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Keynote Lecture

Heterogeneous Catalytic Processes for the production of Energy Vectors and the Development of Clean Technologies

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Abstract

The success of our society on using systematically renewable resources and, thus, replacing a part of the conventional ones, depends on the techno-economic feasibility and the socio-political acceptability of the involved processes.

The research work of our Center focuses on the development of catalysts and their use in heterogeneous catalytic reactions for the development and optimization of clean technologies and processes yielding energy vectors and materials synthesis from renewable resources.

The lecture will present the recent developments on:

1. Novel, recently patented, catalytic formulations for the production of hydrogen and more generally syngas/bio-syngas of SOFC fuel cell feed quality. These products have also the required specifications to be used as green fuel synthesis feedstock.
2. A patented thermo-catalytic technology for GHG (i.e. CO_2) sequestration based on dry reforming with simultaneous production of nano-carbons and syngas. While syngas can be used as energy or synthesis vector, the so-derived stable nano-carbons are actually evaluated as potential additives, adsorbents and catalysts supports.
3. New, plasma-spray-derived, nano-iron-carbides-based catalytic formulations for Fischer-Tropsch synthesis of green fuels in 3-phase slurry reactors.

The concepts will be accompanied by results, mechanisms explanation, statistical validation and materials analyses. Finally, the on-going work as well as an evaluation of commercialization hopes will be discussed.