



## ***Symposium B : Energy Harvesting I***

### **Scope of the Symposium**

This symposium will provide an interdisciplinary forum for the latest R&D activities on the development of advanced functional materials for 1) sustainable solar fuels and 2) thermoelectric materials focusing on environmental and electronic applications. It will address the latest advances regarding the fundamental understanding of materials properties and their performance and stability by bringing together top worldwide academic scientists and engineers. The symposium aims to gather the most significant advancements in recent years for a sustainable generation of hydrogen and oxygen from solar energy conversion in conjunction with the fundamental understanding, and applications of thermoelectrics. Not limited to that, it will also be dedicated to the development of novel materials on different scales (micro, meso, and nano), new architectures, interfaces and contacts for new generation solar cells (perovskites, organic and hybrid, dye-sensitized, modules and Tandem devices) and thermoelectric materials (bulk, thin film, heterostructures, nanostructures, and nanocomposites).

### **Abstracts will be solicited in (but not limited to) the following areas**

- *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 generation;*
- *Advances in materials design for efficient plasmonic/hot electron/multiple exciton generation;*
- *Status of long-term performance and stability strategies and assessments of materials for solar energy conversion;*
- *Atomic-scale understanding of mechanisms for solar energy conversion and structural-performance relationships;*
- *Materials for down conversion/up conversion processes;*
- *Advances in materials design and control, bandgap engineering, quantum confinement, and plasmonic effects to enhance the solar energy device conversion;*
- *Large-area processing and fabrication of solar modules;*
- *Tandem and multi-absorber solar cells;*
- *Photoelectrochemical cells (PEC);*
- *Solar driven electrochemical and photoelectrochemical processes;*
- *Novel catalysts, photocatalyst and nanostructured materials for hydrogen production;*
- *Hydrocarbon synthesis from CO<sub>2</sub> reduction;*
- *Theoretical approaches to designing and discovering novel concepts for solar energy conversion;*
- *New generation of solar cells (organic and hybrid, dye sensitized solar cells): novel materials (hole and electron transport layers, contacts, metal oxide interfaces), lifetime and stability, new techniques for fabrication, encapsulation, and printing of*
- *Perovskite-based solar cells: stability and life-time studies, physical chemical and opto-electronic properties, new materials (hole and electron transport layers, contacts, metal oxide interfaces), film structure and morphology;*
- *Carbon nanotubes, fullerenes, graphene and other nanomaterials applied to solar cells;*
- *Recent advancements in classical and novel thermoelectric materials;*
- *Concepts of the thermoelectric phenomena: Phonon and electron transport properties (intrinsic behavior within grains, crystals, and oriented films; anisotropy; electron correlation; interface properties);*
- *Thermoelectric materials design, synthesis and preparation;*
- *Thermoelectric materials characterization;*
- *Advances in applicative technology and device design, and applications, ranging from energy harvesting for low to high temperatures, and refrigeration;*

## List of invited speakers

**Muhammad N Huda** (*University of Texas*) **Frank Osterloh** (*UC Davis*) **Fiorenzo Ventrone** ( *Universit du Qubec*) **Ian Sharp** (*TU Munich*) **Jin Zhang** (*UC Santa Cruz*) **Jozsef Pap** ( *MTA*) **Juan Ramon Morante** (*IREC*) **Lionel Vayssieres** (*Xian Jiaotong Univ.*) **Ooman Varghese** (*Univ. Houston*) **Renata Solarska** (*Warsaw Univ.*) **Zetian Mi** (*University of Michigan*) **Sam S Mao** (*UC Berkeley*) **Eva Hemmer** (*University of Ottawa* ) **Tharamani C.N.** (*Indian Institute of Technology Ropar*) **Gunnar Westin** (*Uppsala University*) .

## Symposium Organizers

**Renato Vitalino Gonalves** (*Sao Carlos Institute of Physics, USP*) **Heberton Wender** (*Universidade Federal do Mato Grosso do Sul ? UFMS*) **Gunnar Westin** (*Uppsala University, Chemistry Dept.* ) **Jesum Alves Fernandez** (*University of Nottingham*) **Leilane Roberta Macario** (*LNNano ? CNPEM*) **Marcos A. Avila** (*Universidade Federal do ABC*) .

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**XIX Brazil MRS Meeting**