

INNOVATION DAY

ENERGIA 2024

21 de novembre | Barcelona

New generation Solid Oxide Cells (SOCs) for a hydrogen-powered society

Juande Sirvent

Nanoionics and Fuel Cells Group

IREC^R

Shaping Energy for a Sustainable Future

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Shaping Energy for a Sustainable Future

 **CEEC**
Clúster de l'Energia
Eficient de Catalunya

XRE4S
XARXA d'R+D+i
ENERGY FOR SOCIETY

 Generalitat de Catalunya
**Institut Català
d'Energia**



11

RESEARCHERS



1

RESEARCH FACILITIES MANAGER



7

POSTDOCS



17

PHD STUDENTS



5

MASTER STUDENTS

IREC^R

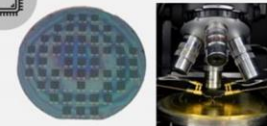
35+ M€
in projects
since 2010



SOLID OXIDE FUEL/ELECTROLYSIS CELLS AND SOLID STATE BATTERIES



INTEGRATED POWER SOURCES



ADVANCED MATERIALS and PROCESSING



NANOIONICS AND INTERFACES



NEW PHENOMENA AND NEW TECHNOLOGY



150

PUBLICATIONS



25

THESIS



9

PATENTS

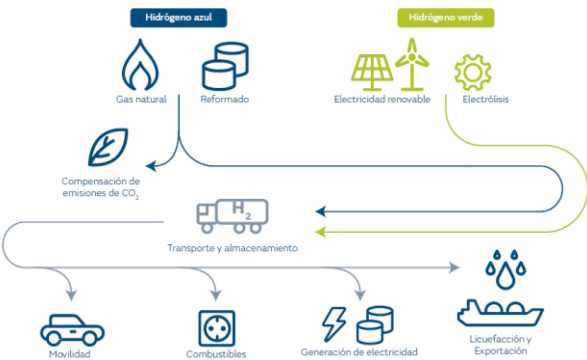


80

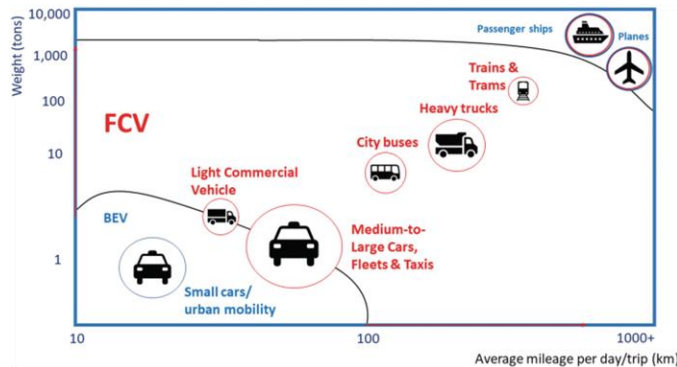
INVITED TALKS



Current technologies are not powerful enough for highly carbonised sectors



Hidrógeno: Vector energético de una Economía descarbonizada
Fundación Naturgy



Encyclopedia of Systems and Control; Baillieul, J., Samad, T., Eds.; Springer International Publishing: Cham, 2021



Low power density



Slow starting up
(current SOFCs >5h)



Poor fuel flexibility

Ammonia
Methanol
Biofuels

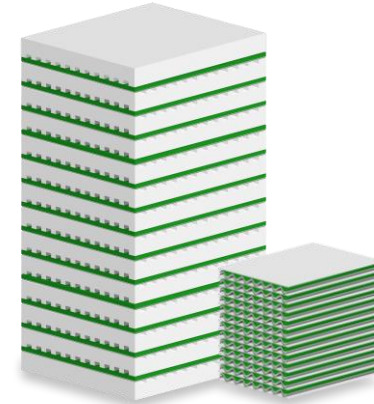
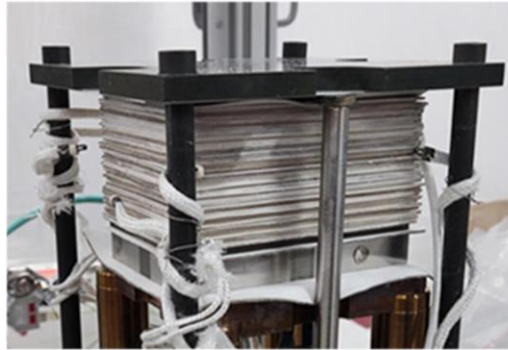
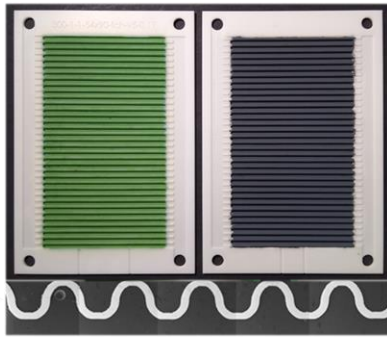
Reuters World US Election Business Markets Sustainability Legal Breakingviews Technology

Is hydrogen the best long term back-up for data centres?

Our examination of the main alternatives confirms the potential for hydrogen to play a part in a low-carbon future for data centres – specifically, low-carbon hydrogen for energy storage.



SOC cell with corrugated geometry developed by industrial ceramic 3D printing



TRL5 – tested in laboratory



>2 kW/L
>0.5 kW/kg



<45 min



Fuel flexible

IP Protection

Patent Application filed on 29/11/2022

Patent Application filed on 20/08/2021

Patent Application filed on 18/06/2019

Martos, A. M.; Márquez, S.; Pavlov, R. S.; Zambelli, W.; Anelli, S.; Nuñez, M.; Bernadet, L.; Brey, J. J.; Torrell, M.; Tarancón, A. 3D Printing of Reversible Solid Oxide Cell Stacks for Efficient Hydrogen Production and Power Generation. *Journal of Power Sources* **2024**, *609*, 234704



Spin-off
MVP 1.5 kW

Demonstrator in
relevant environ.

Scaling-up through
Ind. Part.

2nd gen.
aerial transport

Scaling-up through
Ind. Part.

2024

2025

2026

2027

2028

2029

Industry Validation



Port de Barcelona

LOBANOV

Thank you for your attention

Juande Sirvent

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