



DEVELOPMENT OF FUEL CELL MATERIALS AND PROCESSES

The ENERMAT laboratory has been created in 2009 in the framework of a collaboration between the Karlsruhe Institute of Technology (KIT) and EIFER. It is located at the Institute for Chemical Technology and Polymer Chemistry (ITCP) at KIT Campus South.

Activities at ENERMAT:

- Promotion of EIFER's expertise in materials science and processes for energy, using conventional and less costly techniques such as screen-printing, and tape casting.
- Development of EDF patents linked to materials and processes before their exploitation phase.
- Evaluation of advanced materials for energy in strategic applications such as electricity production in fuel cell, electrochemical hydrogen production in electrolyzer and hydrogen separation membrane.

ENERMAT

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ENERMAT PLATFORM

MATERIALS FOR ENERGY SYNTHESIS AND PROCESSES

FROM POWDER TO POWER

Manufacturing of innovative powder-metallurgical processed materials, covering the whole production process, from the raw material to the finished product in 3 steps.

CAPABILITIES

I. Synthesis

Up to 50g of materials per batch

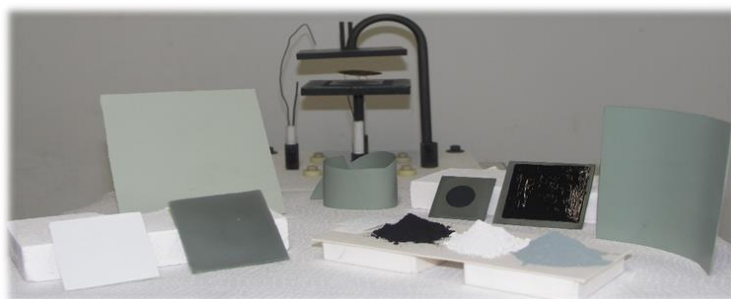
- Solid-state reaction
- Pechini Process
- Sol-Gel Processing

II. Powder Processing

- Pressing, tape-casting (300 to 2000 μm)
- Screen-printing (5 to 40 μm)
- Nano-Infiltration
- Sintering process (15 x 15 x 15 cm^3 up to 1600°C)

III. Electrochemical Measurements

- Electrochemical Impedance Spectroscopy (EIS)
- Application profiles: power, temperature and reversibility
- Cell area from 3 to 50 cm^2 , pO_2 pH_2 PH_2O
- Microscopic Analysis



Samples produced in ENERMAT

PUBLIC FUNDED PROJECTS



CONDOR (ANR 2009 – 2011)

Protonic Ceramic Fuel Cell: Development, optimization and realization of advanced intermediate temperature protonic cells.



INNOSOFC (ANR 2009 – 2012)

Innovative solid oxide material used in fuel cell device.



METPROCELL (EU 2012 – 2015)

Innovative fabrication routes and materials for metal and anode supported proton conducting fuel cells. <http://www.metprocell.eu/>

REFERENCES

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Marrony, M., et al. (2015). Elaboration of intermediate size planar proton conducting solid oxide cell by wet chemical routes: A way to industrialization. *Solid State Ionics*, 275, 97-100.