techniques such as discrete dislocation dynamics and atomistic approaches, i.e., Monte Carlo and molecular dynamics, to quantum mechanical ab initio methods based on Density Functional Theory. For each technique we will discuss its principles, typical applications (with a special focus on thin films), advantages and shortcomings. We will also stress the need for constant cross-checking with experiments to validate the predictions, but also to steer the modelling efforts, hence leading to «experiment-guided theory».

### Lecturers:

**Gregory Abadias** is Professor at the Physics Department of the University of Poitiers, France. He received his Ph.D. degree in materials science in 1998 at National Polytechnic Institute of Grenoble (INPG), and he is currently group leader of thin films activities at CNRS Pprime Institute in Poitiers. He conducts research on a range of topics related to nanoscale thin films, including mechanical, electrical and optical properties of metallic, nitride or oxide systems, as well as hard and protective coatings in the form of nanocomposites or multilayers. His current research interests focus on the understanding of thin film growth dynamics using real-time and in situ diagnostics, with main emphasis on the stress development during sputter-deposition of polycrystalline and epitaxial layers. He has co-authored more than 130 peer-reviewed papers and serves as Editor of Surface and Coatings Technology journal since 2016.

**David Holec** is a group leader of Computational Materials Science at the Department of Physical Metallurgy and Materials Testing, Montanuniversität Leoben. David has received his BSc (mathematics, 2002, and physics, 2004) and MSc (condensed matter physics, 2005) degrees from Masaryk University, Brno, Czech Republic, and a PhD (materials science, 2008) from Cambridge University, UK. He has been at the Montanuniversität Leoben since 2008, when he was first appointed as a post-doc. Since 2013 he is also a guest researcher at TU Wien. His strong expertise includes DFT modelling of alloying trends in nitrides and oxides, in addition to other material classes, e.g., novel semiconductors, intermetallics, shape memory materials, and carbon nanostructures. He has published over 100 peer-reviewed papers and has presented 12 invited talks at international conferences. He has supervised a number of BSc, MSc, and PhD students. He teaches several courses on materials modelling and solid-state physics.

**Tomas Kubart** is Associate Professor at the Department of Solid State Electronics at Uppsala University. Tomas is focusing on highly ionized deposition techniques and novel techniques for high quality thin films, especially oxides, for electronics and energy applications. He leads the Thin Films group and is responsible for the Thin Film Deposition area at the Ångström Microstructural Laboratory.

**Panos Patsalas** is Professor of Advanced Materials at the Department of Physics of Aristotle University of Thessaloniki, Greece. He received his B.Sc. in Physics and Ph.D. in Solid State Physics in 1996 and 2001, from University of Ioannina and Aristotle University, respectively. His research interests include the growth of films and nanostructures by vapor techniques, their structural characterization via X-Ray and neutron methods, the surface science, spectroscopy and the optical properties of thin films and nanostructures, and the fabrication of electronic, photonic and plasmonic devices. He is engaged with the research on conductive nitrides for over 20 years. His current research interests focus on the implementation of conductive nitrides in photonic and plasmonic devices. He authored or co-authored more than 150 peer-reviewed papers and has served as Guest Editor of numerous volumes of Elsevier journals.

**Kostas Sarakinos** is Associate Professor at the Department of Physics, Chemistry and Biology at Linköping University and he is heading the Nanoscale Engineering Research Division. He holds a Ph.D. degree in Physics from RWTH Aachen University, Germany (2008) and a Habilitation degree in Materials Science from Linköping University, Sweden (2012). Kostas's research interests include atomistic processes during film nucleation and growth, growth manipulation, in situ growth monitoring, and deterministic and stochastic film growth simulations. He has co-authored 50 papers and 4 book chapters, and he has presented 15 invited talks at international conferences and schools. He teaches courses related to thin-film physics at both undergraduate and post-graduate level.

deadline for abstract submission: 15 January 2019

deadline for abstract submission: 15 January 2019

# Practical information

## Practical information

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

### CONFERENCE SECRETARIAT

#### E-MRS 2019 SPRING MEETING

BP 20  
F-67037 Strasbourg Cedex 2  
Phone: +33 3 88 10 63 72  
Fax: +33 3 88 10 63 43  
emrs@european-mrs.com

#### Address for express mail:

E-MRS  
Campus CNRS  
Building 50  
23 rue du Loess  
67200 Strasbourg – France

#### Contact person:

P. Siffert +33 (0)3 88 10 63 72  
SIRET n°: 382 390 292 00011  
APE code: 9499Z

### BANK DETAILS

**Bank:** BP ALSACE LORRAINE CHAMPAGNE  
Address: Immeuble Le Concorde  
4 quai Kléber  
BP 10401  
67001 Strasbourg cedex - FRANCE  
Account: ASS E MRS  
Domiciliation / Paying Bank:  
CRONENBOURG MITTEL  
IBAN (International Bank Account Number):  
FR76 1470 7500 1111 1913 8543 942  
BIC (Bank Identification Code): CCBPFRPPMTZ

### HOTEL ACCOMMODATION

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

Mathez has been appointed as official housing bureau for E-MRS Spring Meeting 2019.

With more than 80 years of experience, dealing with congresses, they can help you to take care of your needs regarding accommodation (negotiated rates and allotments), transfers, meeting rooms, dinners, tours, and hostesses.

### Contact:



#### Voyages Mathez

4 Avenue Georges Clémenceau  
06000 Nice  
Phone: +33 4 93 82 68 82  
Email: [Congres.nice@matheztravel.com](mailto:Congres.nice@matheztravel.com)

### Warning for Participants - IMPORTANT

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

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

### VISA ASSISTANCE

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

**By email:** [maxence.vigin@european-mrs.com](mailto:maxence.vigin@european-mrs.com)  
**Subject:** VISA ASSISTANCE - SPRING MEETING

**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.

## Practical information

### CONFERENCE VENUE

#### Nice Acropolis

1 Esplanade Kennedy  
06302 Nice cedex 4  
France  
<http://www.sean-acropolis.com/en/>

### CONFERENCE LANGUAGE IS ENGLISH

### ABSTRACT SUBMISSION

#### Deadline for abstract submission: January 15, 2019.

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

Note: All abstracts must be submitted via the E-MRS website [www.european-mrs.com](http://www.european-mrs.com)

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

Because major revisions may affect a symposium organizer's decision to accept your abstract, please review it carefully before submission. In the unusual circumstance of having to revise your original abstract, the online submission center enables authors to revise their abstracts **up to and including the submission deadline of January 15, 2019**. After that date, the change must be submitted to: [emrs@european-mrs.com](mailto: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 26, 2019 at the latest.**

### MANUSCRIPTS AND PROCEEDINGS

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

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

### POSTERS

The viewable size of the poster board is: vertical 1.20 m and horizontal 0.90 m. Please prepare your poster in A0 format (841 x 1189 mm). The boards are full white. Please use tape. Pins are not allowed! Attendees can preview their posters the morning before the formal presentation.

**Authors need to be present at their posters for discussion with attendees during the session. Subsequently, it is each author's responsibility to remove his/her poster immediately at the end of the session.** E-MRS assumes no responsibility for posters left up after this time.

### REGISTRATION

#### IMPORTANT:

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

Registration starts at the end of the abstract submission period only. Online registration will be possible until **May 21, 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 and pre-payment is recommended to avoid a long queue.

## Practical information

### REGISTRATION FEES

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

#### FULL RATE

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

BEFORE April 2, 2019 **580 EUR net**  
AFTER April 2, 2019 **710 EUR net**  
ON SITE **750 EUR net**

#### STUDENT RATE

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

BEFORE April 2, 2019 **320 EUR net**  
AFTER April 2, 2019 **450 EUR net**  
ON SITE **490 EUR net**

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

### PAYMENT OF FEES

Payment should be made in EURO for the net total amount due.

The following possibilities are offered:

- **Credit card** (Carte Bleue, Visa, Eurocard/ Mastercard) (mode preferred)
- **Bank transfer:**  
Bank: BP ALSACE LORRAINE CHAMPAGNE  
Paying Bank: CRONENBOURG MITTEL  
Account: ASS E MRS  
IBAN: FR76 1470 7500 1111 1913 8543 942  
BIC: CCBPFRPPMTZ

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

- **Purchase order (bon de commande) to be sent by April 24 at the latest.**
- **Cash** (on-site payment only)

### ON-SITE REGISTRATION

**Attendees can also register on-site at the Convention Center. On-site registration opens SUNDAY, May 26 at 15:00.**

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

#### On-site payment hours:

Sunday May 26	15:00 - 18:30
Monday May 27	7.30 - 18.00
Tuesday May 28	8.00 - 18.00
Wednesday May 29	8.00 - 18.00
Thursday May 30	8.00 - 18.00
Friday May 31	8.00 - 12.00

### CANCELLATION

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

In order to receive a refund, cancellation requests must be in writing and sent by **May 6th** which will cause a €25 processing fee. No refunds will be issued on requests postmarked after May 6th. 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.

## Practical information

### EXHIBITION HOURS

#### Location:

Nice Acropolis  
1 Esplanade Kennedy  
06302 Nice cedex 4  
France  
<http://www.sean-acropolis.com/en/>

**Installation:** Monday May 27 (14:00 - 19:00)

#### Exhibition hours:

##### Opening:

Tuesday May 28 9:30 - 18:00 pm  
Wednesday May 29 9:30 - 18:00 pm  
Thursday May 30 9:30 - 16:30 pm

**Dismantling:** May 30, after 16:30

### PLENARY SESSIONS

There will be two short plenary sessions, each consisting of 2 presentations.

#### 1. TUESDAY MAY 28 from 11:15 to 12:30:

- Prof. Hiroshi Amano (Nobel Laureate in Physics 2014) - 45 mn  
- 2019 EU-40 Materials Prize winner - 30 mn

#### 2. THURSDAY MAY 30 from 11:15 to 12:30:

- Prof. Klaus von Klitzing (Nobel Laureate in Physics 1985) - 45 mn  
- 2018 MRS Mid-Career Award winner - 30 mn

### SOCIAL EVENT

A reception is being arranged for all the conference participants on **Wednesday evening May 29 starting at 19:00**. All conference attendees are invited to this reception as a chance to meet and renew relationships with colleagues. Music and food will be provided free of charge.

## Practical information

### TRANSPORT

**By car:** Nice is connected to all the great European cities by a major motorway network. In particular, the A8 motorway, 'La Provençale', running from Aix-en-Provence to the West to the Italian border on the East. From the A8 motorway, take the exit n° 50 «Promenade des Anglais», and join the Nice Acropolis Convention Center via the «Way Pierre Mathis». Follow the sign « Acropolis ».

**By train:** The SNCF (National Railway Company) provides regular connections from abroad and daily connections with the largest cities in France. The TGV (high-speed train) connects Paris and Nice in 5 1/2 hours. Direct daily connections: [www.gares-sncf.com](http://www.gares-sncf.com)

The train station is 5 minutes from the city center. Take the tramway towards « Hôpital Pasteur »; Stop at « Acropolis ».

**By tram:** Acropolis station  
<http://tramway.nice.fr/>

#### By plane:

The Nice Airport is an international gateway just 10 minutes from the city centre. The Nice Côte d'Azur Airport is the second largest in France with 13,3 million passengers travelling through each year, 111 direct-flight destinations and 61 scheduled airlines. It is also the first airport outside Paris to offer a daily connection to New-York and Dubai and the leading provincial low-cost airport, with 3 million passengers a year and 18 airlines.

The infrastructures provided make it the second busiest airport in France, a secure, resolutely modern activity cluster, integrated in the Alpes-Maritimes's development and harmony. It has two terminals: T1 and T2. [www.nice.aeroport.fr](http://www.nice.aeroport.fr)  
Connection from the airport: take Bus n°98 to the station « Cathédrale Vieille-Ville »; then take the tramway towards « Hôpital Pasteur »; stop at « Acropolis ».

<http://en.nice.aeroport.fr/>



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Event ID Code to keep for the booking: 33953AF  
More details here:

Event: 2019 E-MRS IUMRS ICAM Spring Meeting

ID Code: 33953AF

Travel Valid Period: 22/05/2019 to 05/06/2019

Event location: NICE, France

Please visit the event website or access directly through <http://globalmeetings.airfranceklm.com/Search/promoDefault.aspx?vendor=AFR&promocode=33953AF>

### PARKING

#### Parkings nearby:

Parking Indigo Acropolis  
Parking Promenade des Arts

### COFFEE BREAKS

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

### INTERNET ACCESS / WIFI

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

1. Select the conference network: EMRS2019
2. Open your browser
3. Fill in all fields marked with an asterisk (first connection only)
4. You are connected

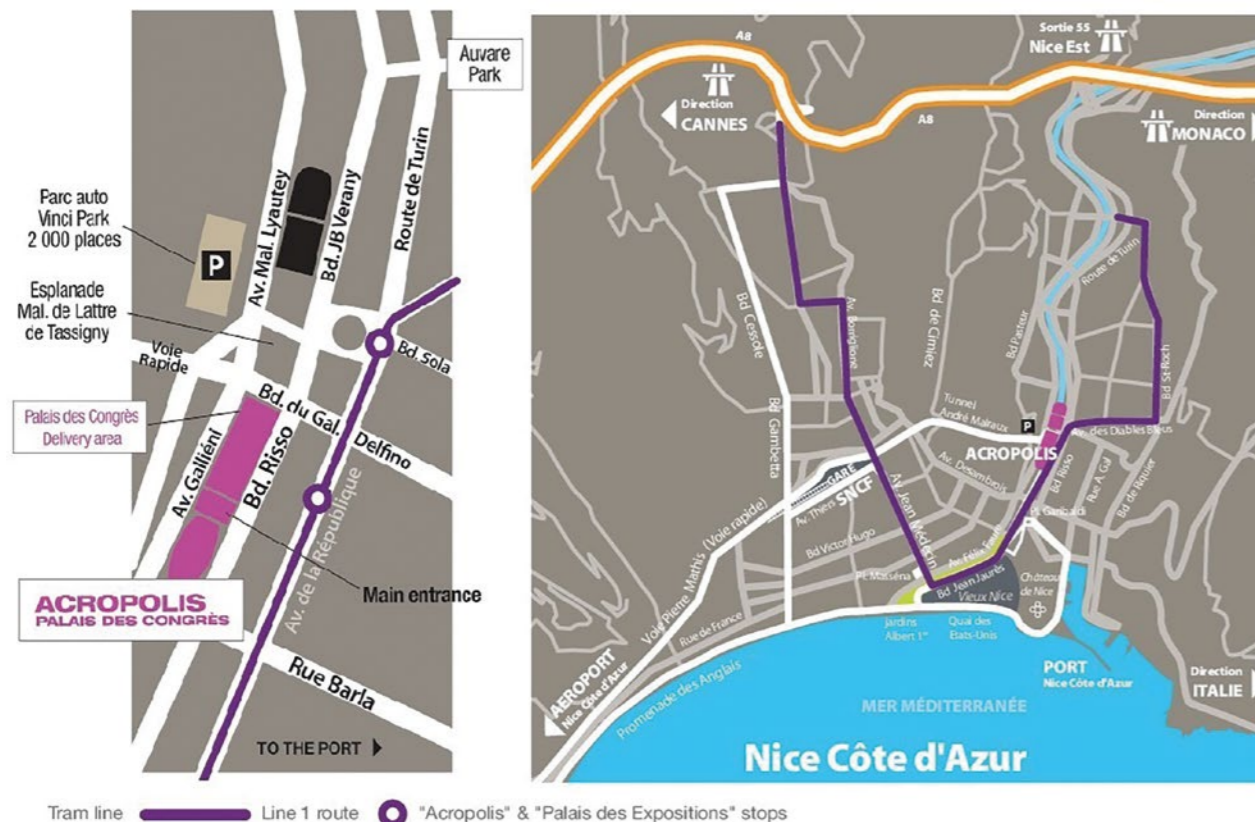
### AUDIOVISUAL PACKAGE

The standard audio-visual package in each symposium room will consist of:  
video projector, screen, laser pointer/remote control & microphone  
PC windows XP pro / Microsoft Office pack (including power point), USB plug and CD-Rom

### CONFERENCE APP

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

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



E-MRS  
BP20  
67037 Strasbourg Cedex 2  
France

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