Call for Abstracts and Papers

Symposium X: Functional Materials for Environmental Sensors and Energy Systems

E-MRS - Spring Meeting 2016, May 2 - 6, Lille Grand Palais, Lille, France

Background

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

The **COST Action TD1105 EuNetAir** is a science and technology running platform involved as European Network in the New Sensing Technologies for Air Pollution Control and Environmental Sustainability.

Scope of the Symposium

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

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

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

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

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

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

This **Special Issue** in *Beilstein Journal of Nanotechnology* (BJNANO, 2014 Impact Factor = 2.67) will consolidate the research in the newly emerging area of environmental sensors and energy systems. Authors are invited to submit papers on the theoretical, technological and experimental aspects of the design, development, and validation of various types of novel sensors and energy systems printed on diverse substrates, e.g. planar substrates, plastic, metal foils, paper etc. Submission of research/review papers is particularly encouraged.

Hot Topics covered by the Symposium

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

Tentative List of Invited Speakers

- **Silke Christiansen** (Helmholtz Zentrum for Materials and Energy, Berlin, Germany) "*Nanomaterials for Energy Applications*"
- **Christopher Hierold** (ETH, Zurich, Switzerland) "*New Materials for Advanced Sensing Microsystems and Nano-Transducers"*
- **Eduard Llobet** (Universitat Roviri I Virgili, Tarragona, Spain) "*Carbon-based Nanomaterials for Gas Sensing Devices*"
- **Anton Kock** (MCL, Leoben, Austria) "*Metal-Oxides Nanowires for Gas Sensing Applications*"
- **Ruth Pearce** (NPL, London, UK) "*Advancing Characterization of Hydrogen Purification Membranes for Energy Applications*"
- **J. Daniel Prades** (Universitat de Barcelona, Spain) "*Towards Zero-Power Gas Detection Systems based on Nanowires*"
- **Jerome Brunet** (Universitè Blaise Pascal, Aubiere, France) "*Carbon-based Hybrid Materials and Nanocomposites for VOCs Sensing*"
- **Jens Eriksson** (Linkoping University, Linkoping, Sweden) "*Graphene-based Sensors for Chemical Sensing*"
- **Danick Briand** (EPFL, Neuchatel, Switzerland) "*Gas Sensors on Printed Flexible Substrates for Wearable Applications*"
- **Xuhui Sun** (Soochow University, Suzhou, China) "*Uniform Metal-Oxide Semiconductor Multilayer Porous Thin Film for Enhanced Gas Sensing Performance*"
- **Marcel Bouvet** (Université de Bourgogne, Dijon, France) "*Advanced Hybrid Materials for Environmental Sensors*"

Depending on the number of submitted abstracts and on the topics covered by the abstracts, the list will be completed by other **Invited Talks** selected from submitted oral contributions.

Important Dates

January 15, 2016:	**Deadline for Abstract Submission (1500 characters, no figures) to E-MRS server**
February 28, 2016:	Authors Notification
March 31, 2016:	Completion of Scientific Program
May 2 - 6, 2016:	**Symposium X at E-MRS 2016 Spring Meeting 2016 in Lille (France)**
June 30, 2016:	**Deadline for Paper Submission to Beilstein Journal of Nanotechnology (BJNANO)**
December 2016:	Publication of the Open Access Special Issue Beilstein Journal of Nanotechnology

Symposium Organizers and Guest Editors

Michele Penza
Materials for Sustainability
ENEA
I-72100, Brindisi, Italy
michele.penza@enea.it

Anita Lloyd Spetz
Dept. of Physics, Chemistry & Biology
Linkoping / Oulu University
SE-581 83 Linkoping, Sweden
spetz@ifm.liu.se

Albert Romano-Rodriguez
Department of Electronics
University of Barcelona
08028 Barcelona, Spain
albert.romano@ub.edu

Meyya Meyyappan
Ames Research Center
NASA
94035 Moffett Field, CA, USA
m.meyyappan@nasa.gov

Scientific Committee

Heli Jantunen, University of Oulu, (FI)
Rositsa Yakimova, Linköping University, (SE)
Ralf Moos, University of Bayreuth, (DE)
Giorgio Sberveglieri, University of Brescia, (IT)
Yongxiang Li, Chinese Academy of Sciences, (CN)
John Yeow, University of Waterloo, (CA)
Sywert Brongersma, IMEC, (NL)
Andreas Schuetze, Saarland University, (DE)
Zafer Ziya Ozturk, GEBZE Technical University, (TR)

Submission of Abstracts and Peer-Review of Extended Papers

All **Abstracts** (max 1500 characters, no figures, no formulae) must be submitted to **E-MRS 2016 server (Symposium X)** within the deadline of **15 JANUARY 2016** by the electronic manner at the following weblink: http://www.emrs-strasbourg.com/index.php?option=com_content&task=view&id=409&Itemid=152.

The authors of the accepted abstracts will be invited to submit Extended Papers to Open Access **Beilstein Journal of Nanotechnology** (BJNANO), Beilstein Institut (*Editor-in-Chief*: Prof. Thomas Schimmel, Karlsruhe Institute of Technology). All **Extended Papers** shall undergo the standard Beilstein Journal of Nanotechnology peer-review process. Manuscripts must be submitted on-line, by deadline of **30 June 2016**, via the *BJNANO Manuscript Submission*, see http://www.beilstein-journals.org/bjnano/submission/submissionOverview.htm.

When submitting, please indicate in the "*Manuscript Type*" roll down menu, and also by e-mail to Michele Penza, michele.penza@enea.it, that the paper is intended for the "*E-MRS 2016 Spring Meeting 2016, Symposium X*" Special Issue. Authors are particularly encouraged to suggest names of the potential reviewers for their manuscripts in the space provided for these recommendations in the *Manuscript Submission*.

For manuscript preparation and submission, please follow the guidelines and template in the *Information for Authors* at the *BJNANO Journal webpage*, http://www.beilstein-journals.org/bjnano/submission/authorInstructions.htm.