

## Technical specifications

### Electrical testing facilities

- Ageing testing protocols in DC and AC
- Simulation of demand cycles in power range from 0.3 to 30 kW under controlled temperature and humidity
- 3 Modular 10 kW DC power test channels: 120 V / 200 A max. per channel
- 3 Modular 300 W DC power test channels: 80 V / 50 A max. per channel

### Data acquisition & control

- Several input/output modules (analogue + digital)
- Development of LabVIEW® applications
- Fast voltage, current, and mode transitions
- High-speed power waveform generation capable of reproducing arbitrary charging/discharging signals

### Testing features

- Performance and cycle life tests
- Development of intelligent algorithms and signal processing:
  - Constant current, voltage, power and resistance operating modes
- Control and monitoring of environmental conditions (temperature and humidity)
- Ramp, step and pulse voltage and/or current inputs for determining the response to transitory events
- Frequency response analysis for determining the state of health of the battery

### Electrochemical testing facilities

- Potentiostat/galvanostats:
  - 30 Channels (10 V and 0.4 A)
  - 3 Boosters (4 and 10 A)
- Electrochemical impedance spectroscopy (EIS) measurements
  - 6 channels with frequency range from 1 MHz to 10 mHz
- Climatic chamber -40 to +180°C and 10 to 98% relative humidity

### Pilot plant test bench

- Demonstration system with a flexible design that allows for different process configurations
  - Tanks volume (2x20 L)
  - Flow: 25 – 1200 L/h
  - Pressure: 0 - 4 bar
  - Temperature: 0 - 60 °C
  - LabVIEW® control

www.energy.imdea.org



#### Contact:

[contact.energy@imdea.org](mailto:contact.energy@imdea.org)

tel. +34 91 737 11 20

fax +34 91 737 11 40

Avda. Ramón de la Sagra, 3  
Parque Tecnológico de Móstoles  
E-28935 Móstoles, Madrid, Spain

institute  
**imdea**  
energy

# EDTL

Electrochemical  
Devices  
Testing  
Lab



## Electrochemical Devices Testing Lab EDTL

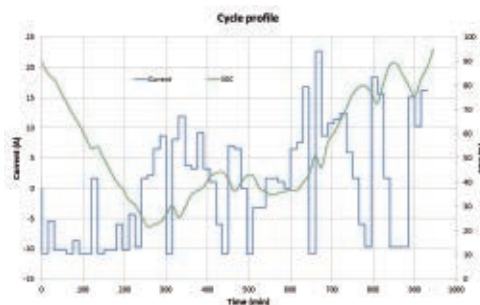


The Institute IMDEA Energy offers an independent **Testing Lab** for electrochemical devices characterization services. The Unit of Electrochemical Processes is specialized in performing research and development of high-efficiency electrochemical energy storage devices, and has developed knowledge in accelerated testing protocols for rapid cycle life and ageing evaluation of advanced electrochemical devices.

The capacity for power testing is from 0.3 to 30 kW under controlled temperature and humidity, and it consists of a set of charge – discharge units controlled by an easy-to-use interface.

The EDTL allows testing under specific profiles simulating power electrical requirements for batteries and supercapacitors in stationary applications coupled to renewable energy sources and for electric vehicles.

The EDTL has a flexible configuration that allows testing single cells, modules and small battery packs.

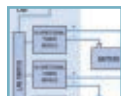


## Lines of work



### Energy storage devices testing

- Fast charge and discharge experiments
- Capacity degradation study
- Automated experiments with real time control



### Battery emulation capabilities



### Characterization and testing of redox flow batteries for consumption management of electric power



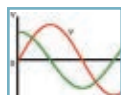
### Advanced battery ageing test for quick charging of electric vehicles



### Process & test validation of capacitive deionization for energy efficient water treatment



### Supercapacitor tests for power interruptions and high current peaks



### Development of control algorithms and waveform signals to create realistic charge/discharge profiles

## Services



- Research in batteries and supercapacitors
- Cell, module and pack testing up to 30 kW (120V - 600A max.)
- Design and evaluation of programmable real-life charge/discharge profiles
- Real time control and data acquisition
- Frequency domain analyses
- Ageing mechanism analysis
- Post-mortem & failure mode analysis



- Performance and endurance tests on:
  - Commercial energy storage devices (batteries, supercapacitors)
  - Lithium - ion batteries using different recharge standards
  - Supercapacitors and high-power lithium-ion batteries for power-assist applications



- Pilot plant test bench operation
- Process design and control of new systems: redox flow batteries, capacitive deionization

