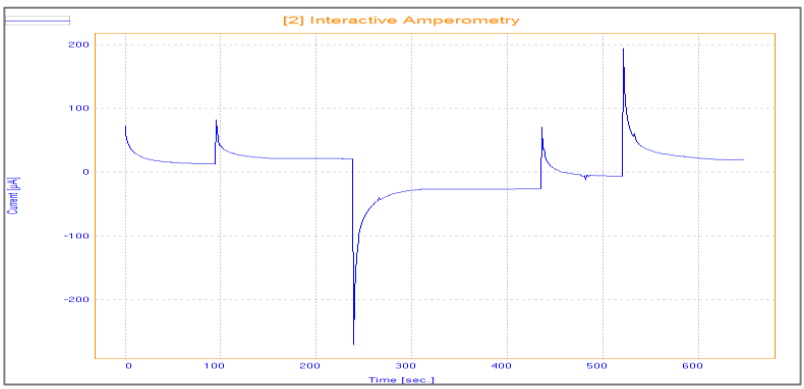
Application Note

General Electrochemistry
AP-GE04

Interactive Chrono Amperometry



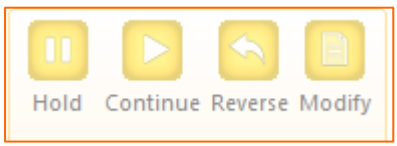
This Application Note describes how the Interactive Chrono Amperometry method works by giving an example with Ferri/Ferrate solution.

Origalys Electrochem

Introduction

In this method which is a chrono-amperometry, a potential step induces a current change. The current is recorded while the WORK potential is maintained at a preset value versus the REF, FREE or LAST imposed potential.
Information about the diffusion properties of the electrochemical species and the kinetics of the process can be obtained. Transient studies require a high sampling rate. You can modify the potential setpoint during the experiment itself at any time.

The potential, the current and the total coulomb charge are displayed on the virtual front panel in real time during the experiment.



Parameters

With the above default settings, working electrode is polarized at +200 mV versus the REF potential for 1 hour. This potential can be changed **at any time** while the experiment is in progress (use the **Modify** interactive key).
The current is recorded every second (Meas. period).
If you want to start the Interactive Amperometry at the open circuit potential of the system, enter 0 mV for Potential and FREE for Versus.

If the Interactive Amperometry follows another method in the sequence, the Versus = LAST option enables to start the Interactive Amperometry from the last potential really imposed in the preceding method.

Properties

Display all | Details | Graph

Interactive	
Potential (mV)	200, REF
Duration	1, hour
Meas. period (sec.)	1
Maximum range	Auto
Minimum range	Auto
Analog Filter	Auto
Open circuit at end	Yes

Figure 1: Parameters of method

Results

Figure 3 shows the voltammogram of this test for Fe solution. Az it can be seen in the graph, during the test the imposed potential changed by clicking on modify button each time.

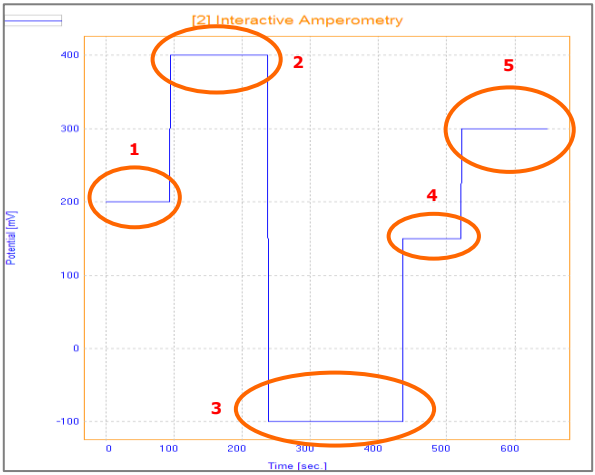
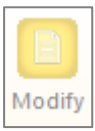


Figure 2: All steps of applied potential

1- First, the imposed potential = 200 mV in the initial parameters.

2- The imposed potential changed to +400 mV after 100 seconds (Figure 3), by clicking on:



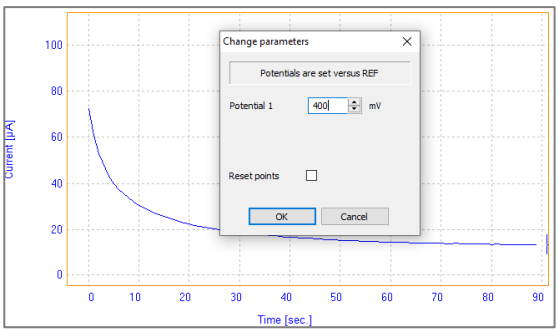
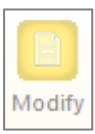


Figure 3: Curve after modifying the imposed potential

3- The imposed potential changed to -100 mV after 240 seconds (Figure 4), by clicking on:



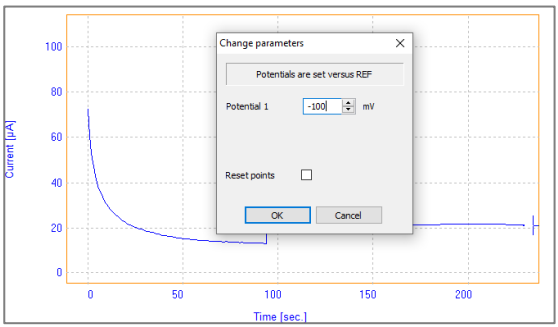
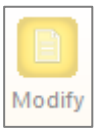


Figure 4: Curve after modifying the imposed potential

4- The imposed potential changed to +150 mV after 435 seconds (Figure 5), by clicking on:



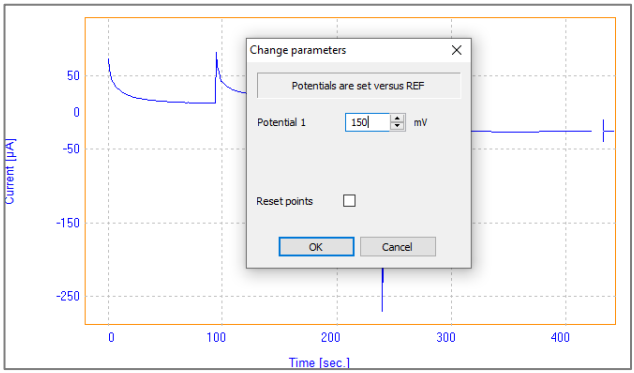
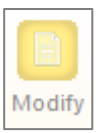


Figure 5: Curve after modifying the imposed potential

5- The imposed potential changed to +300 mV after 520 seconds (Figure 6), by clicking on:



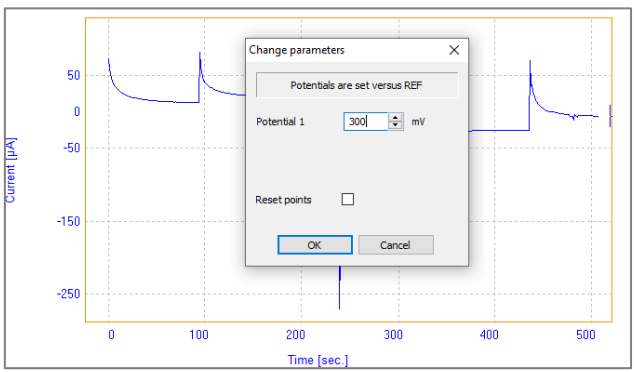


Figure 6: Curve after modifying the imposed potential

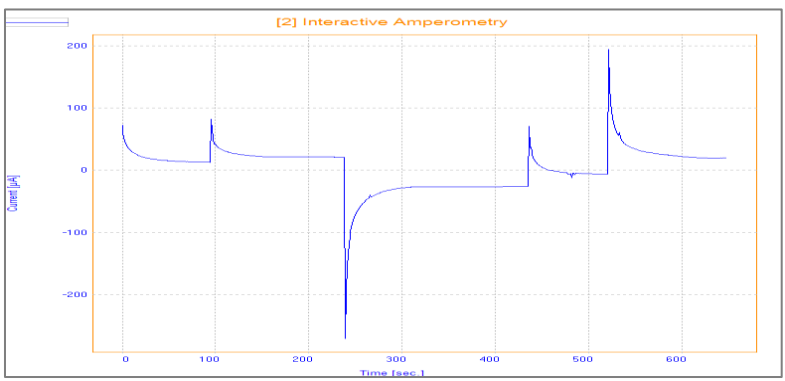


Figure 7: Final result

Instrument and Electrodes

Figure 8: OrigaFlex OGF500

Electrode setup	
Reference Electrode (REF)	Calomel Type: OGR003
Counter Electrode (AUX)	Platinum wire Ø1mm Type: OGV005
Working Electrode (WRK)	Platinum Ø5mm Type: EMEDTPTD5
Electrolyte	Ferri/Ferrate solution 5 x 10^{-3} M in KCl
Instrument	OrigaFlex OGF500
Software	OrigaMaster

Figure 9: Electrochemical cell

REF
Calomel

AUX
Platinum wire Ø1 mm

WRK
Platinum Ø5 mm

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