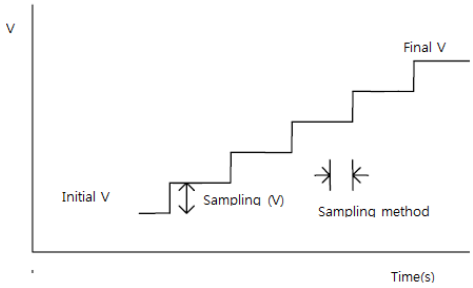
SteadyState Cyclic voltammetry with IR measurement

Purpose

This test is to demonstrate coin cell battery's steady state cyclic voltammetry. During cyclic voltammetry's potential scanning, it measures IR(internal resistance) with 1kHz impedance measurement method (Dynamic IR measurement).

Smart manager will apply sweep mode using constant DAC value increment or decrement with constant time duration. Smart Manager calculate DAC increment/decrement value nearby step height(or sampling interval) which user defined and time duration to meet nearby scan rate which user defined.
User can select averaging sampling condition.



This function is for high capacitive sample such as supercapacitor, corrosion, battery etc.

This demonstration's test condition is;

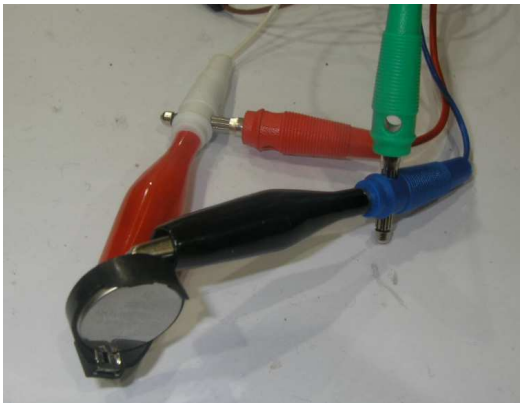
- Voltage range: 2.7V – 4.2V
- Sweep rate: 1mV/sec
- Staircase height: 4mV
- Segment: 4 (Eoc to 4.2V, 4.2V to 2.7V, 2.7V to 4.2V,4.2V to 2.7V)
- IR measurement condition
  - frequency: 1kHz
  - Amplitude: 10mV

Preparation

- ZIVE SP/MP electrochemical workstation
- 4.2V Li ion Coin cell
- Coin Cell holder

Cell Connection

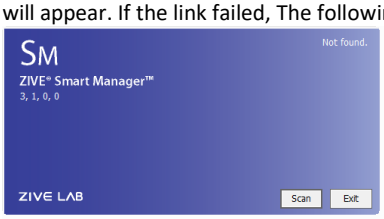
+ electrode(Green lead & Blue lead)
- electrode(White lead & Red lead)



Procedure

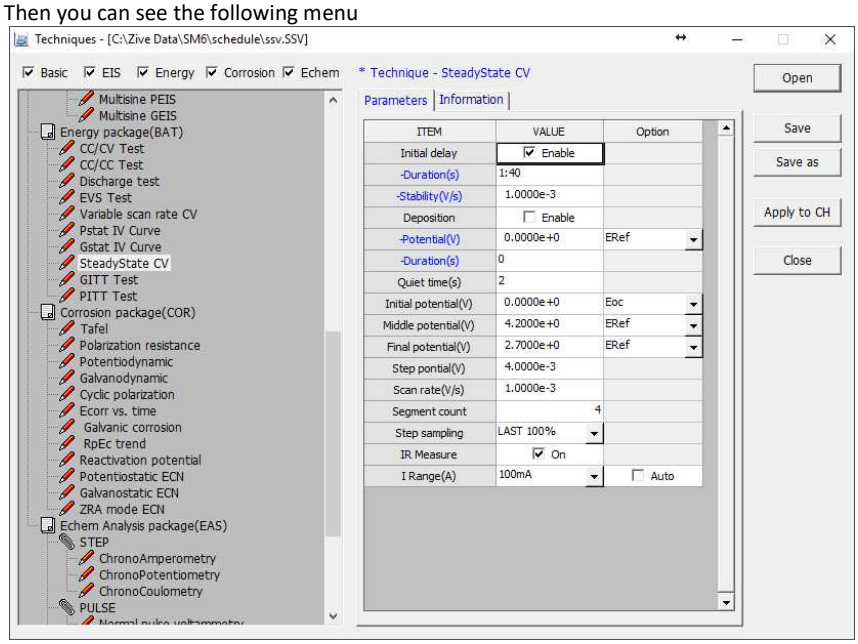
1. Turn the Power switch on the ZIVE SP/MP electrochemical workstation
2. Open the SM software by clicking the SM icon. The following progress box will appear, and will show the progress of checking instrument configuration and communication between ZIVE SP/MP electrochemical workstation and PC.

If the link is successfully connected, Click “OK” button on the box then the progress box will automatically disappear and SM software will appear. If the link failed, The following progress box will display then click the “Retry” button.



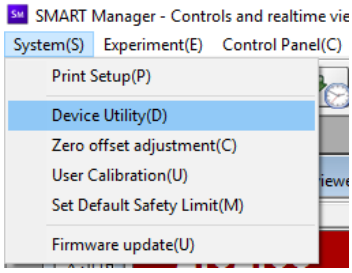
If the link failed again after clicking “Retry” button, you need to check USB cable connection.

3. Steady state CV test technique file: Click New technique function icon  (or select Experiment-Techniques on Experiment menu) Then you can see the following menu

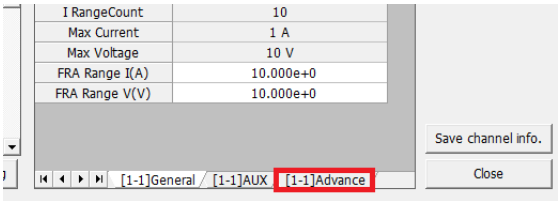


4. Click “Save” button to save the technique file which contains the above parameter and save it as “ssv.ssv” file name and click “Apply CH” button to assign this technique file on channel.

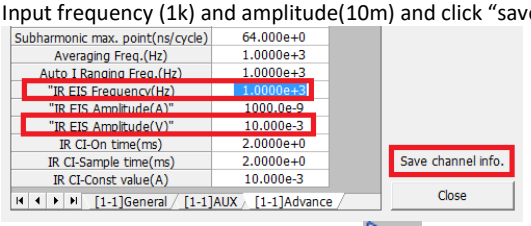
5. Select Device Manager by clicking  icon or system-Device utility



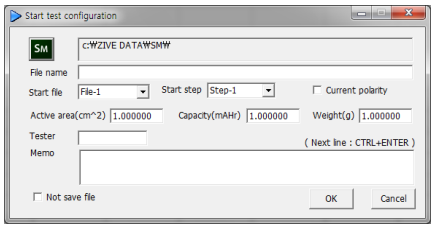
6. Select Advance tab.



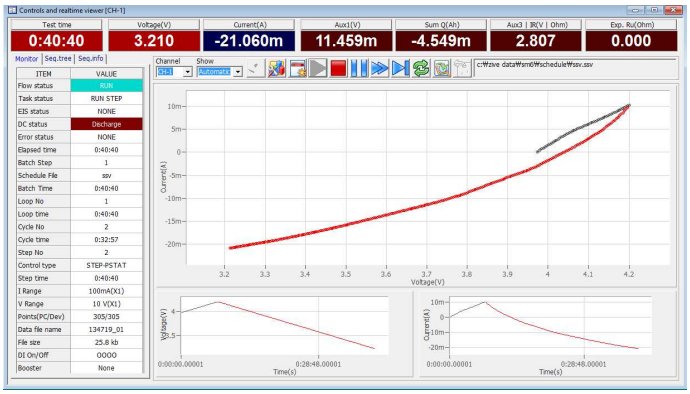
7. Input frequency (1k) and amplitude(10m) and click “save channel info” button



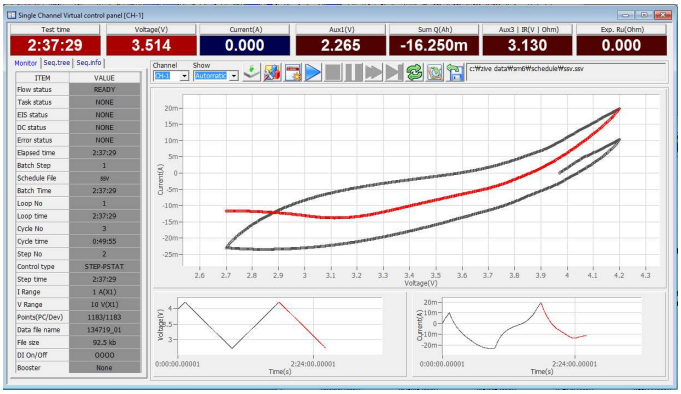
8. To start experiment, click Start button 
9. After click start button, you can see the following box.



You can see real time plot as the following.

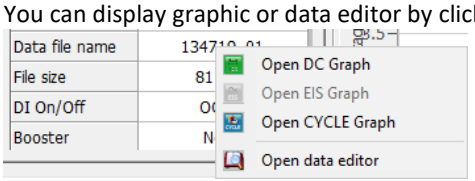


Steady State CV

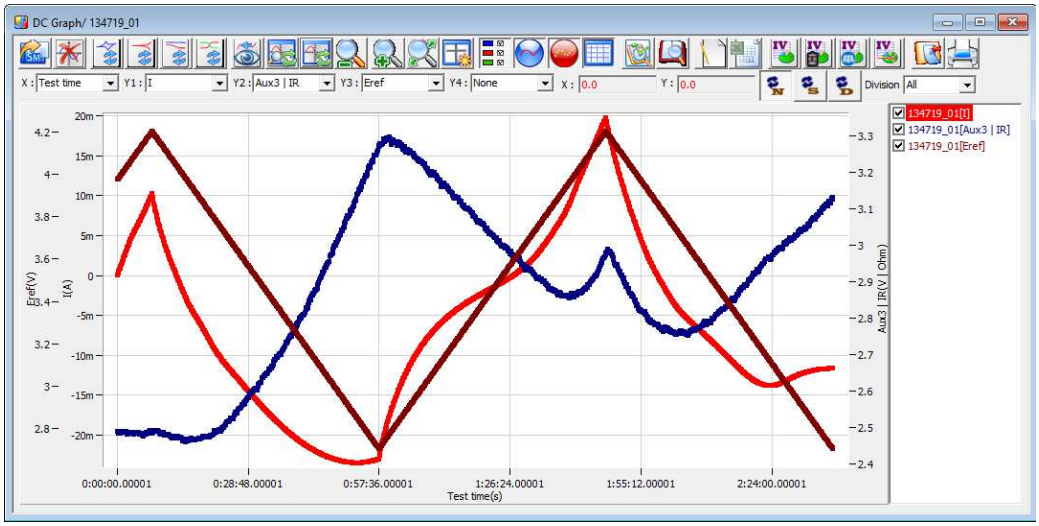


Experiment done

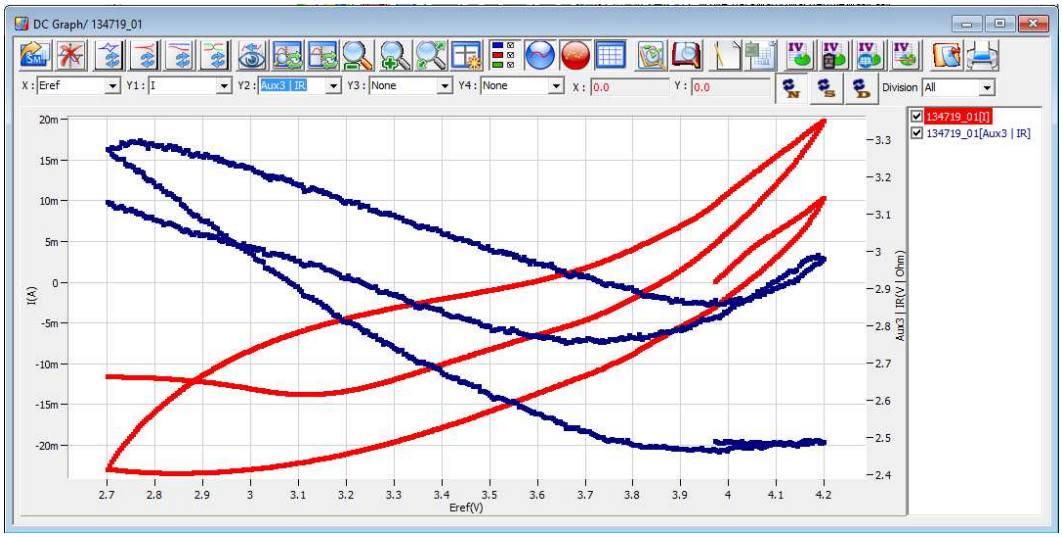
10. You can display graphic or data editor by clicking right mouse on data file name



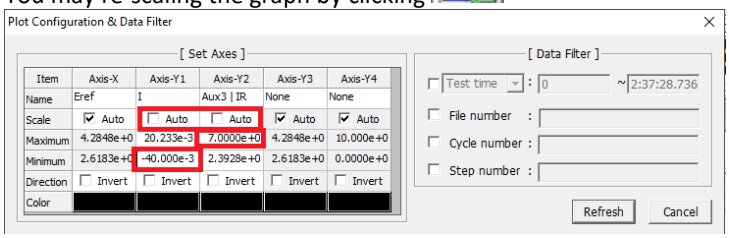
11. You can see voltage, current, IR vs test time when you selected those parameter on DC graph

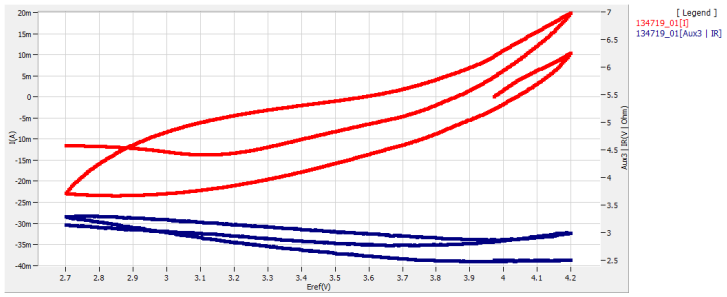


12. You can see current, IR vs voltage when you selected those parameter on DC graph



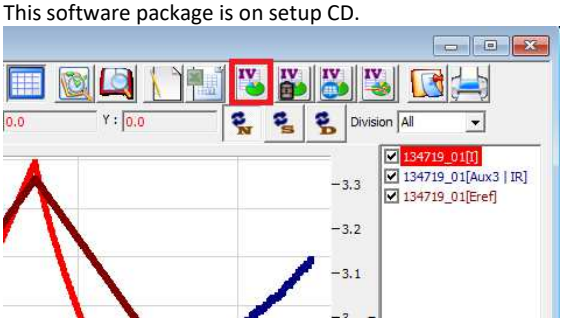
13. You may re-scaling the graph by clicking 



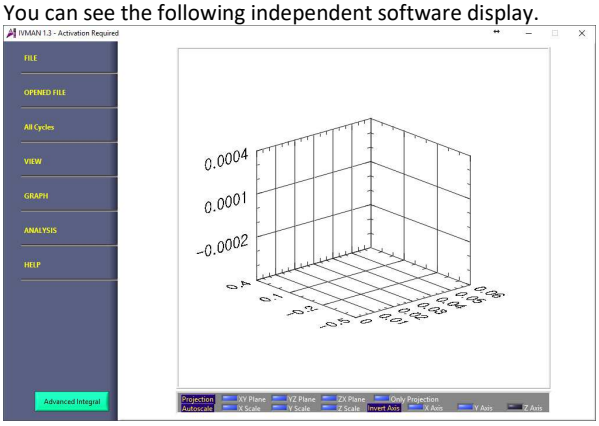


Data Analysis

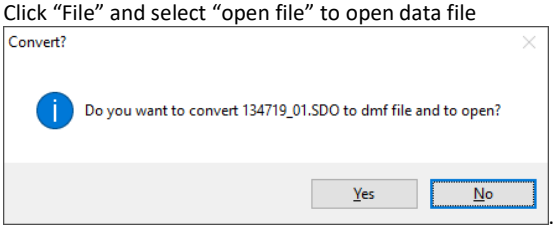
1. Open “IVMAN” by clicking IVMAN main icon  . To use this analysis software, you must install IVMAN software package. This software package is on setup CD.

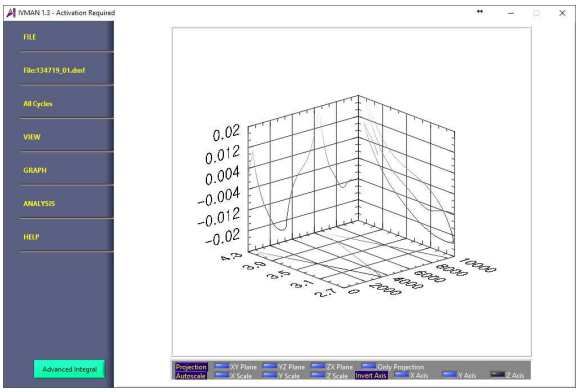


2. You can see the following independent software display.

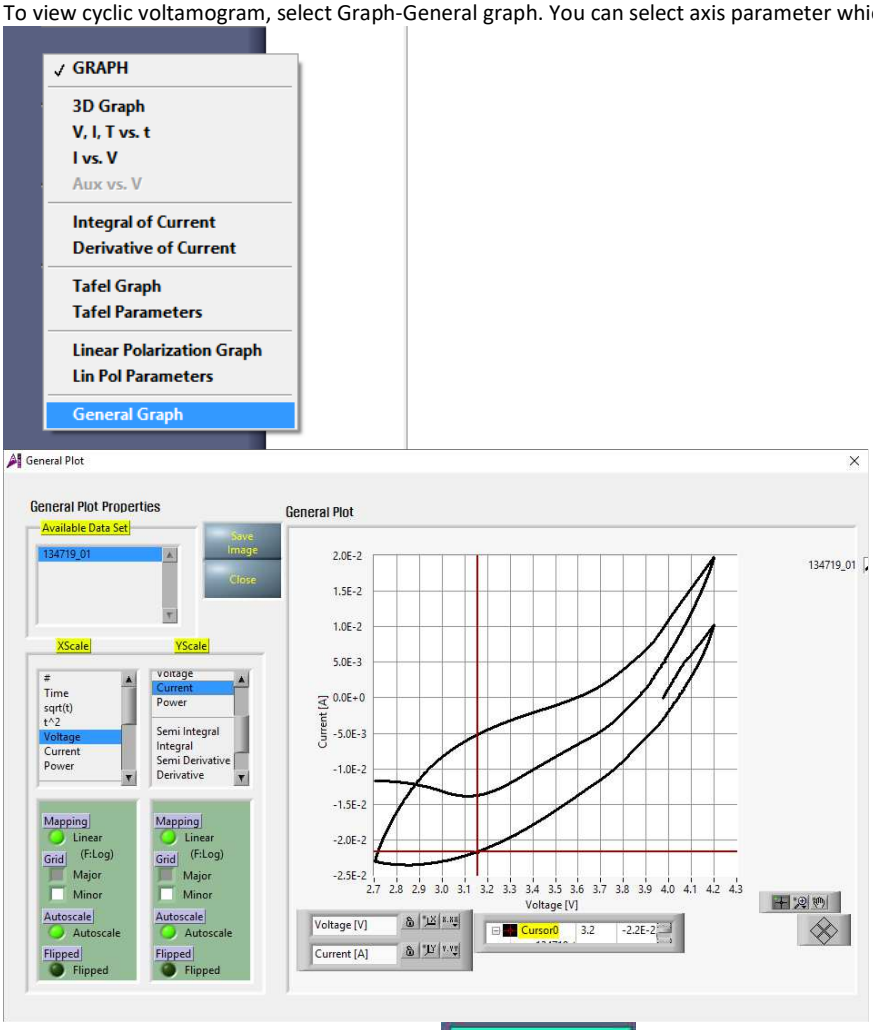


3. Click “File” and select “open file” to open data file

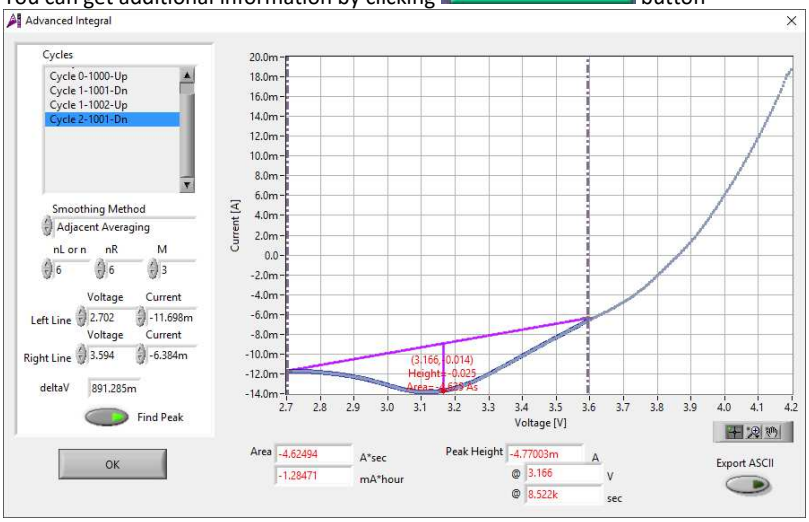




4. To view cyclic voltamogram, select Graph-General graph. You can select axis parameter which you want.



5. You can get additional information by clicking  button



ZIVE LAB