

# EChem Software (ES260)



EChem software running

### Description

eDAQ EChem™ software runs on Windows or Macintosh computers for the collection, display and analysis of data from electroanalytical voltammetric experiments. EChem is used with **e-corder**<sup>®</sup> data recording systems, and a potentiostat.

EChem is compatible with analog poteniostats that have an 'external input' and current and potential recorder outputs. EChem uses the **e-corder** hardware as the digital waveform generator, and data acquisition system. Even non-scanning potentiostats can often be upgraded to the full range of EChem techniques.

EChem is also fully compatible with the eDAQ Potentiostat (EA160) and the high sensitivity eDAQ Picostat (EA162).

### Techniques

EChem supports the following electrochemical techniques:

- Linear (Staircase) Sweep Voltammetry (LSV)
- Normal Pulse Voltammetry (NPV)
- Square Wave Voltammetry (SVVV)
- Differential Pulse Voltammetry (DPV)
- Cyclic (Staircase) Voltammetry (CV)
- Differential Pulse Amperometry (DPA)

All voltammetric techniques are also supported in stripping mode. Chronoamperometric/coulometric/potentiometric techniques are supported by the standard **e-corder** Chart and Scope software.

EChem also features a Multi Pulse Voltammetry technique where you can design a potential waveform using a staircase ramp with up to two pulses per step. Experiment with new techniques such as Cyclic Square Wave Voltammetry!

- Most voltammetric techniques
- Windows or Macintosh
- ullet No programming required just plug and play
- Works with most analog potentiostats
- 16 bit resolution (minimum)
- Digital signal processing for best S/N ratios
- Multiple runs stored in one file
- Ideal for educational or research use

#### GLP

EChem is designed to help you with good laboratory practice:

- All runs are date and time stamped.
- Parameters used for any run can be recalled.
- Store sample preparation notes, standard addition concentrations, and general observations in the data file.
- Data is saved to hard disk after every run in 'autosave' mode, and can be recovered in the event of a power outage.
- Up to 999 runs can be stored in the one data file.
- Transfer files between Windows and Macintosh computers.



## View Modes

Display current or potential on the X or Y axis, or plot current and/or potential versus time. You can reverse the direction of the current and potential axes to suit your convention.

## Data Pad

The Data Pad is an internal mini-spreadsheet that helps analyze you data by locating peak positions, heights, areas and more.

## Transform Data

Functions include smoothing, integrating or differentiating data. The potential axis can be offset to display results against a different reference (for example work with a Ag/AgCl electrode, then display data against a SHE reference). The raw data is always maintained internally and can be recovered.

## **Export Friendly**

You can export raw voltammograms (as graphics or tabular data), and peak reports to other graphing software, word processors, and spreadsheets.

## **Digital Signal Processing**

EChem gives the highest quality data possible from your potentiostat by averaging the current signal over a 'sampling period' for each data point displayed. The signal-to-noise ratio improves by a factor of  $\sqrt{n}$  when 'n' readings are averaged. In practice, where noise has been a problem, signal quality often improves by an order of magnitude, or more.

Signal averaging is performed at 32 bit floating point resolution which means that results from differential techniques (SVVV, DPV, and DPA) are no longer limited by the system digital resolution.

### **Computer Requirements**

EChem requires Windows 98, 2000, Me, XP, or MacOS 8.6 or later. The computer should have a minimum 128 MB RAM, and a USB port (2.0 or 1.1) to collect data.

## **Specifications**

Recording speeds: 0.1, 1, 10, 100 kHz Signal resolution: 16 bits Signal averaging resolution: 32 bit floating point Scan rates:  $< 10^{-6}$  to  $\sim 500$  V/s Step width: 0.01 ms minimum Input ranges:  $\pm 2$  mV to  $\pm 10$  V (adjust to potentiostat output) Waveform output ranges:  $\pm 10, \pm 5, \pm 2, \pm 1$  V Output resolution: 16 bits Number of readings per sampling period: 65000 maximum Number of data points in one run: 16000 maximum Number of runs in one file: 999 maximum

## Ordering

EChem software can be ordered as individual licenses (ES260) or as a departmental license (ES261).

#### EChem techniques are selected Square Wave... Normal Pulse. from a pull down menu Differential Pulse Linear Sweep Stripping... Square Wave Stripping... Differential Pulse Stripping. • ⊆yclic Voltammetry.. Ctrl+E Multi Pulse Voltammetry. Range: 1000m Multi Pulse Amperometry... Ran d 10kHz Apply Technique. Initial Upper Final Rate Parameters for each technique are easily entered Sten **V** - 1 D. Cancel Pot Pot OK The potential waveform for an EChem technique can be previewed before the experiment is commenced



Results from an anodic stripping voltammetry experiment. Highlighted area viewed in zoom window.



Cyclic voltamogram of FCA using a 1 µm microelectrode and EA162 Picostat.

### www.eDAQ.com

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