

CS300M Potentiostat/Galvanostat contains a fast digital function generator, high-speed data acquisition circuitry, a potentiostat and a galvanostat. With high performance in stability and accuracy with advanced hardware and well-functioned software, it is a most cost-effective and basic model for you. With basic methods such as potentiostatic (I-T), CV, LSV, Potentiodynamic (Tafel plot), galvanostatic charge and discharge(GCD), it's suitable for various applications such as corrosion measurement, the carbon dioxide reduction, the electro-catalysis, battery charge and discharge tests, etc. Model CS300M doesn't include



Applications

- Reaction mechanism of Electrosynthesis, electrodeposition, anodic oxidation, etc.
- Electrochemical analysis and sensor;
- New energy materials (Li-ion battery, solar cell, fuel cell, supercapacitors), advanced functional materials, photoelectronic materials;
- Corrosion study of metals in water, concrete and soil, etc;
- Fast evaluation of corrosion inhibitor, water stabilizer, coating and cathodic protection efficiency.

Specifications

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Support 2-, 3- or 4-electrode system	Potential and current range: Automatic
Potential control range: $\pm 10V$	Current control range: $\pm 2A$
Potential control accuracy: $0.1\% \times \text{full range} \pm 1mV$	Current control accuracy: $0.1\% \times \text{full range}$
Potential resolution: $10\mu V$ ($>100Hz$), $3\mu V$ ($<10Hz$)	Current sensitivity: $1pA$
Rise time: $<1\mu S$ ($<10mA$), $<10\mu S$ ($<2A$)	Reference electrode input impedance: $10^{12}\Omega 20pF$
Current range: $2nA \sim 2A$, 10 ranges	Compliance voltage: $\pm 21V$
Maximum current output: $2A$	CV and LSV scan rate: $0.001mV \sim 10,000V/s$
CA and CC pulse width: $0.0001 \sim 65,000s$	Current increment during scan: $1mA @ 1A/ms$
Potential increment during scan: $0.076mV @ 1V/ms$	SWV frequency: $0.001 \sim 100 kHz$
DPV and NPV pulse width: $0.0001 \sim 1000s$	AD data acquisition: $16bit @ 1 MHz, 20bit @ 1 kHz$
DA Resolution: $16bit$, setup time: $1\mu s$	Minimum potential increment in CV: $0.075mV$
Low-pass filters: covering 8-decade	Operating System: Windows 10/11
Interface: USB 2.0	Weight/Measurements: $6.5kg, 36x 30x 16 cm$

Techniques - CS300M

Stable polarization

- Open Circuit Potential (OCP)
- Potentiostatic (I-T curve)
- Galvanostatic
- Potentiodynamic (Tafel plot)
- Galvanodynamic (DGP)
- Sweep-Step Functions (SSF)

Transient Polarization

- Multi Potential Steps
- Multi Current Steps
- Potential Stair-Step (VSTEP)
- Galvanic Stair-Step (ISTEP)

Chrono Method

- Chronopotentiometry (CP)
- Chronoamperometry (CA)
- Chronocoulometry (CC)

Voltammetry

- Linear Sweep Voltammetry (LSV)
- Cyclic Voltammetry (CV)
- Staircase Voltammetry (SCV)#
- Square Wave Voltammetry (SWV)#
- Differential Pulse Voltammetry (DPV)#
- Normal Pulse Voltammetry (NPV)#
- Differential Normal Pulse Voltammetry (DNPV)#
- AC Voltammetry (ACV)
- 2nd harmonic AC Voltammetry (SHACV)
- Fourier Transform AC Voltammetry (FTACV)

#There is corresponding voltammetry stripping methods

Corrosion Measurements

- Cyclic polarization curve (CPP)
- Linear polarization curve (LPR)
- Electrochemical Potentiokinetic Reactivation (EPR)
- Electrochemical Noise (EN)
- Zero resistance Ammeter (ZRA)

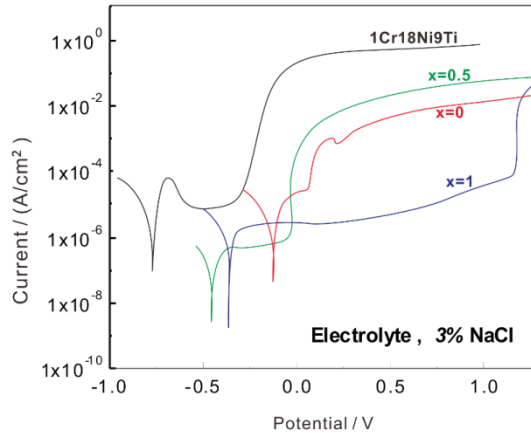
Battery test

- Battery Charge and Discharge
- Galvanostatic Charge and Discharge (GCD)
- Potentiostatic Charging and Discharging
- Potentiostatic Intermittent Titration Technique
- Galvanostatic Intermittent Titration Technique

TECHNICAL ADVANTAGES

Polarization curve

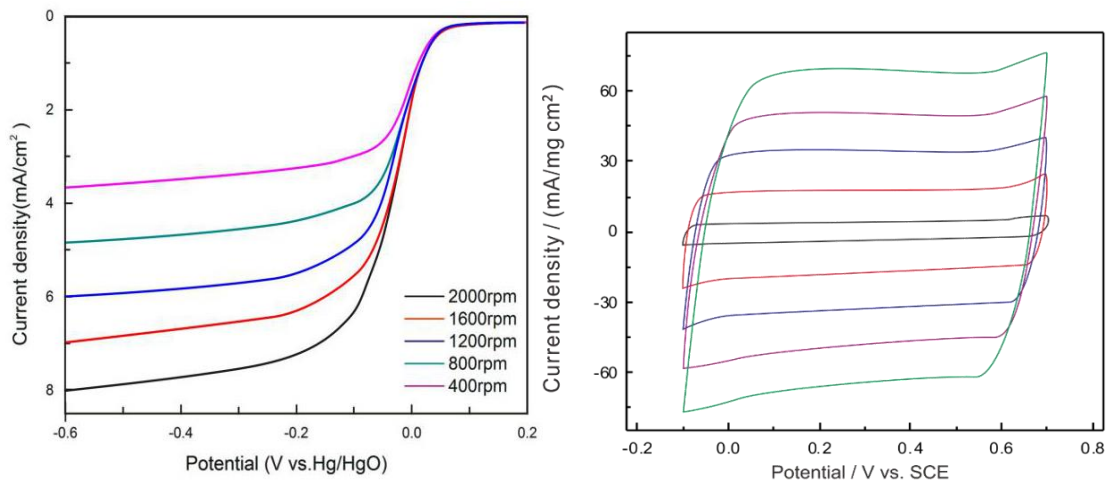
It can complete linear polarization curve and Tafel plot measurements. The user can set the anodic reversal current (passivation film breakdown current) of the cyclic polarization curve to determine material's pitting potential and protection potential and evaluate the its susceptibility to intergranular corrosion. The software employs non-linear fitting to analyze polarization curve, and can make fast evaluation of material's anti-corrosion ability and inhibitors.



Polarization curve of Ti-based amorphous alloy & stainless steel in 3%NaCl solution

Voltammetry

It can do the following electroanalysis methods: Linear Sweep Voltammetry(LSV), Cyclic Voltammetry(CV), SWV, NPV, DPV etc. It integrates calculation of peak area, peak current and standard curve analysis.

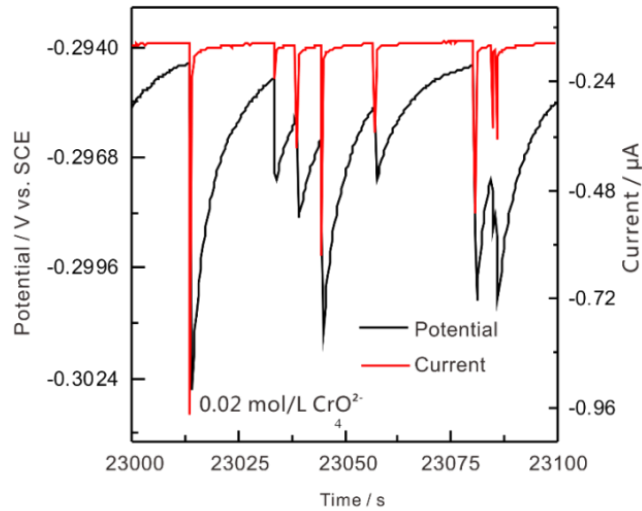


Left: LSV curve: mesoporous carbon material in 0.1M KOH

Right: CV curves of PPysupercapacitor in 0.5 mol/L H₂SO₄

Electrochemical Noise

With high-resistance follower and zero-resistance ammeter, it measures the natural potential/current fluctuations in corrosion system. It can be used to study pitting corrosion, galvanic corrosion, crevice corrosion, and stress corrosion cracking etc. Through noise spectrum, we can evaluate the inducement, growth and death of metastable pitting and crack. Based on calculation of noise resistance and pitting index, it can complete localized corrosion monitoring.



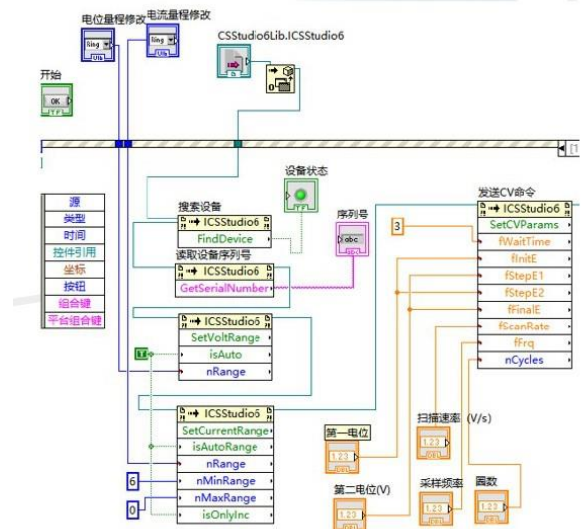
Electrochemical noise of low-carbon steel in 0.05mol/L Cl⁻+0.1mol/L NaHCO₃

Full floating measurement

CS150M workstation uses full-floating working electrode. It can be used for autoclave electrochemical measurements, on-line corrosion monitoring of metallic components under the ground (rebar in concrete, etc.)

Software development kit(SDK)

We can provide secondary development interfaces,API general interfaces and development examples, and can realize data call for Labview, C, C++, C#, VC and other program, which is convenient for secondary development and test methods customization.



High current, high compliance options

- With the CS2020B/CS2040B booster, the current can be boosted to 20A/40A, which meets the requirement in fuel cell, power battery, electroplating, etc
- Can customize the instrument to be 30V high compliance voltage, which meets the test requirement in low-conductivity solutions (organic system, concrete system etc), especially suitable for carbon and nitrogen reduction study.

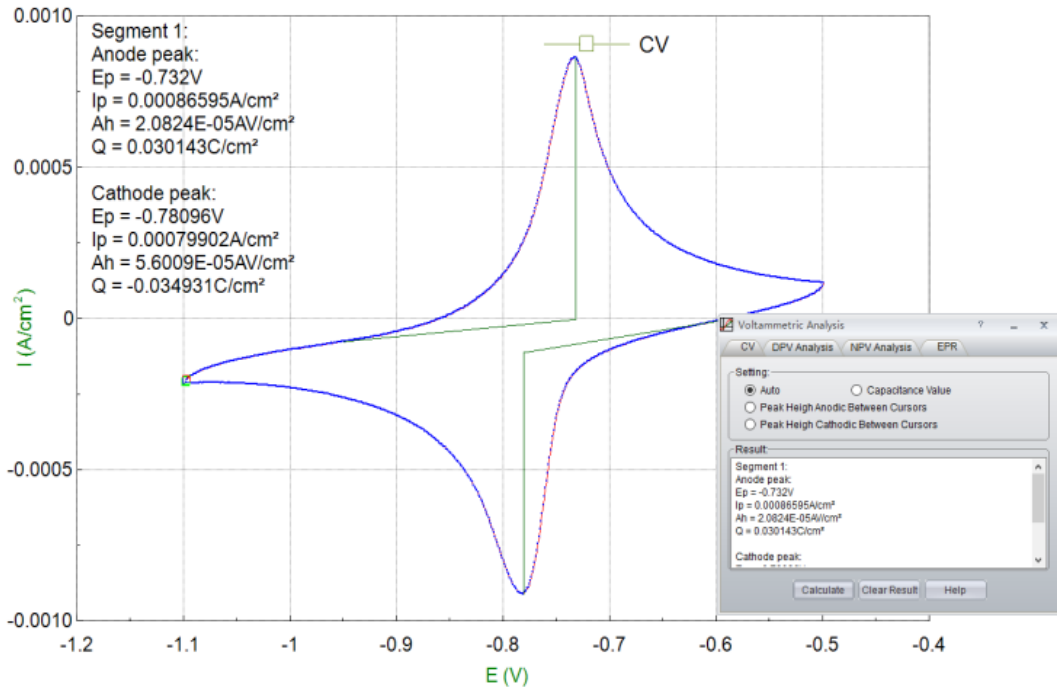


Real-time data storage

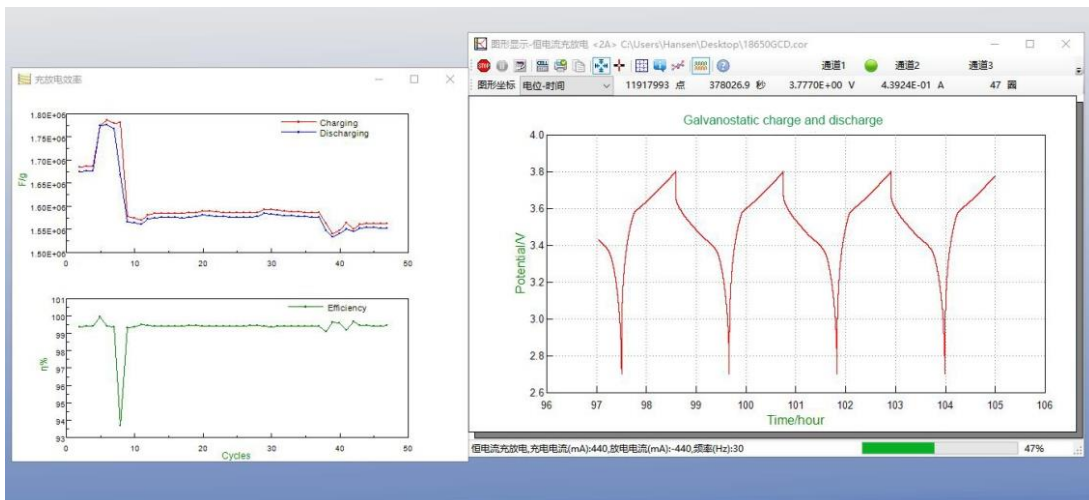
Experiment data can be stored in real time. Even if the test is interrupted by a power failure, the data will be automatically saved. The data is compatible with Excel, Origin, and can be directly opened.

SOFTWARE FEATURES

Cyclic voltammetry: CS studio software provides users a versatile smoothing/differential/integration kit, which can complete the calculation of peak height, peak area and peak potential of CV curves. In CV technique, during the data analysis, there is function of selecting exact cycle(s) to show. You can choose to see a cycle or some cycles as you want.

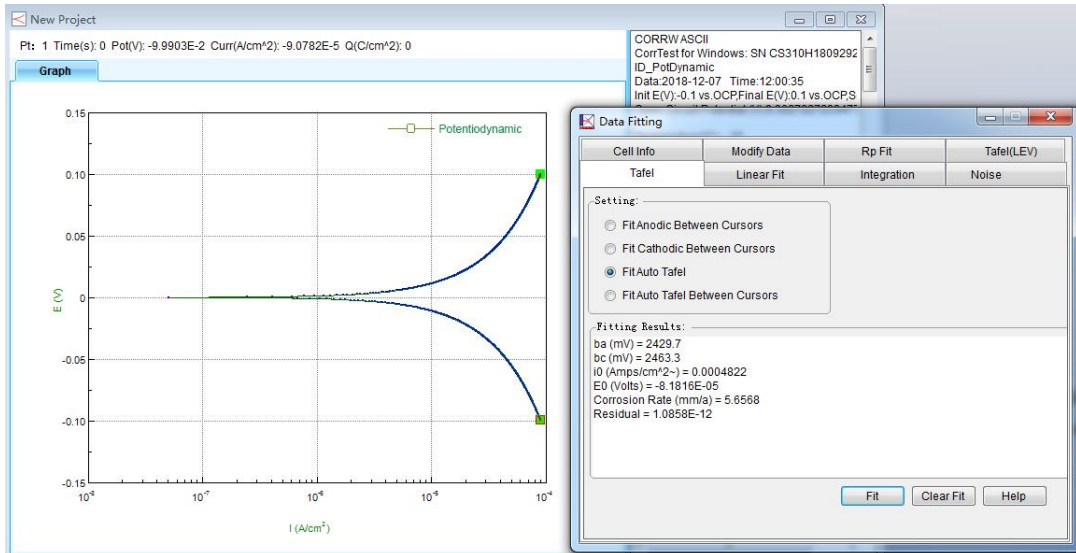


Battery Test and analysis: charge & discharge efficiency, capacity, specific capacitance, charge & discharge energy.



Tafel plot and corrosion rate

CS studio also provides powerful non-linear fitting on Butler-Volmer equation of polarization curve. It can calculate Tafel slope, corrosion current density, limitation current, polarization resistance, corrosion rate. It can also calculate the power spectrum density, noise resistance and noise spectrum resistance based on the electrochemical noise measurements.



Combination test: CS studio software supports the combination test for various experiments to achieve flexible and unattended test. You can set the parameters for each experiment in advance, and set the intervals, wait time etc between each experiment.

No.	Name	Description
1	Start time	The following test starts at [2022/03/23 11:34:35]
2	Start the cycle	Cycles:3
3	Open Circuit Potential	Freq(Hz):10, Hold Time(s):1800
4	Potentiostatic EIS (IMP)	DC Potential(V):0, Amplitude(mV):10, Initial Frequency:100000, Final
5	Potentiodynamic (Tafel, LPR)	Init E(V):-0.1 vs OCP, Final E(V):0.1 vs OCP, Scan Rate(mV/s):0.5, Freq
6	Wait	After 180 seconds, testing will be continued
7	End the cycle	End

Combination Test: corrosion tests

No.	Name	Description
1	Cyclic Voltammetry	Step1 E(V):-1 vs Ref, Step2 E(V):1 vs Ref, Scan Rate(mV/s):5, Freq(Hz):10, Cycl
2	Cyclic Voltammetry	Step1 E(V):-1 vs Ref, Step2 E(V):1 vs Ref, Scan Rate(mV/s):10, Freq(Hz):20, Cyc
3	Cyclic Voltammetry	Step1 E(V):-1 vs Ref, Step2 E(V):1 vs Ref, Scan Rate(mV/s):20, Freq(Hz):40, Cyc
4	Cyclic Voltammetry	Step1 E(V):-1 vs Ref, Step2 E(V):1 vs Ref, Scan Rate(mV/s):50, Freq(Hz):100, C
5	Cyclic Voltammetry	Step1 E(V):-1 vs Ref, Step2 E(V):1 vs Ref, Scan Rate(mV/s):100, Freq(Hz):200, C
6	Cyclic Voltammetry	Step1 E(V):-1 vs Ref, Step2 E(V):1 vs Ref, Scan Rate(mV/s):200, Freq(Hz):400, C
7	Cyclic Voltammetry	Step1 E(V):-1 vs Ref, Step2 E(V):1 vs Ref, Scan Rate(mV/s):500, Freq(Hz):1000

Combination Test: Pseudo capacitor tests

Data open: You can open the data files by txt format in notepad directly. Data can also be opened in Origin, Excel.

Standard supply

Instrument host CS300M x1

CS studio software

Power cable x1, USB cable x1, Cell cable x2

Dummy cell(1kΩ||100μF) x1, Manual

After-sales Service

1. Warranty period: 5 years
2. Provide manual, software installation video, and training videos.
3. Provide repair service for free