



Symposium PM4: Novel Materials, Fabrication Routes and Devices for Environmental Monitoring

The urban population, which is 54% of the world's population now, is continuously increasing and expected to reach 66% by year 2050 according to the United Nations. This adds enormous stress on the urban environment, which is characterized by an increase in gaseous and liquid pollutants. Consequently, there is an increased need to monitor the environmental conditions of urban areas because of the well-known impact of ambient air on people's health and wellbeing.

Solid state sensors have been investigated and developed for more than 30 years and are deployed in different applications and scenarios in recent years. Environmental monitoring now demands new materials, fabrication technologies and devices with improved performance.

Nanotechnologies, including nanostructured materials for sensing, chemical sensors, portable systems and commercial devices, provide 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-oxide, carbon-nanostructures, large band-gap semiconductors, metals, plastics, polymers) with new sensing properties (detection at ppb-level, high sensitivity and selectivity), self-heating and durable operations for low-powered (tens of μ W to tens of mW) devices are key elements in air quality measurement at indoor and outdoor level. Additionally, the sensing material can be prepared on different type of substrates (semiconductor, glass, metal, plastic, paper) with different sensing behavior.

Modeling provides a tool for tailor-made nanomaterials for specific purposes and applications. In order to realize functional improvements in packaging, both testing and aging investigations are also very important.

Topics will include:

- Hybrid materials and nanocomposites for chemical sensing
- Catalytic sensing materials
- Metal oxides for chemical sensing
- Carbon-based materials for chemical sensing
- Advanced semiconducting gas sensing materials
- New nano sensors for monitoring gaseous and liquid pollutants
- Surface-sensitive spectroscopies for studying sensor material/gas interaction
- Modeling of sensor material/gas interaction
- Polymeric materials for chemical sensing
- Materials and processes for chemical sensor packaging

A **tutorial** complementing this symposium is tentatively planned. Further information will be included in the MRS Program that will be available online in September.

Invited speakers include:

Sven Barth	Vienna University of Technology, Austria	Juan Daniel Prades	Universitat de Barcelona, Spain
Martin A. Briggs	U.S. Geological Survey, USA	Donatella Puglisi	Linköping University, Sweden
Mohamed F. Chowdhury	Cambridge CMOS Sensors Ltd, United Kingdom	Giorgio Sberveglieri	University of Brescia, Italy
Maximilian Fleischer	Siemens AG, Germany	David Schwartz	Xerox PARC, USA
Jay Grate	Pacific Northwest National Laboratory, USA	Kengo Shimano	Kyushu University, Japan
Christopher Hierold	ETH Zurich, Switzerland	Xuhui Sun	Suzhou University, China
Andrei Kolmakov	National Institute of Standards and Technology, USA	Thomas Thundat	University of Alberta, Canada

Symposium Organizers

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