PowerCV
Voltammetry Software

Power and Flexibility

- Cyclic Voltammetry (CV) and Linear Sweep Voltammetry (LSV) techniques for characterization of redox-active systems.

- Improved programming flexibility with choice of either Ramp or Staircase modes, with Staircase mode offering Pulse Electrode Conditioning, Vertex Delays and Acquisition Mode parameters.

- Multi-Cycle CVs (either single or double vertex) with improved graphics for displaying all cycles or any four cycles within the data set.

- Powerful graphics with plotting and analysis tools to easily extract information from the data.

- Positive Feedback IR compensation available (except for VersaStat II)

- Easy importation of M250/270 data files

Discover the power of a true 32-bit Windows program with the PowerCV Voltammetry Software module for our Electrochemistry PowerSuite software platform. Take advantage of all the new features including powerful wizards, new graphics, data presentation formats and easy-to-use import/export tools for both graphs and data.

PowerCV continues our long tradition of providing the leading voltammetry software to the research electrochemistry community.

PowerCV, the PowerSuite module that offers Cyclic Voltammetry (CV) and Linear Sweep Volatmmetry (LSV) techniques for data acquisition and analysis with Princeton Applied Research systems, has expanded its capabilities further with the addition of new waveform programming options and analysis tools.

LSV and CV are the most widely used techniques in electrochemical studies as they provide a fast and simple way to characterize a redox-active system. In these techniques, the potentiostat applies a linear sweep of a programmed potential range and monitors the current as a function of the applied potential. Traditionally, this technique is performed using a straight analog ramp. Due to the digital nature of today's potentiostats, however, the actual ramp consists of a series of small potential steps that approximate the linear ramp desired.
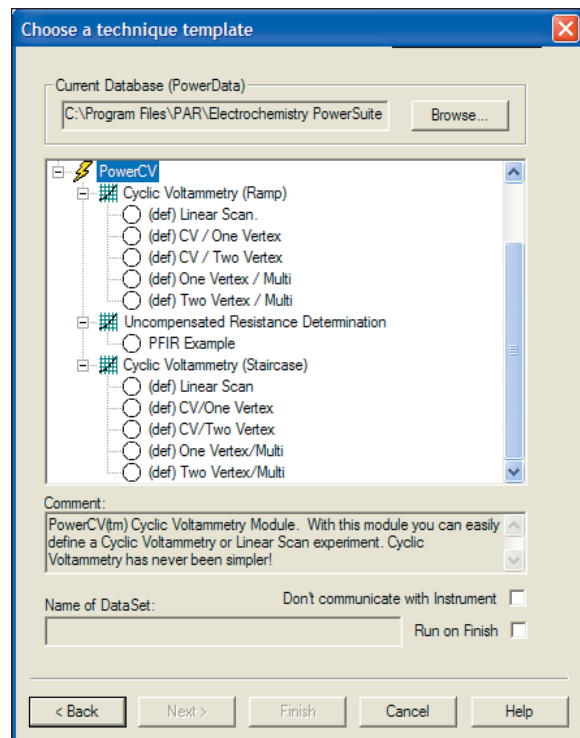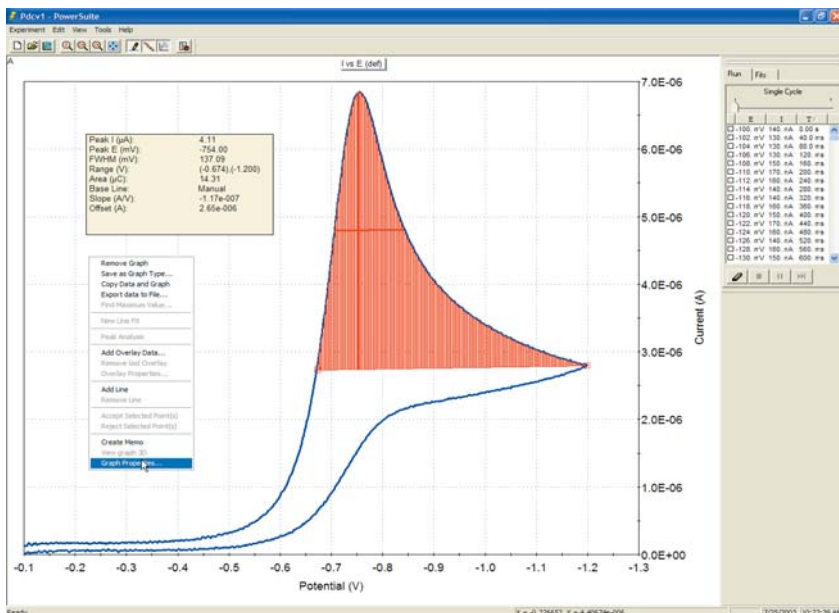
The latest versions of PowerCV (2.40 and above) include two options for CV and LSV experiments: Ramp mode and Staircase mode.

Ramp mode (the mode utilized in all prior versions of PowerCV), is programmed to build a waveform that more closely approximates an analog ramp. In this mode, the user defines a scan range and scan rate, and the waveform is programmed using the smallest potential steps allowed by the hardware, with the current being measured at the end of each step.

In the Staircase Mode, the user has full control of setting the potential step size, as well as the step time (period), when setting the scan rate. This results in the ability to scan at faster rates with larger potential steps, and to include vertex delays (hold at the vertex potential for a set period before continuing the scan) if desired. Also, in the Staircase mode, a new parameter has been added to provide the ability to control the sampling point of the current along each potential step. This Acquisition Mode parameter is particularly important for yielding results that are the equivalent of those produced with an analog ramp. (Journal of Electroanalytical Chemistry, 1987,222,69).

With either mode, the potential settings are defined by initial, vertex, and final potentials, with either single vertex or double vertex scans available. The potentials can be defined as absolute voltages or by their relationship to the open circuit (oc) potential. The list of default templates (experimental setup options) has been expanded to include the multi-cycle options, permitting up to 90 cycles per defined waveform, and up to 100,000 points total (depending on hardware)!

Other new features in PowerCV include Peak Analysis, providing valuable information on peak location, height and area. Also, Data Factors are now included in the graphical properties for converting values to different units, or for converting to a different unit entirely (i.e., converting Auxiliary Input data from a voltage to its proper units and values).

PowerCV is compatible with data acquired from M250/270 Research Electrochemistry software. Simply import the M250/270 data file and it quickly and easily converts to the PowerSuite data structure so that it is available for display, analysis, and comparison as if it were acquired in PowerCV.

PowerSuite, our 32-bit Windows 95/98/NT/2000/XP application software, provides a simple, flexible and extremely powerful software interface to perform corrosion techniques with Princeton Applied Research Instrumentation.

PowerSuite's unique data storage format using a Microsoft® Access database makes a number of other powerful features available to PowerSuite. They include making changes to some experimental parameters on the fly, performing fits on data as it's being collected, searching data files based on comments added by the user, and exporting data and plots to other programs such as Excel or PowerPoint.
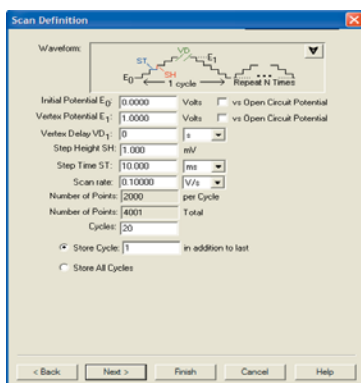

For new users, the "New Experiment Wizard" guides you through a step by step process to configure all aspects of the experiment. Once you have a setup that is to be repeated over several experiments, it can be "Saved as a Template…" , recalled, and executed without having to re-enter information with each use.

PowerSuite's dominant feature is the graphical capabilities that provide tremendous flexibility with data presentation. Up to four plots can be viewed simultaneously on the screen without opening a separate viewing program. Several default plots are available, and the user has the ability to modify each or create and save their own custom graphs according to their criteria. A wide variety of parameters are available for plotting, as well as the ability to add a second Y-axis or view the plot in 3-D. The user can select the data symbols/lines desired, and change the color of any plot.

Additional graphical features allow for the data on any axis to be mathematically changed (by choosing either +, –, /, or * of the axis values) using the Data Factors feature. This feature can be used to change a reading in amps to microamps for data comparison purposes, or it can be used to convert a potential reading acquired from an ancillary component (such as a temperature probe) through the Auxiliary Input into its proper values (such as °C).
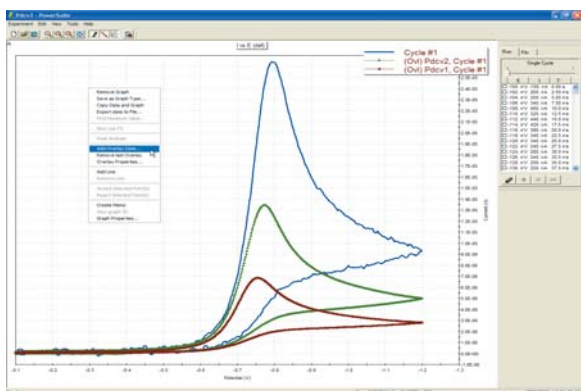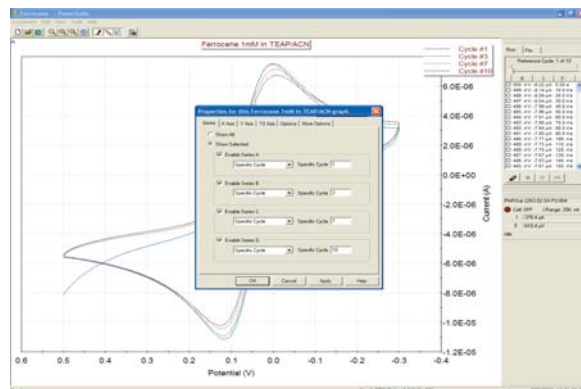
Overlaid data from prior experiments can appear on up to four different graphs simultaneously. You can even place the overlay data on the plots prior to acquiring the data, which allows the user to compare the two data sets as the experiment progresses! The graphical properties of the overlaid data can also be modified in terms of color or plot style. Any overlaid data can be selected to become the "active" data file, at which point the current "active" file becomes an overlay, and full data analysis can be performed on what was an overlay! A number of graphical and analytical features are available by right-clicking on any graph and selecting from a full complement of options.

The "Hover" window feature in PowerSuite provides you with a unique information window for any data point, even during the acquisition. Just position the cursor near a data point and the Hover box will appear, providing detailed information on that data point determined by the type of plot being examined.

The Experiment Bar provides a live interface to the experiment. The control buttons on the Experiment Bar's Run tab allow the user to start, stop, or pause an experiment. The Fits tab on the Experiment Bar provides the information on Line Fits, Peak Analysis, etc., depending on the data being analyzed. An Instrument Toolbar provides information on the ID of the instrument being controlled, the cell on/off status, current scale, as well as the current and potential measurements.

The Autoexecute Bar gives you even more automated control over PowerSuite. Experimental templates can be entered into control windows for execution, along with time delays, loops, and even user prompts. Any template can be added to an Autoexecute sequence, allowing a user to run, for example, both DC and AC corrosion techniques in the same sequence! An Autoexecute can be created and saved for repeated use to allow the user to work while away from the instrument, increasing productivity and throughput.

Specifications

Hardware Supported
GPIB Instruments: 273A, 263A (with /91 option), 6310A, BES, 283, VersaStat II
USB Instruments: PARSTAT Series (ie., PARSTAT 2263)

Voltammetry Techniques
Linear Sweep Voltammetry
Cyclic Voltammetry (one Vertex)
Cyclic Voltammetry (two Vertex)
One Vertex CV/Multi-Cycle
Two Vertex CV/Multi-Cycle
Uncompensated Resistance Determination

Working Electrodes Supported
Model 303A Static Mercury Drop Electrode (HMDE mode only) with 507 interface
Model 616/636 Rotating Electrodes
Solid Electrodes (see online catalog for electrodes and cell selection)

Recommended Computer Specifications
Pentium Processor (1GHz or greater)
64MB RAM
50MB available HDD space
CD-ROM drive
Microsoft Windows 95/98/2000/NT/XP

Interface Card (GPIB Instruments only)
National Instruments PCI-GPIB (PC)
National Instruments PCMCIA-GPIB (Laptop)

	283	263A/BES/6310A	273A	VersaSTAT II	PARSTAT
Scan Range	±8 V	±8 V	±2 V	±2 V	±10 V
Applied E	±10 V	±10 V	±10 V	±10 V	±10 V
Scan Rate Maximum (Ramp Mode)	1 V/s	1 V/s	1 V/s	1 V/s	50 V/s
Scan Rate Maximum* (Stair Case Mode)	1667 V/s	1667 V/s	1000 V/s	500 V/s	2500 V/s
# Points/Cycle	1k	1k	1k	1k	10k
# Points/Multi-Cycle	90k	90k	2k	2k	100k

*The maximum scan rate for Staircase mode is achieved only in a single sweep with 50 mV potential steps on set current range in 4/4 acquisition mode.

Specifications subject to change
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