CS2350 Bipotentiostat

CS2350 bipotentiostat is developed from single channel CS350 potentiostat/galvanostat. There are two sets of built-in potentiostat /galvanostat. It consists of main channel and slave channel. The slave channel is mainly working along with the main channel to do rotating ring-disk electrode (RRDE) and hydrogen diffusion test (HDT).

If the user only chooses to use the main channel, then CS2350 becomes a CS350. Apart from all functions that CS350 single-channel potentiostat has, CS2350 can especially be used to do RRDE and HDT.

Applications

(1) Electrosythesis, electrodeposition (electroplating), anodic oxidation, electrolysis

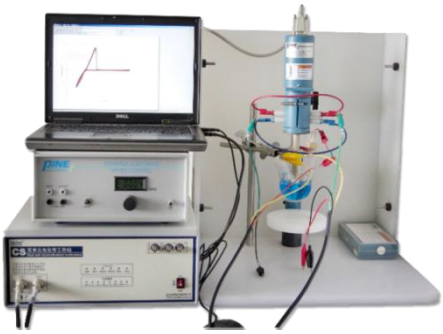
(2) Oxygen reduction reaction(ORR), oxygen evolution reaction (OER), Hydrogen evolution reaction(HER), carbon dioxide reduction.

(3) Energy and materials (Li-ion battery,solar cell, fuel cell, supercapacitor), advanced function materials, and sensor.

(4) Corrosion behavior of metals, and anti-corrosion evaluation

(5) Fast evaluation of inhibitor, water quality stabilizer, coating, and cathodic protection efficiency.

Rotating ring-disk electrode(RRDE)



Oxidation/reduction reaction system: while measuring the polarization curve of disk electrode, keep the ring electrode at a fixed polarization potential, and thus detect the intermediates of reaction on the disk electrode. It becomes the typical fluid dynamics method that detects reaction intermediates and studies electrode reaction mechanism.

Hydrogen diffusion test(HDT)

Two potentiostats are combined with Devnathan-Stachurski (dual cell). By measuring cathode hydrogen charging (the left cell) and anode oxidation current of hydrogen atoms (the right cell), it can further calculate the diffusion coefficient of hydrogen atoms in the metal and hydrogen flux.

SPECIFICATIONS

Support 2-, 3-, or 4-electrode system

Potential control range: Main Channel: ±10V

Slave Channel: ±10V

Current control range: ±2.0A

Potential control accuracy: 0.1%×full range±1mV

Current control accuracy: 0.1%×full range

Potential resolution: 10μV (>100Hz), 3μV (<10Hz)

Current sensitivity: 1pA

Rise time: <1μs (<10mA), <10μs (<2A)

Reference electrode input impedance: $10^{12}\Omega$||20pF

Current range: 2A~2nA, 10 ranges

Compliance voltage: ±21V

Maximum current output: 2.0A

CV and LSV scan rate: 0.001mV~10,000V/s

CA and CC pulse width: 0.0001~65,000s

Current increment during scan: 1mA@1A/ms

Potential increment during scan: 0.076mV@1V/ms

SWV frequency: 0.001~100 kHz

DPV and NPV pulse width: 0.0001~1000s

AD data acquisition: 16bit@1 MHz,20bit@1 kHz

DA Resolution: 16bit, setup time：1μs

Minimum potential increment in CV: 0.075mV

IMP frequency: 10μHz~1MHz

Low-pass filters: Covering 8-decade

Potential and current range: Automatic

Electrochemical impedance Spectroscopy(EIS)

Signal generator

Frequency range: 10μHz~1MHz

AC amplitude: 0mV~2500mV

DC Bias: -10~+10V

Output impedance: 50Ω

Waveform: sine wave, triangular wave and square wave

Wave distortion: <1%

Scanning mode: Logarithmic/linear, increase/decrease

Maximum load capacitance: 1nF；Maximum load inductance：10μH

Signal analyzer

Integral time: 10ms or the longest time of a cycle

Maximum: 10^6 cycles or 10^5s

Measurement delay: 0~10^5s

DC offset compensation

Potential automatic compensation range: -10V~+10V

Current compensation range: -1A~+1A

Bandwidth: 8-decade frequency range, Automatic and manual setting

PC and O/S requirement

Communications Interface: isolated Universal Serial Bus (USB 2.0)

Operating System: Windows 2000/NT/XP/7/8/10

SOFTWARE/METHODS OF CS2350

Main channel

Stable polarization: Open Circuit Potential (OCP), Potentiostatic (I-T Curve), Galvanostatic, Potentiodynamic (Tafel), Galvanodynamic,Sweep-Step Functions (SSF)

Transient polarization: Multi-Potential Steps, Multi-Current Steps, Potential Stair-Step (VSTEP), Galvanic Stair-Step (ISTEP)

Chrono Methods: Chronopotentiometry (CP), Chronoamperometry (CA), Chronocoulometry (CC)

Voltammetry: Cyclic Voltammetry (CV), Linear Sweep Voltammetry (LSV), Staircase Voltammetry (SCV), Differential Pulse Voltammetry (DPV), Normal Pulse Voltammetry (NPV), Square wave voltammetry (SWV), AC voltammetry (ACV), Differential Normal Pulse Voltammetry (DNPV), 2nd Harmonic A. C. Voltammetry (SHACV), Fourier Transform AC Voltammetry(FTACV)

Stripping Voltammetry: Potentiostatic stripping, Linear stripping, Staircase stripping, Square wave stripping, Differential Pulse Voltammetry Stripping, Normal Pulse Voltammetry Stripping, Differential Normal Pulse Voltammetry Stripping.

Impedance: EIS vs Frequency (IMP), EIS vs Time (IMPT), EIS vs Potential (IMPE)

Corrosion test: Tafel plot, Electrochemical Noise (EN), Zero Resistance Ammeter (ZRA), Electrochemical Potentiokinetic Reactivation(EPR)

Battery test: Battery charge and discharge, Galvanostatic charge and discharge(GCD)

Bipotentiostat: Rotating ring-dick electrode(RRDE), Hydrogen Diffusion Test(HDT)

Extensions: Data Logger, Electrochemical stripping/deposition, Bulk electrolysis with Coulometry

Slave channel

Open Circuit Potential (OCP), Potentiostatic (I-T Curve), Galvanostatic, Potentiodynamic (Tafel), Galvanodynamic;

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

Cyclic Voltammetry (CV), Linear Sweep Voltammetry (LSV);

Tafel plot, Electrochemical Noise (EN), Zero Resistance Ammeter (ZRA);

Battery charge and discharge, Galvanostatic charge and discharge(GCD)