



2023

# KOREA EUREKA Day

## Meet with SPAIN

Carlos Rubio Lorente

Senior Business Developer, IREC



Ministry of Trade,  
Industry and Energy



## CONTENTS

ORGANIZATION/COMPANY

R&D CAPABILITIES

SOC TECHNOLOGIES &  
PROJECTS

PARTNERSHIPS FOR Korea –  
Spain collaboration

### Organization / Company

#### General description

**CERCA Research Centre**, with a TECNIO accreditation.  
IREC has a dual approach:



### Market orientation

Market Orientation focusing on **technology development**, **new products** and **new technical solutions** for energy sector companies active in the same fields as IREC's established lines of action.

### Long-term research

Long-term research into different aspects of the established lines of action. It will not be initially aimed at the market, but at **generating knowledge** amongst groups in the Institute itself, with a **long-term commercial projection** in mind.



## Organization / Company General description



Energy & Environment



Energy Storage



Smart Energy  
Management

175

people

116

publications

9.5

average IF

16

PhD thesis

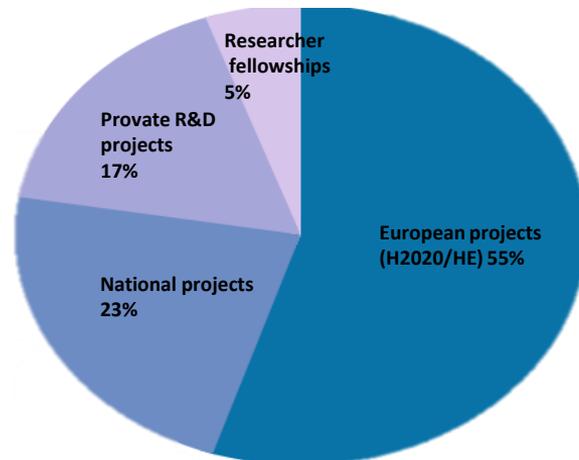
4

patent  
applications

total

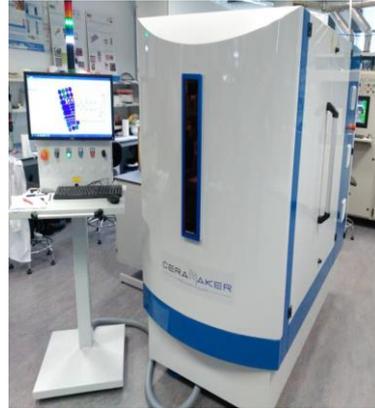
3

spin-offs

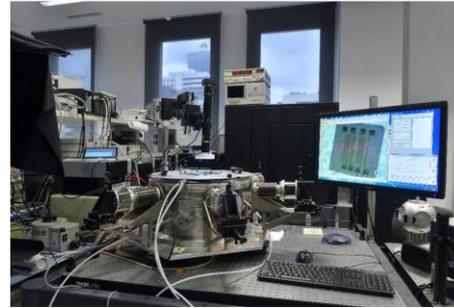


### R&D capabilities

### Large-area ceramic Manufacturing



### Test stations up to 10 kW



### R&D capabilities Structural and chemical characterization



### Prototyping



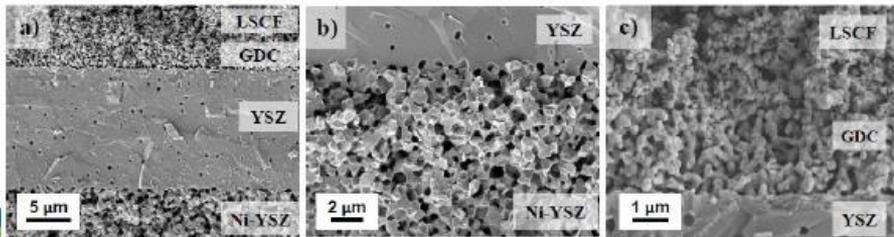
## SOC Technologies

### Conventional SOC:

Large area own cells + interconnects = SRU and SHORT STACKS

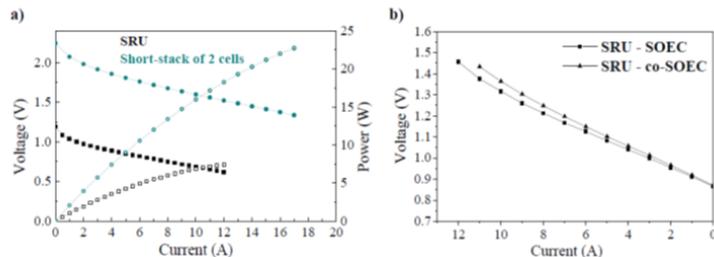


Reliable industrial fabrication (FAE&AMES)

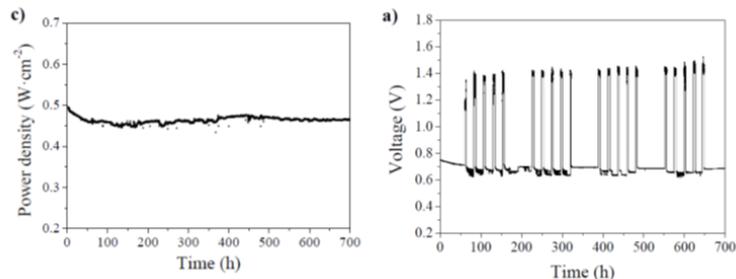


## Reversible mode:

Able to operate in **fuel cell and electrolysis modes**



Technology **stable in the 100 h range and reversible**



### SOC Technologies Projects:



Scaling up SOEC stacks for kW-range systems



Image of the first prototype of SOEC fabricated in collaboration with the Catalan companies FAE and AMES



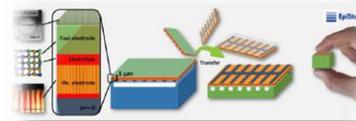
Open Innovation Test Bed for Electrolysis Materials for Clean Hydrogen Production



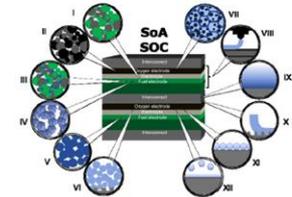
| Task | Title of the Task  | Project ID | Lead organization   |
|------|--|------------|---------------------|
| PL.1 | AEL electrode fabrication tests                          |            | Fraunhofer          |
| PL.2 | CCM manufacturing based on digital ALD                   |            | TNO, SALDO, SPINTEC |
| PL.3 | Nanostructural synthesis process                         |            | Fraunhofer          |
| PL.4 | Testing of PEM electrolys cells stacks                   |            | Fraunhofer          |
| PL.5 | Advanced CCM manufacturing and assembly line             |            | tecnalia, IREC      |
| PL.6 | MBA O membrane Electrode Assembly testing line           |            | IREC                |
| PL.7 | 3D printing for fabrication of complex SOEC cells stacks |            | IREC                |
| PL.8 | Advanced electrode manufacturing for innovative SOEC     |            | IREC                |
| PL.9 | SOEC testing pilot line                                  |            | VTT                 |



Thin Film Reversible Solid Oxide Cells for Ultracompact Electrical Energy Storage

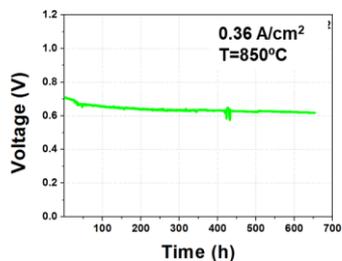
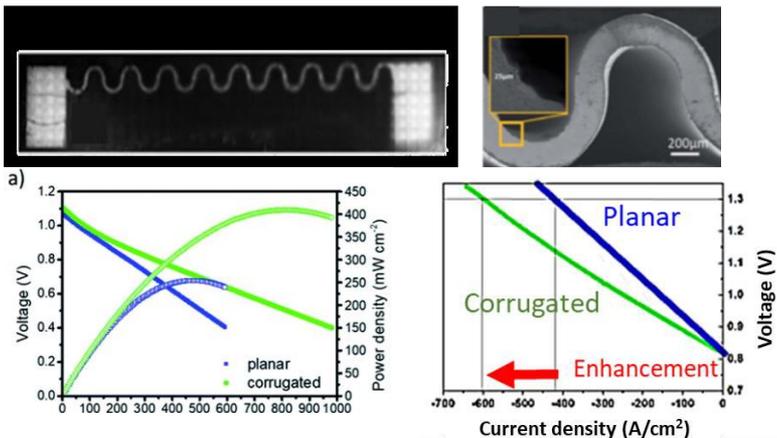


Next Generation solid oxide fuel cell and electrolysis technology



## Technologies

### 3D printing: enhanced by design

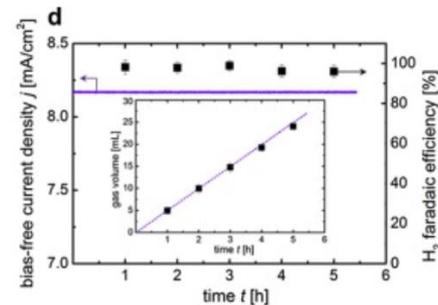
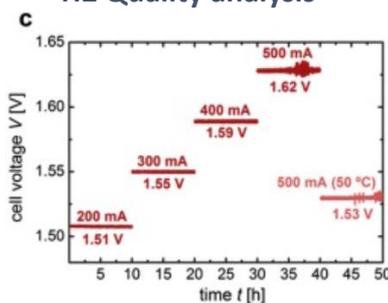
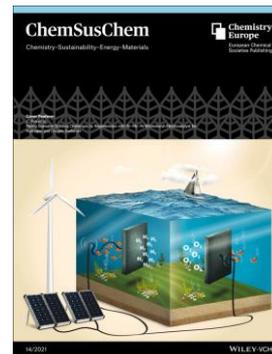


## Catalysis

- Photocatalysis (PC)
- Electrocatalysis (EC)
- Photoelectrocatalysis (PEC)

### Capabilities:

- Catalyst development
- Photo-active materials development
- Cell design, modelling and scale-up
- Seawater electrolyzers
- H<sub>2</sub> Quality analysis



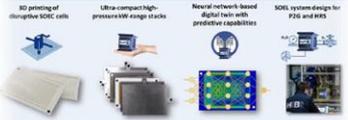
### Technologies

#### 3D printing and high pressure



**HyP3D**

Hydrogen Production in Pressurized 3D-Printed Solid Oxide Electrolysis Stacks






**REGENERA**

Development of a new SOEC generation based on 3Dprinted electrolyte cells with special features for enhancing the



**H<sub>2</sub>B<sub>2</sub>**

#### Catalysis



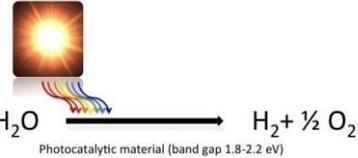
**LESGO**

Light to Store Energy in reduced graphene oxide




**SOLAROGENIX**

Visible-Light active metal oxide nano-catalysts for sustainable solar hydrogen production



 Looking for partners

- Ceramic powder suppliers
- Cells, seals and current collector manufacturers.
- Companies interested in:
  - SOFC for Aviation and Naval applications.
  - Customized fuel cells (size, power, others).

Meet with SPAIN

2023  
KOREA  
EUREKA Day



Thank you!



Ministry of Trade,  
Industry and Energy

