



ENERGY STORAGE & CONSERVATION RESEARCH LABORATORY

Energy Storage & Conversion Research (ESCR) Laboratory was established in 2017 with the assistance of USAID funding under a USPCAS-E project. In this lab, students work on different types of materials for Fuel Cells, Batteries, Supercapacitors, CO₂ Conversion to Fuels Catalysis for Energy and Carbon Capture. ESCR is developing low-cost and effective materials for Batteries, Fuel Cells and Supercapacitors, which will help these energy storage technologies develop indigenously for local solutions. Our students are engaged in high quality research in the advanced Energy technologies.

LAB MISSION

To develop energy storage and sustainable energy production local solution for the country.

RESEARCH PORTFOLIO

Dynamics Li-ion Batteries, Na-ion Batteries, Fuel Cells, Hydrogen Storage, Carbon Capture, Supercapacitors, CO₂ conversion to fuels.



RESEARCH THEMES AND EQUIPMENT

Equipment	Description	Specification
Coin Cell Battery Fabrication	Coin cells are a standard way to test prototype materials for batteries. The coin cell is safely sealed and can be tested on standard test apparatuses.	MTI Corporation Tube furnace GSL-1600x Vacuum Oven, Film coater, Rolling press, vacuum mixer, battery analyzer(1mA5V) and Glove Box (H ₂ & O ₂ <0.1ppm)
Battery Analyzer	Battery Analyzers are the ideal test tool for maintaining, troubleshooting and performance testing individual stationary batteries and battery banks used in critical battery back-up applications in data centers, telecom networks, power distribution systems and more.	National Instruments Model: NI PXIe 1082 NI FlexRIO-based Custom Test Equipment for High-Speed Digitizer sensor
PEM Fuel Cell Test Station	Testing of low and high temperature polymer electrolyte membrane (PEM) fuel cell stacks, components and entire systems for up to 300W electrical power in stationary and transport applications.	Fuel Cell Technology Model:N3304A Single 60A load module with mainframe; provides up to 300W; higher voltage and current resolution
Electrochemical Workstation	To measure the electrochemical performance of material's like Cyclic voltammetry, tafel plot, polarization curve, EIS, charge and discharge.	Electrochemical workstation RRDE- 3A Model=700E Series Bipotentiostat
Sorption Analyzer	High pressure adsorption measurements are important in the fields of carbon dioxide sequestration, methane storage, hydrogen storage, and gas separation	Model :ISORB HP1 Maximum Degas temperature=500 C Pressure= 0.005bar to 100bar
Hydrothermal Reactor	For the synthesis of materials (catalyst) under constant stirring and heating with various soak and ramp functions	Model: 4848 Reactor Controller Temperaure:25-200°C RPM=0-2200 Water circulating jacket

