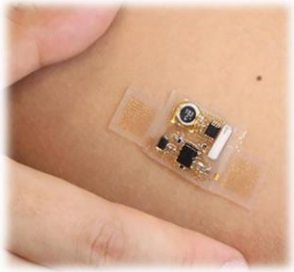
Admiral Instruments

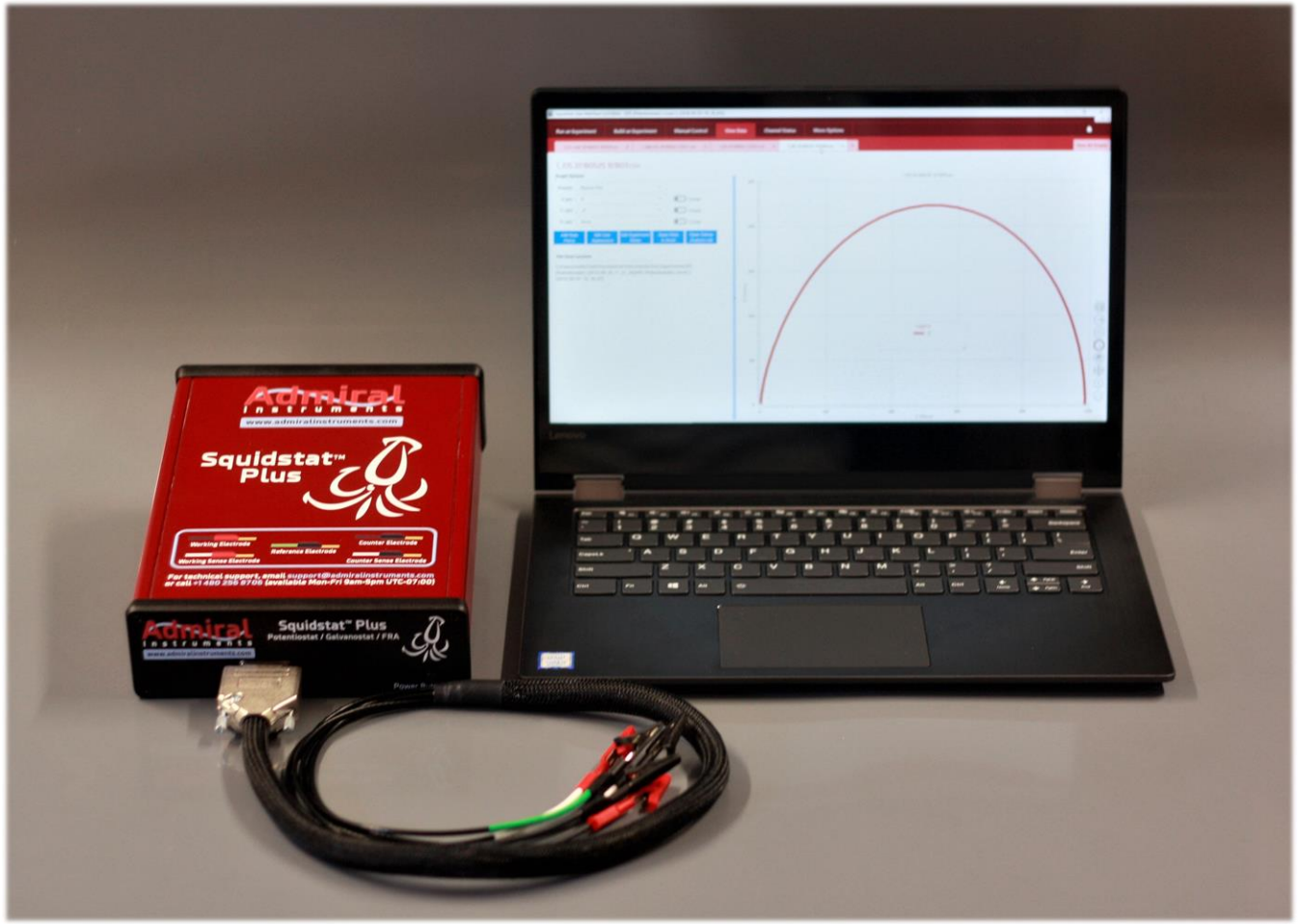
Innovation In Electrochemistry Instrumentation

Do you develop or manufacture any of the electrochemical technologies below?



- **Lowest priced potentiostats (50% savings or more)**
- **Most modern, easy-to-use software anywhere**
- **5x smaller size for convenience/portability**

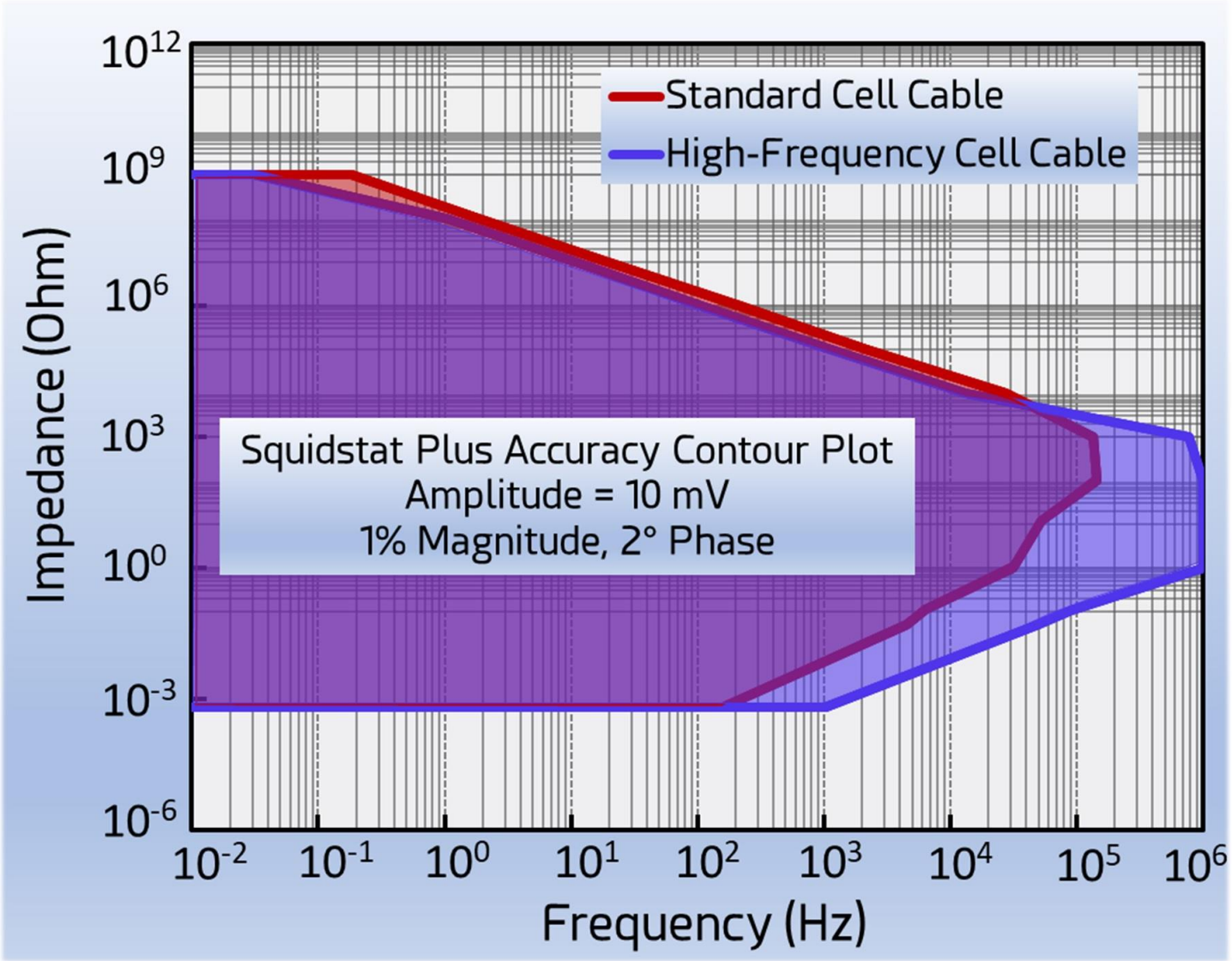
Squidstat Plus Potentiostat - $4,900



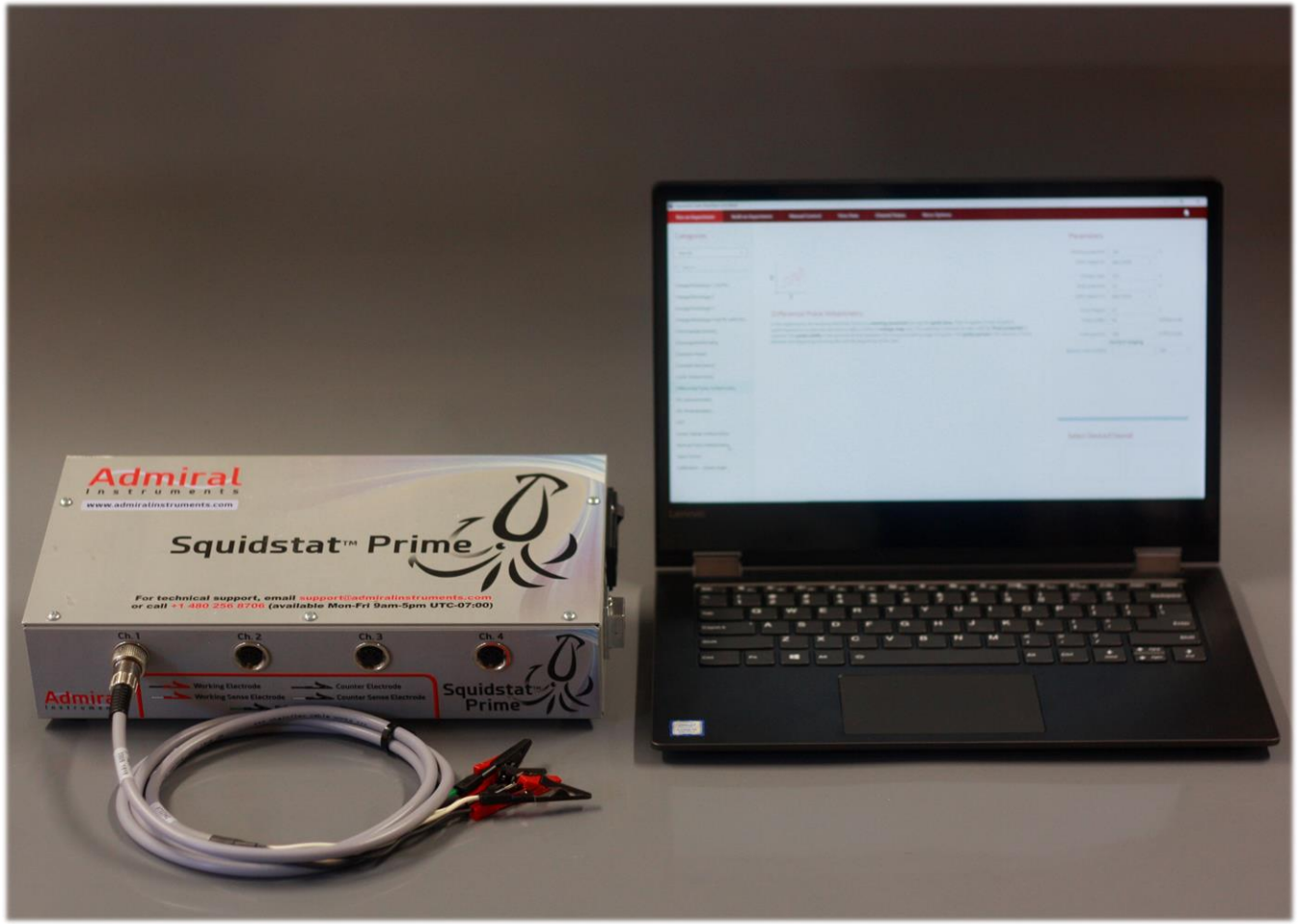
Squidstat Plus Performance Highlights	
EIS Frequency Range	10 µHz to 1 MHz
Max Current Per Channel	±1 A
Potential Scan Range	±10 V
Measured Current Resolution	0.003% of range, down to 3 pA
Potential Resolution	300 µV
Temporal Resolution	10 µs
Dimensions	24 x 17 x 6 cm, 0.9 kg
Works with RRDE?	Yes, with 2-3 units

±1 A Potentiostat with 1 MHz EIS and 1% / 1° Accuracy at 1 mΩ

Squidstat Plus Accuracy Contour Plot



Squidstat Prime Potentiostat - $4,800



Squidstat Prime Performance Highlights	
Max Current Per Channel	±100 mA
Potential Scan Range	±10 V
Measured Current Resolution	0.004% of range, down to 400 pA
Potential Resolution	300 µV
Temporal Resolution	1 ms
Channels Per Unit	4, all DC-only
Dimensions	31 x 16 x 8 cm, 1.5 kg
Works with RRDE?	Yes, with 1 unit

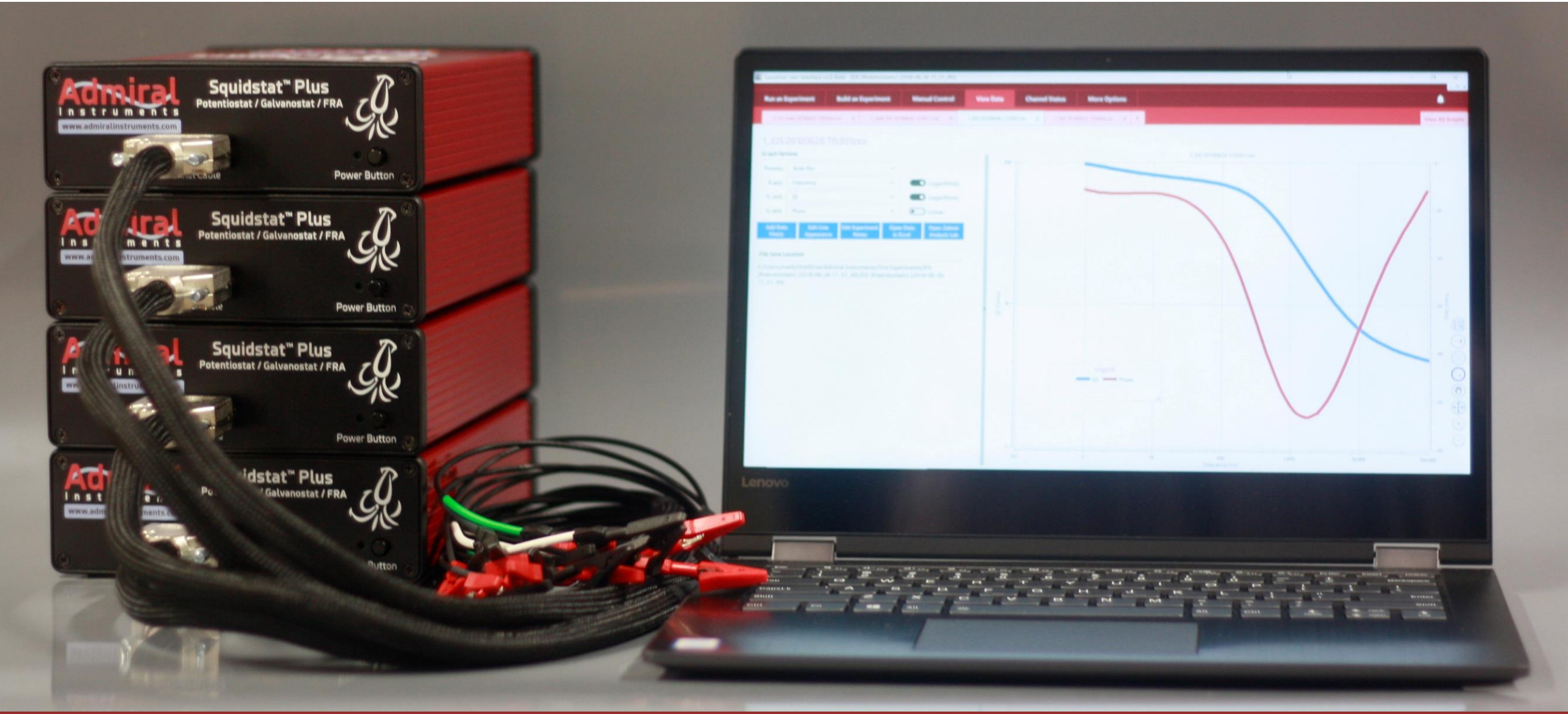
4-Channel Potentiostat Perfect for Multichannel DC Experiments

Squidstat Solo Potentiostat - $1,900

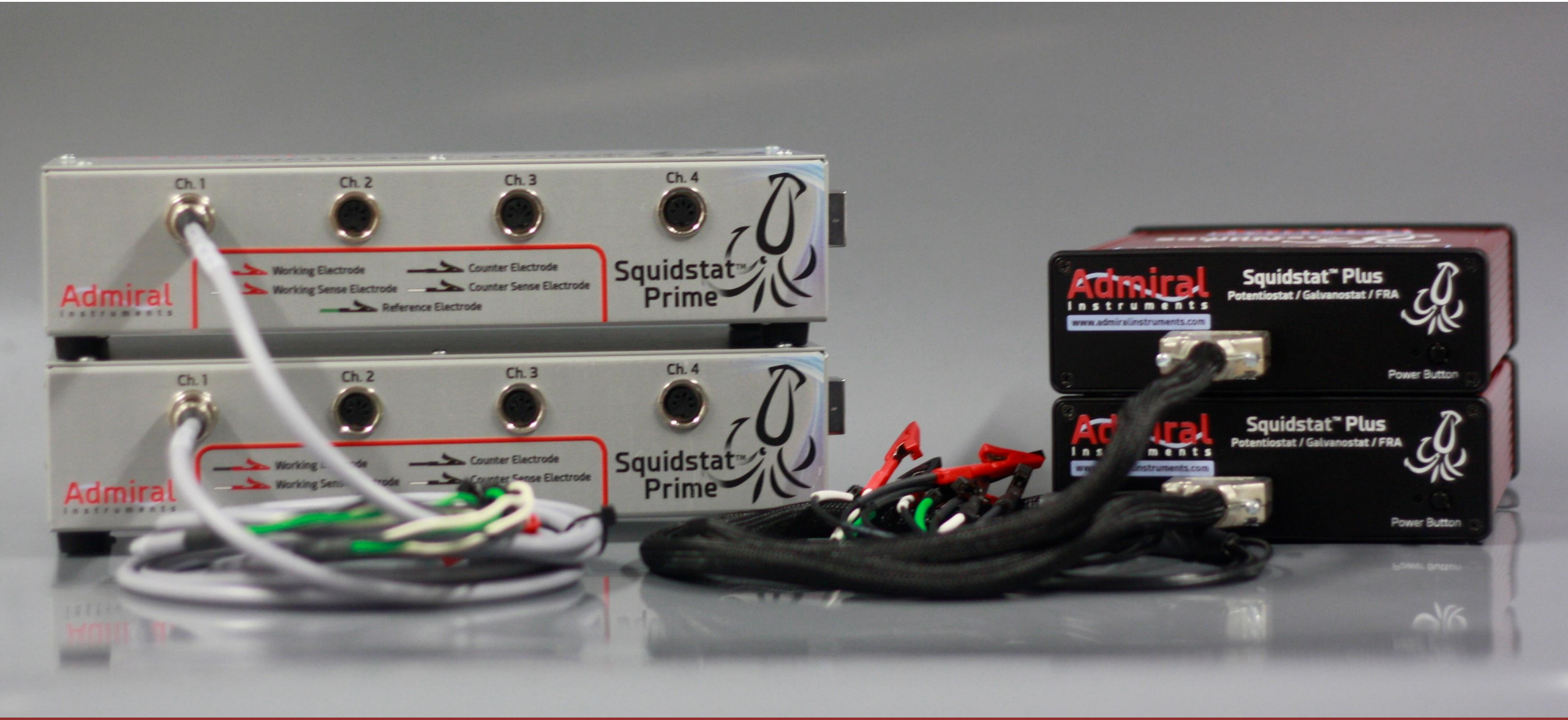
Squidstat Solo Performance Highlights	
Max Current Per Channel	±100 mA
Potential Scan Range	±10 V
Measured Current Resolution	0.004% of range, down to 400 pA
Potential Resolution	300 µV
Temporal Resolution	1 ms
Channels Per Unit	1, DC-only
Dimensions	22 x 16 x 8 cm, 1 kg
Works with RRDE?	Yes, with 2-3 units

Economical, Reliable Potentiostat For 1-Channel DC Experiments

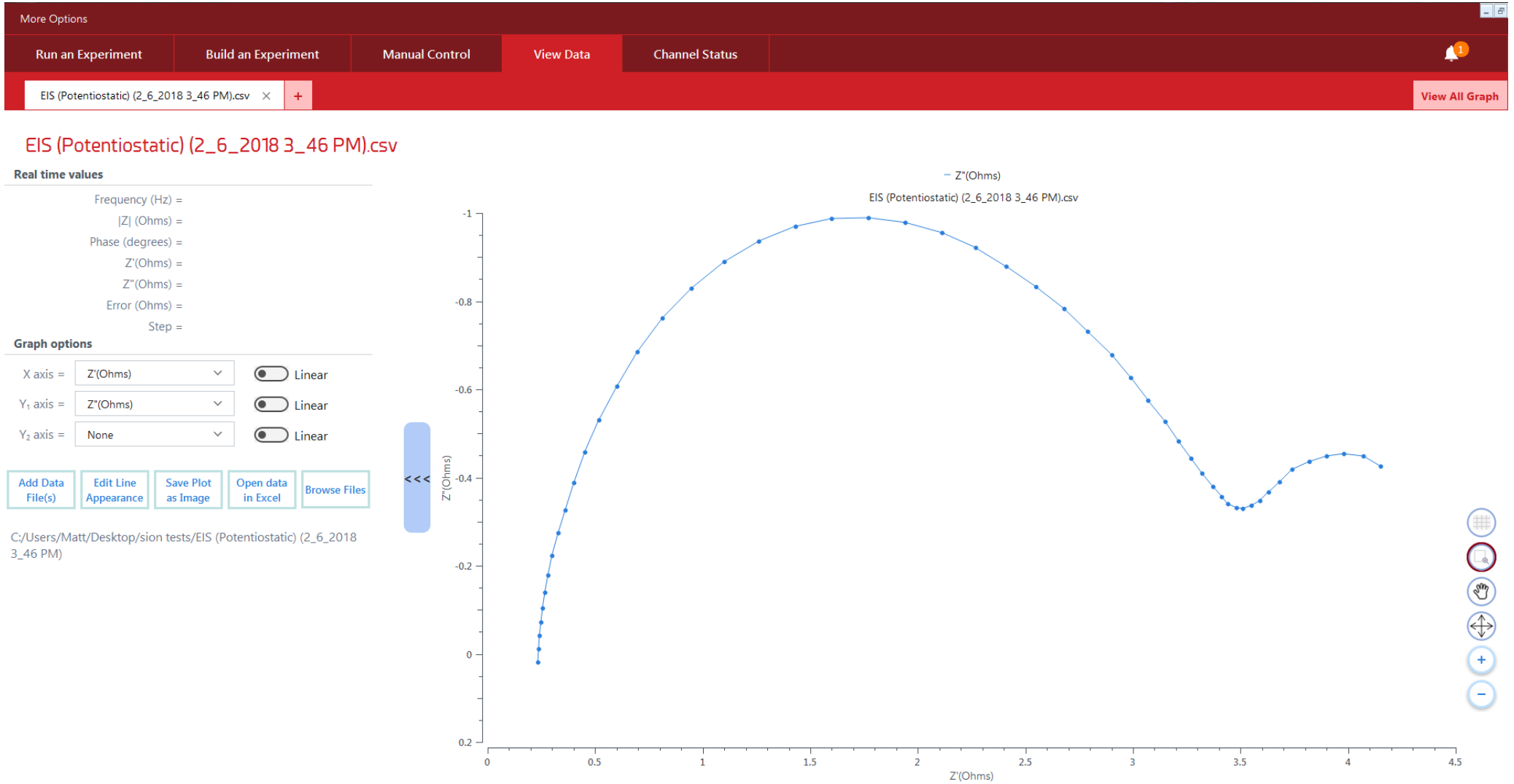
Multichannel Integration For Simultaneous Measurements



Multiple Squidstat Models Can Run On A Single Computer



Low-Cost Electrochemical Impedance Spectroscopy (EIS)



Nyquist Plot

Quickly Access Common Experimental Techniques

More Options

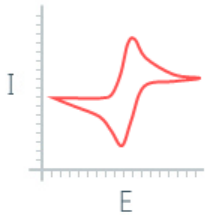
Run an Experiment | Build an Experiment | Manual Control | View Data | 5

Categories

View All

Search

- Charge/Discharge 1
- Charge/Discharge 2
- Chronoamperometry
- Chronopotentiometry
- Constant Resistance
- Cyclic Voltammetry
- Differential Pulse Voltammetry
- EIS (Galvanostatic)
- EIS (Potentiostatic)
- Linear Sweep Voltammetry
- Maximum Power
- Normal Pulse Voltammetry



Cyclic Voltammetry (Basic)

This experiment sweeps the potential of the working electrode back and forth between **upper potential** and **lower potential** at a constant **scan rate dE/dT** for a specified number of **cycles**.

Parameters

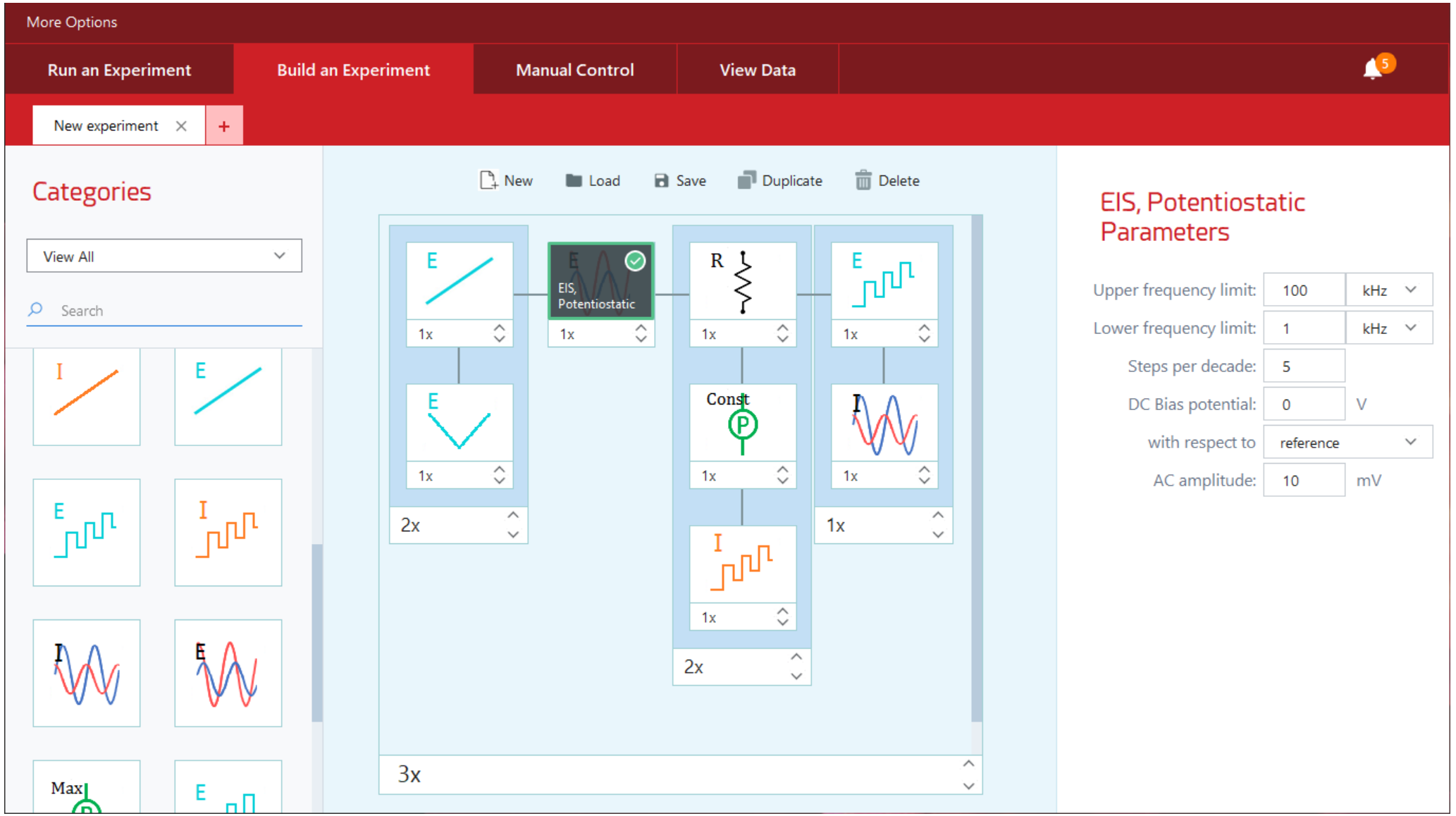
Starting potential =	0	V
with respect to	open circuit	
Upper scan limit =	0.5	V
with respect to	open circuit	
Lower scan limit =	-0.5	V
with respect to	open circuit	
Scan rate (dE/dt) =	100	mV/s
Repeats =	3	

Select Device/Channel

DemoUnit2 (COM3) | Channel 1

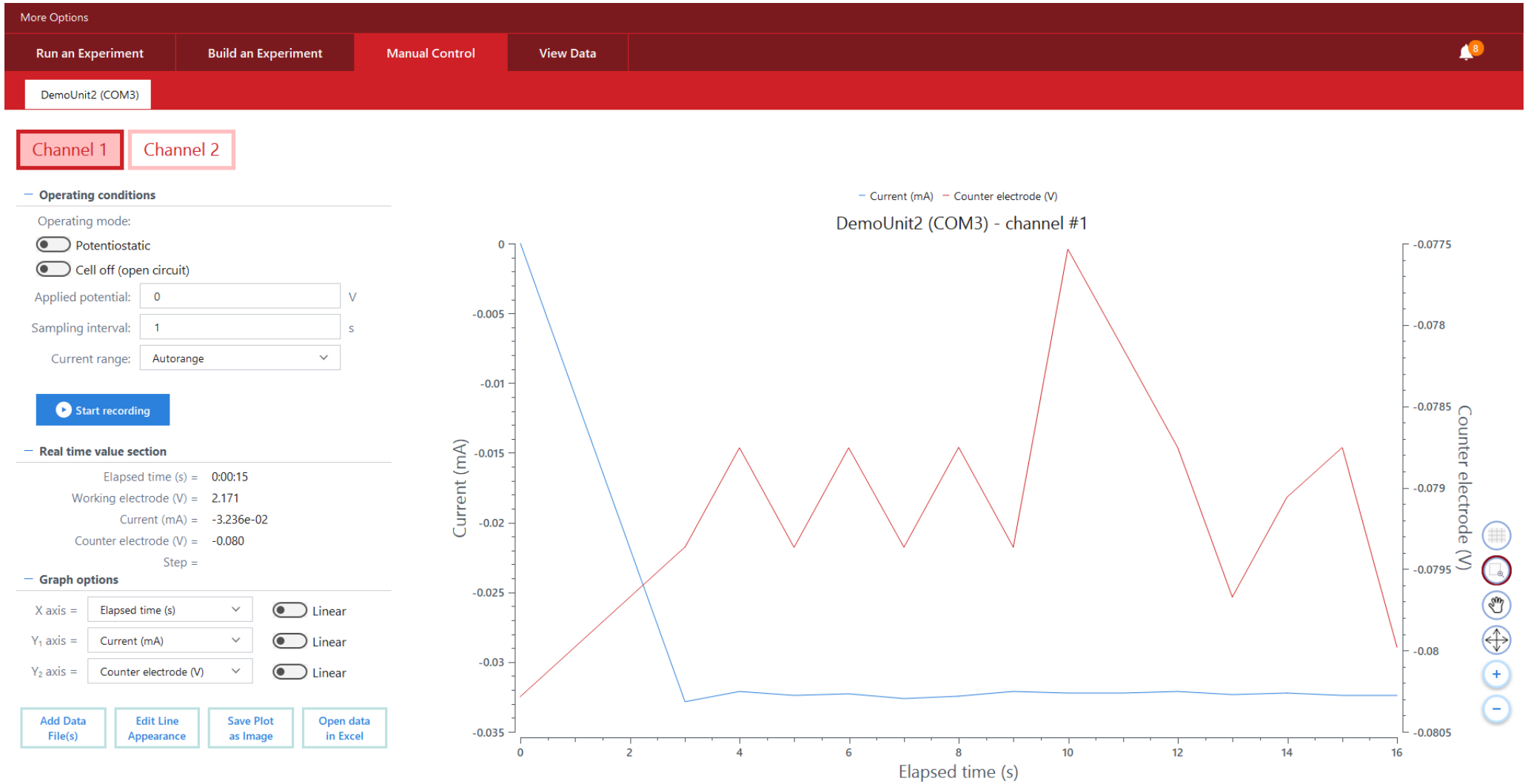
Start Experiment

Drag & Drop to Create Custom Experiments

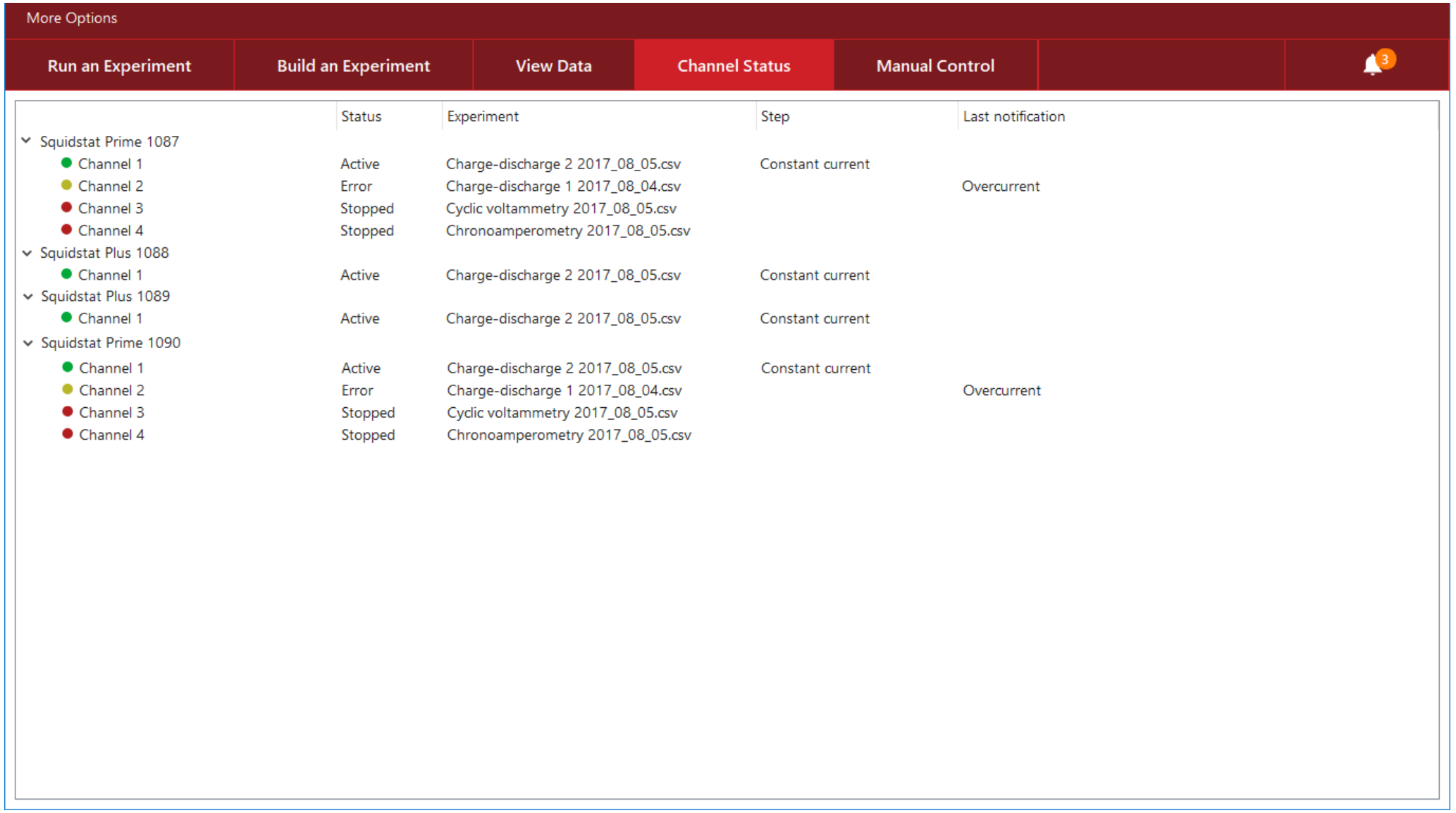


Easily View Data From One or More Channels

"Manual Control" Is A Powerful Exploratory Tool



Monitor & Control Dozens of Squidstats At The Same Time



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Leibniz-Institut für Neue Materialien

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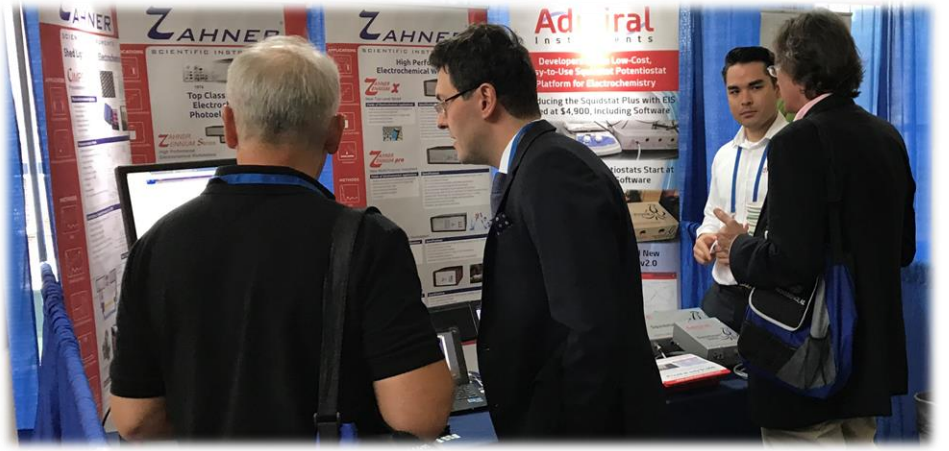

Thanks For Your Consideration

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Appendix - Application Areas

General Electrochemistry

Performing standard electrochemistry measurements, studies on analytes, ion determination, analytical chemistry, electrochemical cell characterization & modeling, organic chemistry, inorganic chemistry and determination of redox potentials fall into this category. Cyclic voltammetry, square wave voltammetry, potentiometry and coulometry are just a few of the methods to be mentioned when it comes to electrochemical analytics. Samples of organic and inorganic chemistry can be evaluated by these techniques in order to gain insight into their composition and the quantity of specific redox active species.

Common Areas of Study

- Analytical Chemistry
- Wastewater Analysis
- Environmental Analysis
- Medical Research
- Biological Research
- Classroom Demonstrations

Frequently Used Methods

- Cyclic Voltammetry
- Square Wave Voltammetry
- Chronoamperometry
- Chronopotentiometry
- Rotating Disk Electrode Experiments
- Rotating Ring Disk Electrode Experiments
- Polarography
- Coulometry

Recommended Products

Squidstat Plus with EIS ($4,900)

Squidstat Prime (4-channels)

Squidstat Solo ($1,900)

Energy Storage & Conversion Systems

Research on batteries, fuel cells, electrolysis cells and supercapacitors fall into this application category. Determination of State-of-Charge/State-of-Health (SOC/SOH) and of current and power density are performed on a routine basis using AC and DC measurement methods. Recording true parallel Electrochemical Impedance Spectroscopy (EIS) data of stacked cells is of prime importance. Solar induced hydrogen production, water splitting, and artificial photosynthesis are also areas where our selection of products can be used to help develop the new generation of energy storage and conversion systems worldwide.

Common Areas of Study

- Battery Cell Research
- Fuel Cell & Electrolysis Cell Research
- Electric Vehicles & Mobility
- Battery Reuse Characterization
- Solar Fuels
- Artificial Photosynthesis
- Hydrogen Production
- Water Splitting
- Photocatalysis

Frequently Used Methods

- Electrochemical Impedance Spectroscopy (EIS)
- True Parallel EIS (max. 17 channels per unit)
- Multichannel Sequential EIS
- Battery Cycling Combined with EIS
- I/E Curves
- Cyclic Voltammetry
- PITT/GITT
- Current Density Curves
- Power Density Curves
- Equivalent Circuit Modeling and Simulation

Recommended Products

Squidstat Plus with EIS ($4,900)

Zennium Workstations

EL1000 Electronic Load

PMux Channel Multiplexer

Solar Cell Research & Optimization

Zahner's CIMPS and QE/IPCE workstations, which utilize a combination of a Zennium workstation and external potentiostat powering a lightsource, are well-known within the solar PV research community as among the best equipment available to carry out the investigation of silicon solar cells (SC), dye sensitized SC, perovskite SC, Grätzel SC, organic photovoltaics (OPV), and other photoactive devices such as photo sensors. Determining power conversion efficiency, incident-photon-to-current-conversion efficiency IPCE, fill factor and charge extraction are common methods that can be run easily and reliably with our equipment.

Common Areas of Study

- Silicon Photovoltaics
- Dye-Sensitized Cells
- Perovskite Solar Cells
- Cadmium Telluride Cells
- Copper Indium Gallium Selenide
- Polycrystalline Photovoltaics

Frequently Used Methods

- Electrochemical Impedance Spectroscopy (EIS)
- Spectral Resolved Transmittance / Absorbance
- Absorbance Spectroscopy vs. Voltage, Current, or Time
- Photocurrent Spectroscopy (PCS)
- Quantum Efficiency (QE)
- Incident Photon-to-Current Efficiency (IPCE)
- Fast Light Intensity Transients: Photocurrent & Photovoltage Response (FIT)
- AM1.5 Solar Simulation

Recommended Products

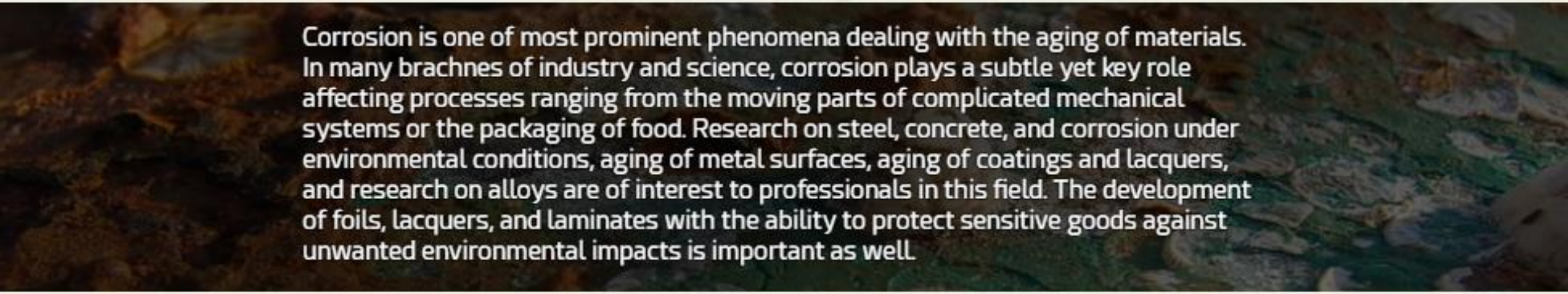
Zahner CIMPS Workstation

Zahner CIMPS-QE/IPCE System

Monochromatic LED Light Sources

PECC-1 & PECC-2 Sample Holders

Corrosion Monitoring & Prevention



Corrosion is one of most prominent phenomena dealing with the aging of materials. In many brachnes of industry and science, corrosion plays a subtle yet key role affecting processes ranging from the moving parts of complicated mechanical systems or the packaging of food. Research on steel, concrete, and corrosion under environmental conditions, aging of metal surfaces, aging of coatings and lacquers, and research on alloys are of interest to professionals in this field. The development of foils, lacquers, and laminates with the ability to protect sensitive goods against unwanted environmental impacts is important as well.

Common Areas of Study

- Foils & Laminates
- Materials Coatings
- Corrosion Protection & Prevention
- Food & Beverage Packaging
- Automotive Industries
- Aviation Industries
- Infrastructure Repair

Frequently Used Methods

- Electrochemical Impedance Spectroscopy (EIS)
- Multichannel Sequential EIS
- Electrochemical Noise Test
- Correlated Two Electrode I/V Noise Test
- Relaxation Voltammetry
- Equivalent Circuit Modeling & Simulation
- AC-DC-AC Corrosion Simulation Method
- Delamination Test
- D-layer Test
- Surface Stability Analysis
- RDE & RRDE Experiments

Recommended Products

Squidstat Plus with EIS ($4,900)

Zennium E Workstation

COLT Coatings & Laminates Kit

KMZ3 & KMZ5 Corrosion Cells

Photo-Electrochemical Systems

Photo-electrochemistry covers many areas where photons comprise the fundamental functionality within a device or system, either through the emission or absorption of them (or both). New materials are developed all the time to harness the value of photo-electrochemical principals. Liquid crystalline displays (LCDs), light emitting diodes (LEDs), and organic light emitting diodes (OLEDs), all examples of such technologies, can be deeply investigated using products within our portfolio. Other types of light-emitting electrochemical cells (LECs) are being optimized for reduced energy consumption as well.

Common Areas of Study

- Light Emitting Diodes (LEDs)
- Organic Light Emitting Diodes (OLEDs)
- Liquid Crystal Displays (LCDs)
- E-ink, E-paper
- Smart Windows & Smart Mirrors
- Other Electrochromic Systems
- Displays, E-readers
- Consumer Electronics

Frequently Used Methods

- Electrochemical Impedance Spectroscopy (EIS)
- Spectral Resolved Transmittance / Absorbance
- Absorbance Spectroscopy vs. Voltage, Current, or Time
- User-defined Script Controlled Electrochemical Absorbance Spectra
- Dynamic Transmittance / Reflectance (OIS)
- Synchronous Multi Spectral Dynamic Transmittance / Reflectance with Parallel EIS
- Light Emission Voltage / Current Testing (PVI)
- Fast Light Intensity Transients

Recommended Products

- Zahner CIMPS Workstation
- Zahner CIMPS-QE/IPCE System
- TLS03 Tunable Light Source
- TR8M Transient Recorder

Sensor Development & Calibration

A majority of sensors, regardless of industry application, rely upon detection of an electrical or electrochemical signal triggered by a reaction or change of state of some kind. Instruments capable of measuring changes in current down to picoamp levels, or even as low as attoamp levels, are oftentimes necessary to develop and calibrate sensing elements. Admiral Instruments carries multiple electrochemical workstations and accessories that are well-suited for sensor optimization. Additionally, our potentiostats can be used in conjunction with a variety of sensing elements to function as the detector itself.

Common Areas of Study

- Analytical Chemistry
- Biochemistry Research
- Environmental Monitoring
- Medical Device Development
- Analyte Detection
- Protein Classification

Frequently Used Methods

- Cyclic Voltammetry
- Chronoamperometry
- Chronopotentiometry
- Electrochemical Impedance Spectroscopy (EIS)
- Electrochemical Noise Test
- Coulometry
- Equivalent Circuit Modeling & Simulation

Recommended Products

Squidstat Plus with EIS ($4,900)

Squidstat Solo ($1,900)

N-Probe Low-Power Potentiostat