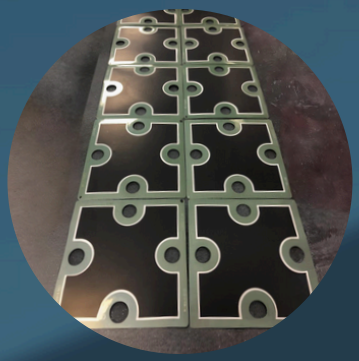
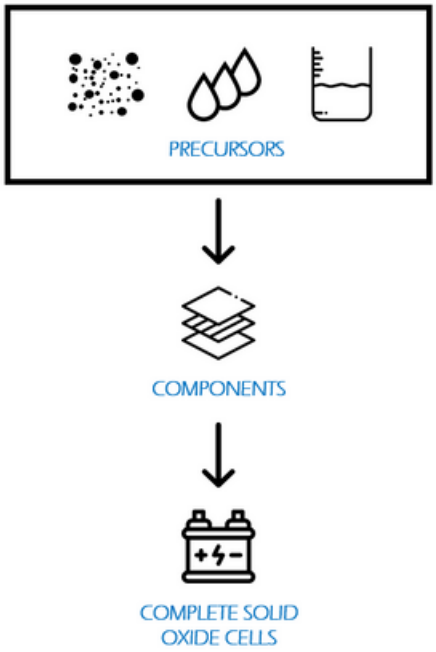


INNOVATIVE MANUFACTURING OF SOLID OXIDE CELLS

DEVICES FOR USE AS SOLID OXIDE FUEL CELLS OR ELECTROLYSERS

THE CONCEPT



ADDED VALUE

- High performance
- High stability of the cells

TRL

4

CONTACT

https://irec.cat
KTT area
ktt@irec.cat
+34 933 562 615

PRODUCT DESCRIPTION

- Fabrication of **solid oxide cells** by **multiple methodologies**
- Implementation of **functional interlayers** for improved stability and performance
- **Thin-film fabrication** methods to reduce amount of critical raw materials
- **Simplified manufacturing** by single-step multimaterial 3D printing
- **Decreased OPEX costs** by innovative fast thermal processing techniques

APPLICATIONS

Focuses on manufacturing of **electrochemical devices** made of **functional ceramic materials** for several applications:

- Solid oxide fuel cells
- Solid oxide electrolysers

DESIRED PARTNERS

- System integrators
- Investors
- Final users

EXPECTED BENEFITS

Simplified fabrication

Mechanical robustness

Reduces waste

Reduces cost

technical details

AVAILABLE MANUFACTURING TECHNIQUES

IREC is capable to build highly-performing SOCs using a combination of fabrication and processing techniques, ranging from industrial 3D printing to:

- **Screen-printing/Spray coating**: Standard micron-range deposition techniques
- **Pulsed laser deposition/Sputtering**: Standard nano-range deposition techniques
- **Multimaterial 3D printing**: In-house development of 3D printing of ceramics
- **Rapid thermal processing**: Surface specific high temperature sintering, within the second-scale
- **Ultrafast high-temperature sintering:** In-house development of high temperature sintering within the minute-scale

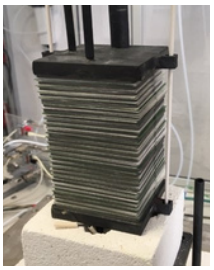
ADDITIONAL DETAILS

IREC technologies on SOC fabrication can:

- Fabricate and functionalize large area cells (~90 cm^2)
- Be compatible with industry-level SOC technology
- Deliver cells with improved performance and stability against degradation

IMPLEMENTATION

Complete electrolyser systems have been constructed and validated in **EDAR Sabadell** (1 kW), **Barcelona** (1 KW) and **CELSA** (5kW)



IREC
SOC stack

0.5 kW electrolyser
(Sabadell)

1 kW electrolyser
(Barcelona)

5 kW electrolyser
(CELSA)

Patents: -WO2023021217A1 + EP22382691A