



STORAGE RESEARCH INFRASTRUCTURE ECO-SYSTEM

RI Information sheet 2022

Fundació Institut de Recerca en Energia de Catalunya (IREC), Advanced
Materials for Energy (M4E) Laboratory

Electrochemical and Chemical

Contact person 1:

Carlos Rubio, crubio@irec.cat

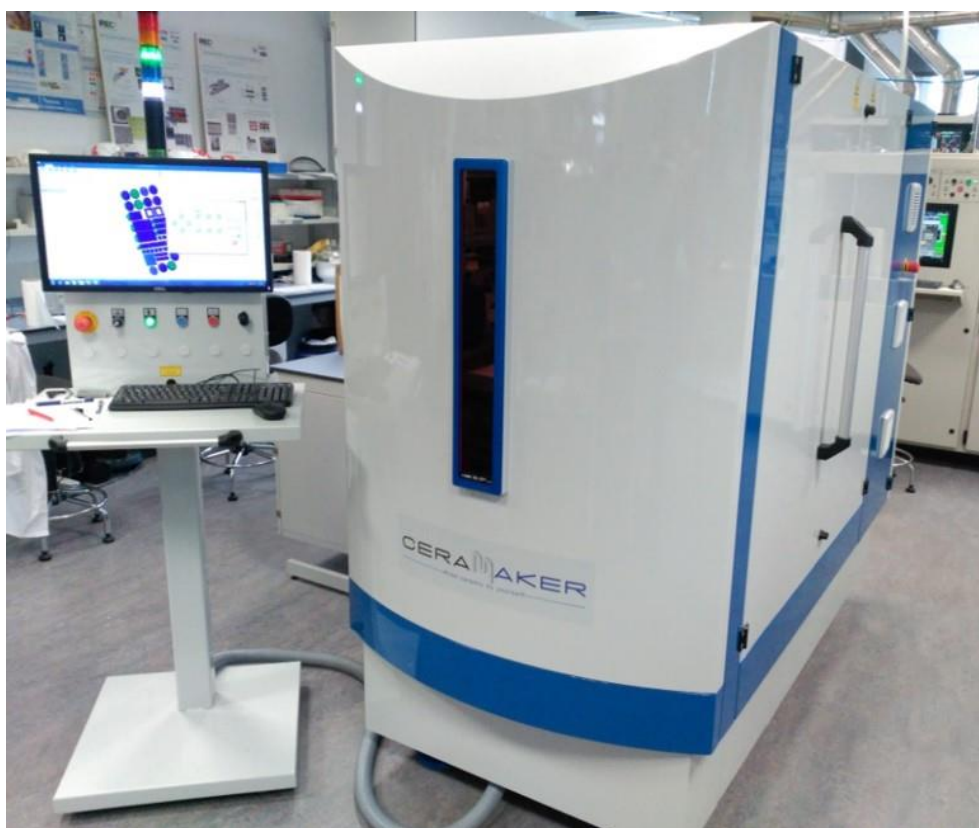
Contact person 2:

Marta Fonrodona, mfonrodona@irec.cat

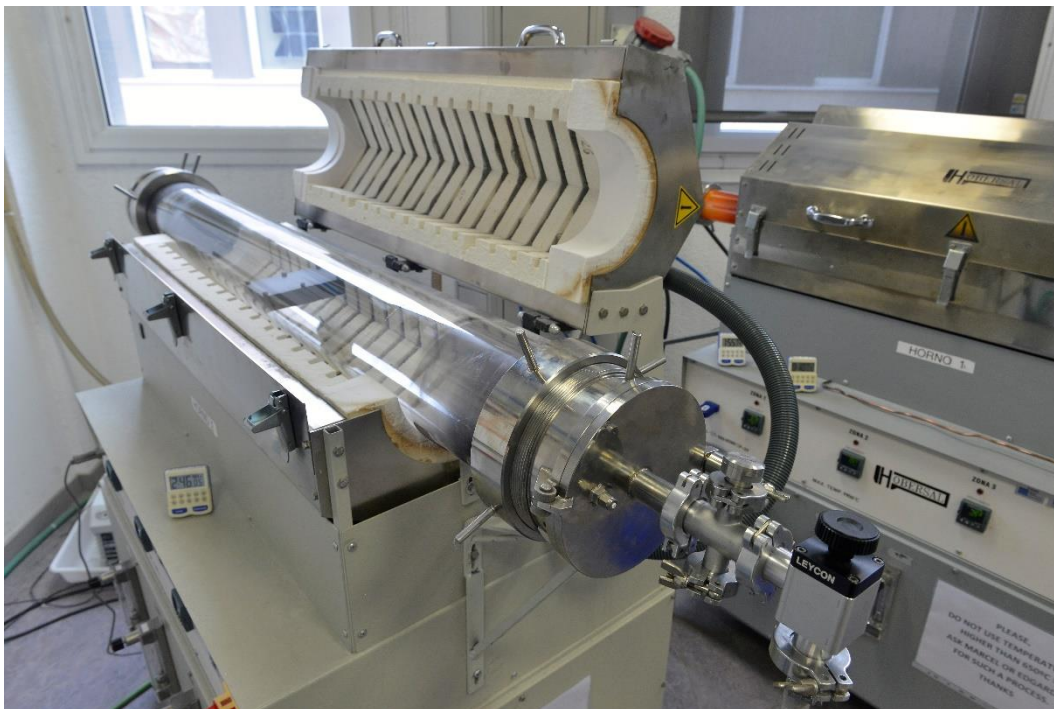
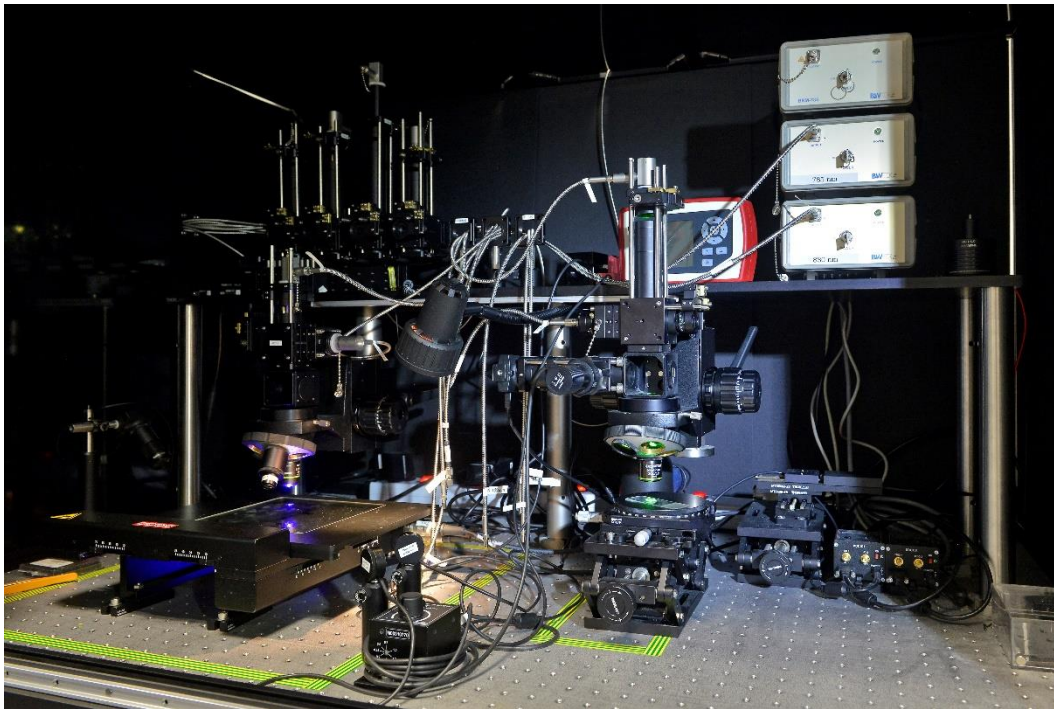
Project Acronym	StoRIES
Call	H2020-LC-GD-2020
Grant Agreement No.	101036910
Project Start Date	01-11-2021
Project End Date	31-10-2025
Duration	48 months

1. Photo









2. Geographical coordinates (°, ′, ″, ... N/S, E/W)

41°24'52.4"N 2°13'14.0"E

3. Description of the research infrastructure for the webpage

The Advanced Materials for Energy (M4E) of Institut de Recerca en Materials de Catalunya (IREC) is an infrastructure fully equipped with cutting-edge equipment



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for the synthesis and full characterization of a broad spectrum of materials as well as the prototyping and testing of novel technologies for energy storage.

State of the art: R&D infrastructure focused on developing new materials and processes for renewable energy generation, storage, conversion and harvesting. It allows the synthesis, characterization, prototyping and testing of the envisioned technologies.

Services currently offered by the infrastructure:

Synthesis of thin film and bulk materials: **Physical methods** (Sputtering with DC generators and RF, Thermal Evaporation, Electron Beam Evaporation, Pulsed Laser Deposition (PLD)). **Heat treatment** (Annealing tubular furnace, Muffla furnace, Controlled Atmosphere Rapid Thermal Process furnace (<1.100°C), High Precision and Homogeneous Temperature Hot Plates (20x20 cm²) for atmospheric conditions. **Chemical processes** (Spin-coating, Serigraphy, Sol-Gel, Chemical Bath Deposition (CBD), Successive Ionic Layer Adsorption and Reaction (SILAR), Low Pressure Chemical Vapour Deposition (CVD), Atomic Layer Deposition (ALD).

Materials characterization: **Structural characterization** (Raman/Photoluminescence (325-1064nm, 60x60cm²), X-ray Diffraction (XRD) with low angle and atmosphere and temperature control, Transmission Electron Microscope (TEM), Field Emission Scanning Electron Microscopy (FESEM), Atomic Force Microscopy (AFM) and conductive AFM (c-AFM), Energy Dispersion X-Ray Spectroscopy (EDX)). **Thermal and thermoelectrical characterization** (Thermogravimetric Analysis (TGA), Differential Scanning Calorimetry (DSC), Seebeck coefficient characterization, Thermal diffusivity characterization with Flash equipment. **Optical characterization** (Ultra Violet- Visible- Infra Red Spectrometry (UV-vis-IR), Confocal/Interferometric Microscopy, Ellipsometry with automatized platform of measurement (0.6-6eV)). **Electrical and electrochemical characterization** (Four-terminal Sensing (resistivity Kelvin Probe system), Source Meter Keithley I(V), Impedance (C-V), Low temperature electrical characterization (>80K), Electroluminescence imaging). **Electrochemical characterization stations for batteries and fuel cells** (Potentiostats, Galvanostats, Impedance spectroscopy). **Optoelectronic characterization** (Solar Simulation (class AAA) for IV curves dark and irradiated, Quantum efficiency measurements with spectral response system). **Advanced characterization in-situ/operando**

(Simultaneous electrochemical and Raman characterization, Simultaneous electrochemical and ellipsometry characterization, AFM and TERS electrochemical characterization).

Electrical, optical and opto-mechanical workshops: Prototyping and processing (Resin 3D printer prototyping, Mechanical plotter, Welding station, Microwires union systems, Encapsulation stations). **Characterization** (UV-VIS-NIR OEM Spectrometry, CCD detectors, X-Y motorized tables and actuators, InGaAS modular opto-mechanical components). **Software and Platforms** (Optical designing, Mechanical designing, Platform for electric and electronic design). **Platform of combinatorial data analysis** (Advanced statistical data analysis, Data analysis with Machine Learning AI tools)

4. Availability of the research infrastructure

Operative

5. Special considerations (confidentiality / NDA agreements, insurance requirement, special training, HSE training)

To access to the infrastructure, the following procedures will be considered: NDA signature, standard access protocol (necessary insurances compliance, CAE documentation, standard infrastructure and safety trainings) Specific training depending on the Transnational Access Activity.

6. Energy storage technology that can be analysed/studied by using the research infrastructure

- Electrochemical
- Chemical
- Thermal
- Mechanical
- Superconducting Magnetic
- Cross-cutting (Specifically: ...)

7. Key words for the webpage

Advanced Materials, Characterization, Prototyping, Testing, Electrochemical Storage and Chemical Storage.



8. TRL level (if applicable):

- 1-3
- 4-6
- Above

