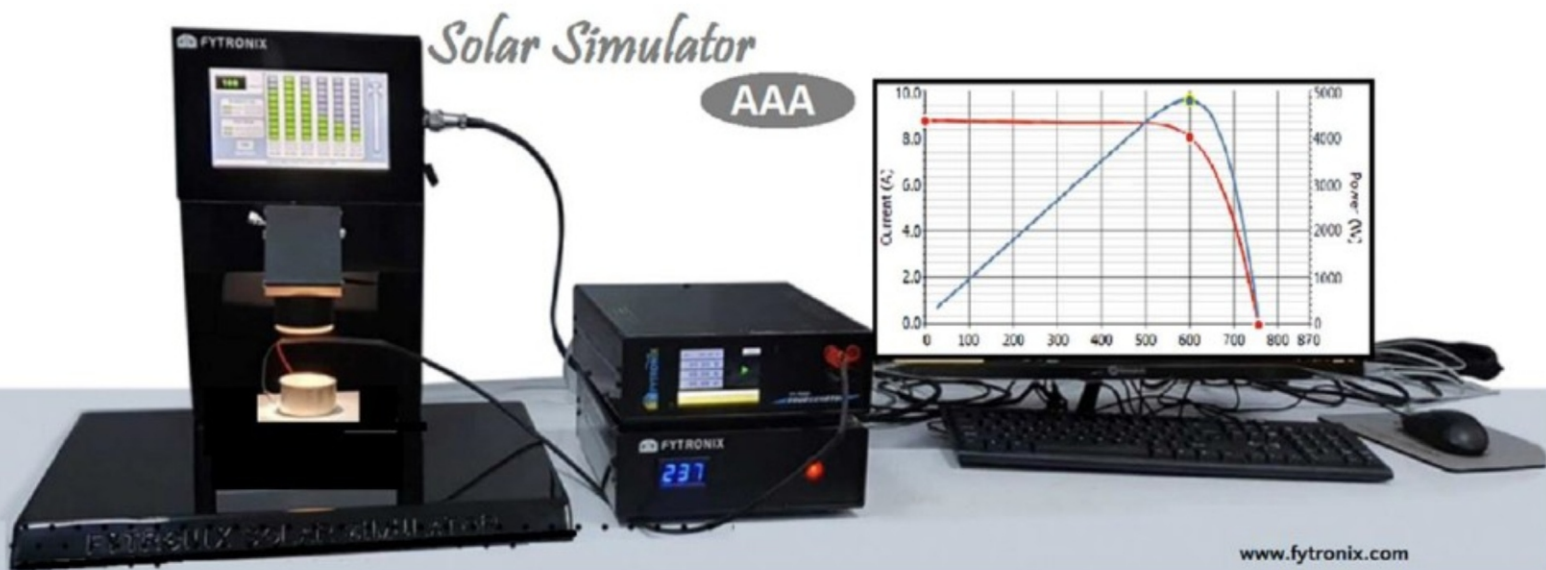




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SOLAR SIMULATOR LSS 9000



Solar Cell I-V Characterization System

This system analyze all photovoltaic and photoconducting characteristics of all solar cells such Dye sensitized solar cells, Quantum dots solar cells, Organic solar Cells, Perovskite Solar Cells, Solar Silicon Solar cells, Thin films solar Cells under various solar light intensities from 0.1 W/cm² to 1500 W/m².

This system is a complete current-voltage (I-V), current-time (I-t) and power-voltage (P-V) measurement environment.

The system contains the following elements:

- Maintenance Free Solar Simulator (FSS)

I-V system, source meter Voltage range:

- 20 V to +20 V Current range: 10 nA to 150 mA

- I-V Solar IV software - Solar cell probes

- Solar cell probes

- Calibrated Reference solar cell



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SOLAR SIMULATOR 9712



FYTRONIX 9712 SOLAR SIMULATOR

Specifications

- Class AAA solar simulator (350-1100nm)
- Light sources

Life time

Xenon lamp 1500 h

Hybrid lamp 12000 h

LED 10000h

Metal Halide Lamp 6000h

Life time of light source is the most important parameter in solar simulator selection.

Why

Life of Xenon lamp is about 2 months

Life of Hybrid lamp is about 1 year and 4 months

Life of LED is about 1 year and 6 months

Life of metal halide lamp is about 8 months



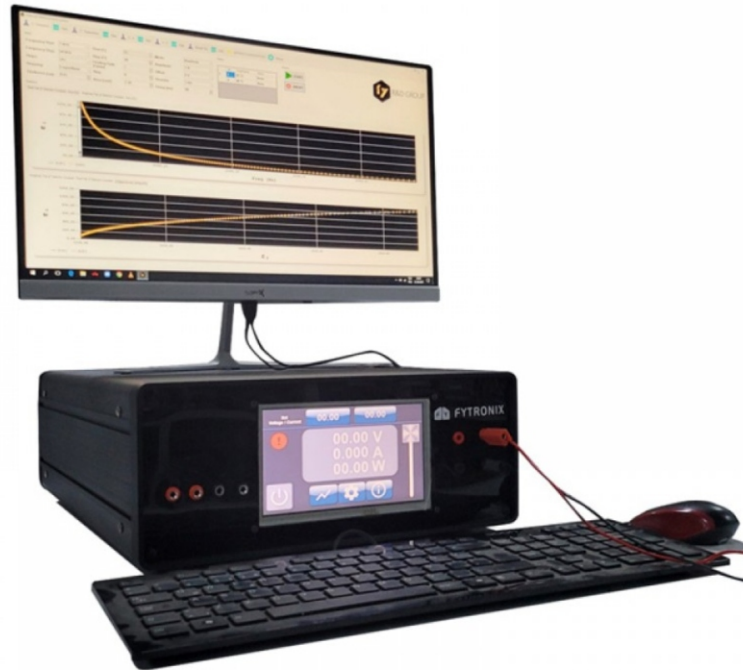
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CV ANALYZER SYSTEM

CVS 9000 SYSTEM



FYTRONIX SEMICONDUCTOR DEVICE CHARACTERIZATION SYSTEM includes

1. C-V analyzer System

This system analyze all electrical characteristics of photodiode, Schottky diode, heterojunction diode and sensors under dark and illumination conditions

This system is a complete impedance and conductance Characteristics under dark, light illumination.

The system contains the following elements: Probe Holder and electric connection cables Software C-V and Dielectric analyzer
Measurement parameters: $|Z|$, $|Y|$, θ , R_p , R_s (ESR), G , X , B , C_p , C_s , L_p , L_s , D ($\tan \delta$), Q Frequency range: 50 Hz- 8 MHz

- Electronic device cell probes for all devices
- 1 Laptop computer under Windows 7 or more

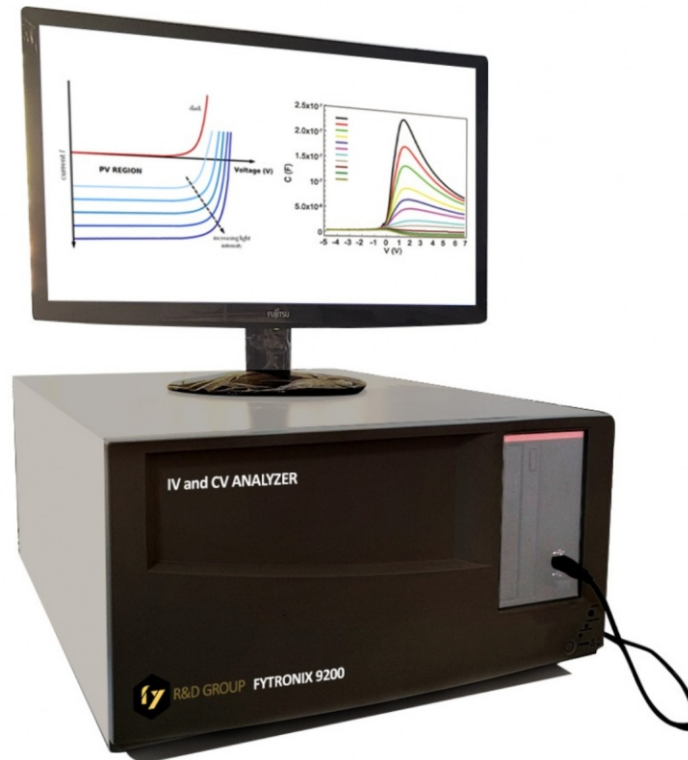


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IV AND CV ANALYZER



SEMICONDUCTOR DEVICES ANALYZER

I-V and C-V measurement system are as easy to perform I-V and C-V characteristics of semiconductor devices. C-V instrument. The capacitance-voltage instrument performs capacitance measurements to microfarad at frequencies from 1kHz to 25MHz.

Frequency range: 1 kHz-10 MHz
System measure the followings

- Impedance: Impedance Magnitude, Series Resistance, Series Reactance, Parallel Reactance Z , R_s , X_s , R_p , X_p
- Admittance: Admittance Magnitude, Parallel Conductance, Parallel Susceptance, Series Conductance, Series Susceptance Y , G_p , B_p , G_s , B_s
- Inductance: Series Inductance, Parallel Inductance X_s , X_p
- Capacitance: Series Capacitance, Parallel Capacitance C_s , C_p
- Factor: D and Q plots
- Nyquist plot for solar cell, super capacitor, battery
- Interface states-frequency profile measurements

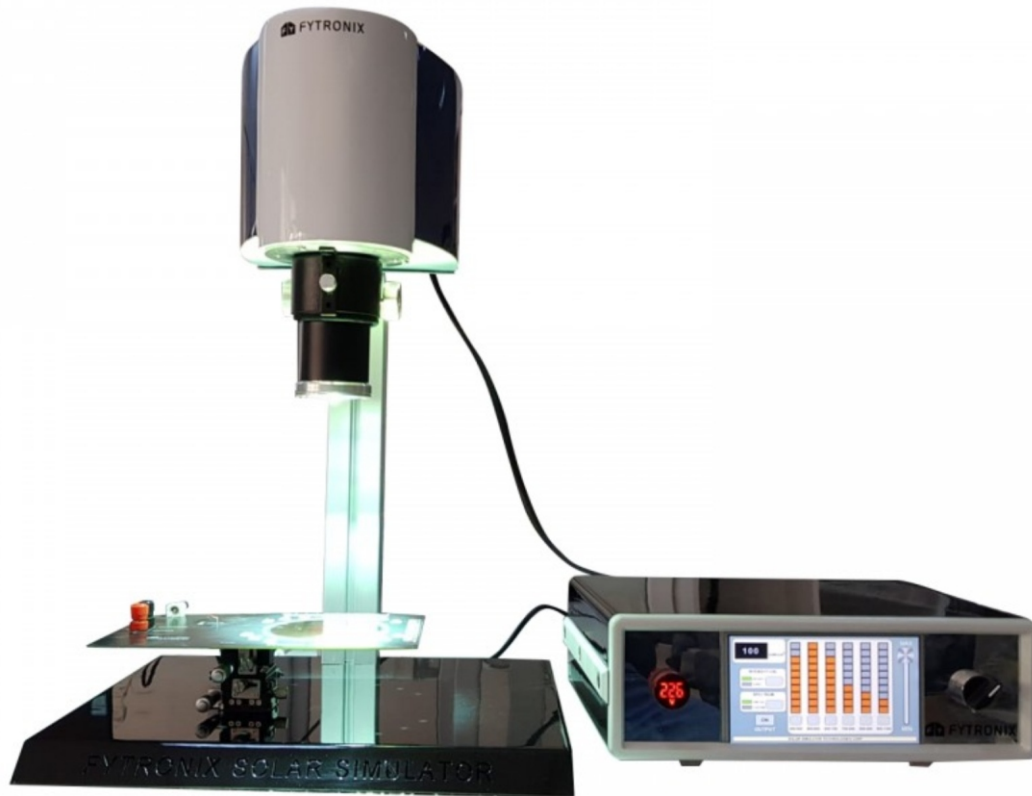


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PHOTOCATALYSIS SOLAR SIMULATOR



SEMICONDUCTOR DEVICES ANALYZER

Photocatalysis solar simulator system irradiates the solar light for various times. Irradiation direction can be adjusted for any direction such as horizontal, vertical or any direction.

TECHNICAL DATA:

Light source: Xenon light source

Light intensity: The intensity of light is controlled depending on distance

Light on/off: Light is switched on/off for a certain time

SUNLIGHT-DRIVEN PHOTOCATALYST

Photodegradation of wastewater pollutants using solar light can make it an economically viable process in particular for large-scale aqueous-phase applications. This useful technique is based on the pollutant removal present in both aqueous and gaseous effluents by means of a reaction occurring on a photocatalytic surface activated by light with a specific wavelength. The efficiency and successful application of photocatalysis, demands that the pollutant, catalyst and source of illumination are in close proximity or contact with each other.



MARKSTRONIC AAA CLASS LED SOLAR SIMULATOR



LED SOLAR SIMULATOR

LED Solar Simulator provides illumination approximating natural sunlight (AM1.5G) in the wavelength range of 350 to 1100 nm. It assures controlled and repeatable laboratory conditions of spectral content, spatial uniformity and temporal stability for photo-electrochemical experiments meeting class AAA specification. Unlike traditional solar simulator based on Xenon short-arc lamp and metal halide discharge lamp, this concept is using high-power LED technology. The sun spectrum is matched using various LED wavelengths, sufficiently spaced apart to provide a uniform light.

The main advantages of such a solution are:

- (i) low operating costs due to instant on/off
- (ii) low maintenance costs because of the extended life of the LEDs;
- (iii) small size and low weight;
- (iv) low price
- (v) Long life time of light source more than 10000 h



FYTRONIX DIELECTRIC CONSTANT ANALYZER



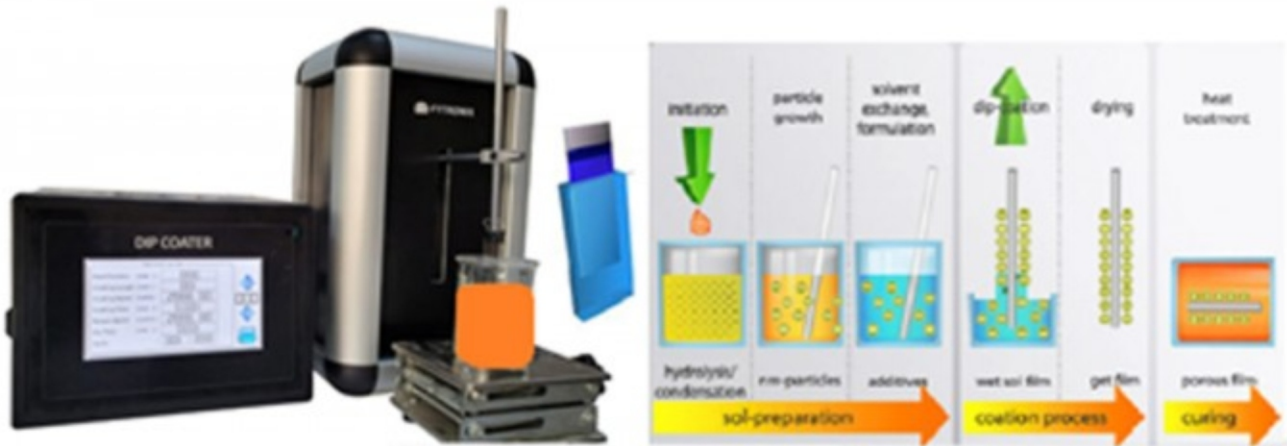
SPECIFICATIONS OF DIELECTRIC SYSTEM

1. The system measure AC conductivity and dielectric parameters from room temperature to 450 K.
2. System simultaneously determine $|Z|$, $|Y|$, θ , R_p , R_s , G , X , B , C_p , C_s , L_p , L_s , D ($\tan\delta$) parameters at constant temperature as a function of frequency
3. System simultaneously $|Z|$, $|Y|$, θ , R_p , R_s , G , X , B , C_p , C_s , L_p , L_s , D parameters at constant frequency as a function temperature
4. Temperature range should be from room temperature to 450 K
5. Frequency range of the system should be from 10 mHz to 10 MHz
6. System should have a cryostat for dielectric measurements.
7. Cryostat should be comprised of two components.

One for heating part and electrical connections and second part should be closure having four glass windows to see samples during measurements.



NANODIP COATER 9000



SPECIFICATIONS

- Vertical movement: 50 mm, 100 mm or 150 mm or other
- Precision: 10 nm
- Immersion speed range from 10 nm/sec to 2000 $\mu\text{m}/\text{sec}$ Programmable dipping sequences and parameters

Start position
Coating length
Coating Speed
Return Speed
Dry time
Cycle

DIP COATER

The FYTRONIX DIP COATER is a tool to growth thin film or quantum dots thin films. This DIP coater is widely used in industry and academia. The film thickness of the films is controlled by the Ph of solution or dipping cycle of the coater. The rate of withdrawal can be controlled with a high degree of accuracy and reproducibility.



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ELECTROSPINNING SYSTEM



NANOSCIENCE AND NANOTECHNOLOGY APPLICATIONS

Electronics (electronic devices, optic devices, spintronics, bioelectronics, quantum electronics)

Automotive (nano products, fuel cells, filters, bedding protection etc.)

Military (respirators, fabrics providing biological or chemical protection, haemostatic pads)

Health Care (targeted drug delivery, artificial joints, tissue replacement, tissue engineering)

Chemical Industry (nanotubes, nanocomposites, cosmetic creams, UV protection)

Environment (filtration, biodegradation, removal of impurities, marking of food, desalinisation)

Textile Industry (novel apparels, sports clothing, hydrophobic and non-soiling fabrics)

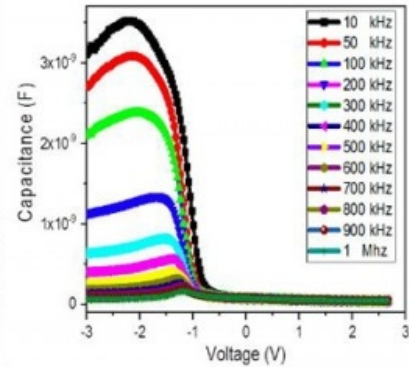


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SOLAR SIMULATOR – C - V ANALYZER SYSTEM



Solar Cell I-V Characterization System

This system analyze all photovoltaic and photoconducting characteristics of all solar cells such Dye sensitized solar cells, Quantum dots solar cells, Organic solar Cells, Perovskite Solar Cells, Solar Silicon Solar cells, Thin films solar Cells under various solar light intensities from 0.1 W/cm² to 1000 W/m².

This system is a complete current-voltage (I-V), current-time (I-t) and power-voltage (P-V) measurement environment.

The system contains the following elements:

- Maintenance Free Solar Simulator (FSS) I-V system, source meter

Light source:

LSS SOLAR IV CHARACTERIZATION SYSTEM includes

SOLAR SIMULATOR

I-V CHARACTERIZATION SYSTEM, SOURCEMETER

SAMPLE HOLDER

CONNECTIONS

SOFTWAREs

Solar IV characterization Software

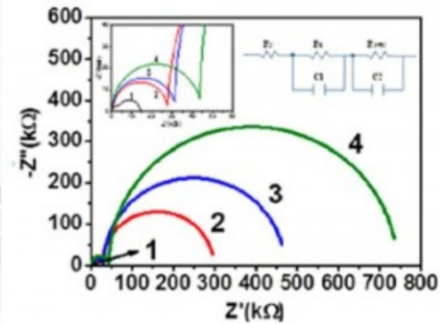
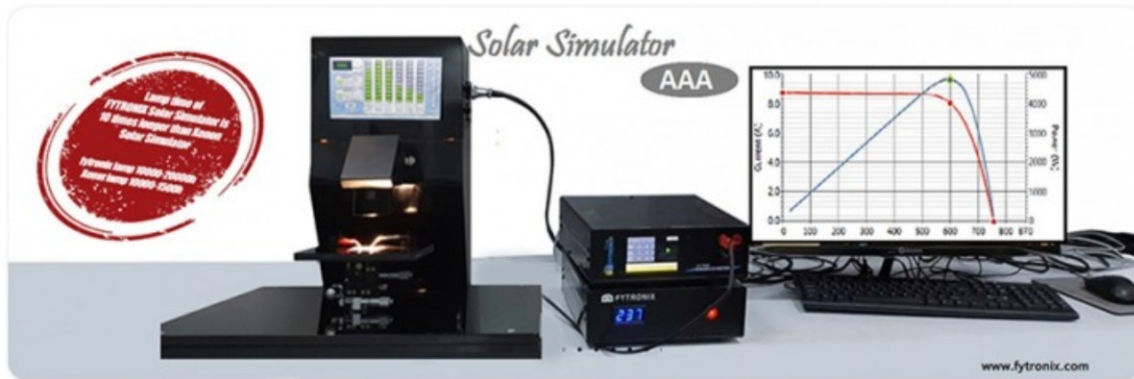


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SOLAR SIMULATOR-IMPEDANCE ANALYZER SYSTEM



Solar Simulator system is controlled automatically by computer

Solar Simulator system adjusts automatically the intensity of light 0.1 W/m² -1000 W /m² by any step, for example from 1 W/m² to 1000 W/m² with 1 W/m².

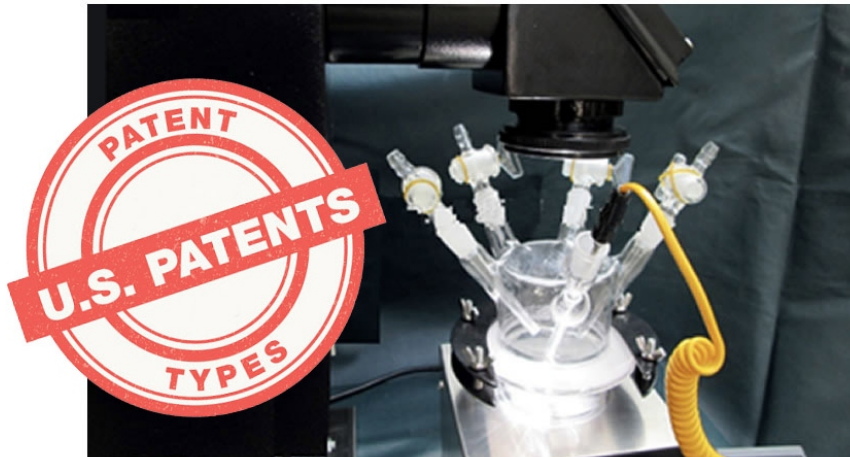
Solar Simulator system automatically measures current-voltage (I-V) under various light intensities

Solar Simulator system automatically measures power-voltage (P-V) under various light intensities

Solar Simulator system automatically analyses photovoltaic mechanism (I-V) under various light intensities

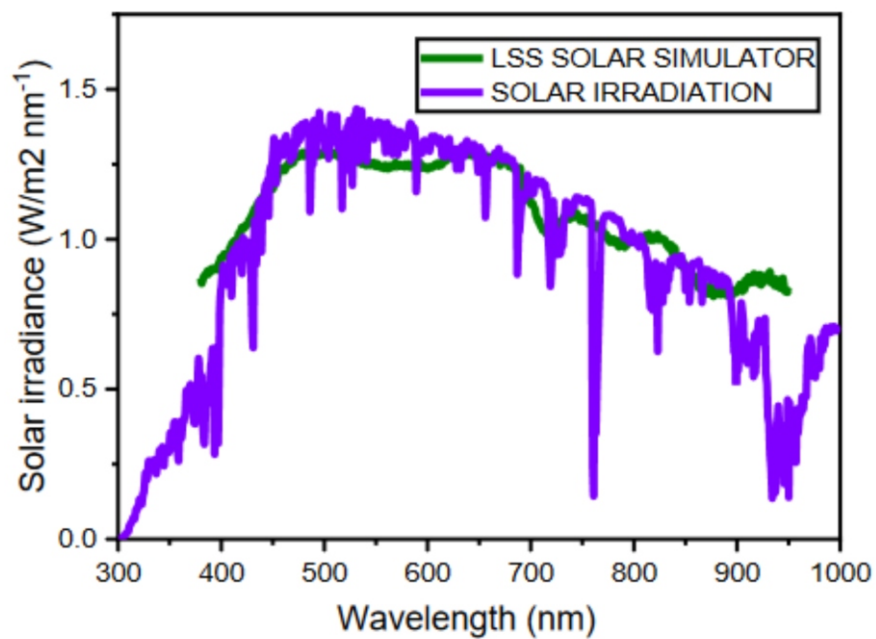


PHOTOCATALYSIS SOLAR SIMULATOR



Solar Simulator system automatically adjust intensity for various illuminations

TECHNICAL DATA AND CALIBRATION RESULTS



SOURCEMETER 9712

FYTRONIX 9712 SOURCEMETER



FY 8000 Sourcemter measures current-voltage (I-V) characteristics of solar cells, Schottky diode, p-n junction, photosensors, biosensor, gas sensors under various external effects.

I-V Characteristics by sourcemeter

Sourcemeter performs electrical characteristics of all solar cells such Dye sensitized solar cell, quantum dots solar cells, Organic solar Cells, Silicon Solar cells, Thin films solar Cells, Schottky diodes, pn junction diodes, Photosensors, Transistors and etc.

Sourcemeter is a complete current-voltage (I-V) and current-time (I-t) measurement environment.

Technical data

I-V system, source meter

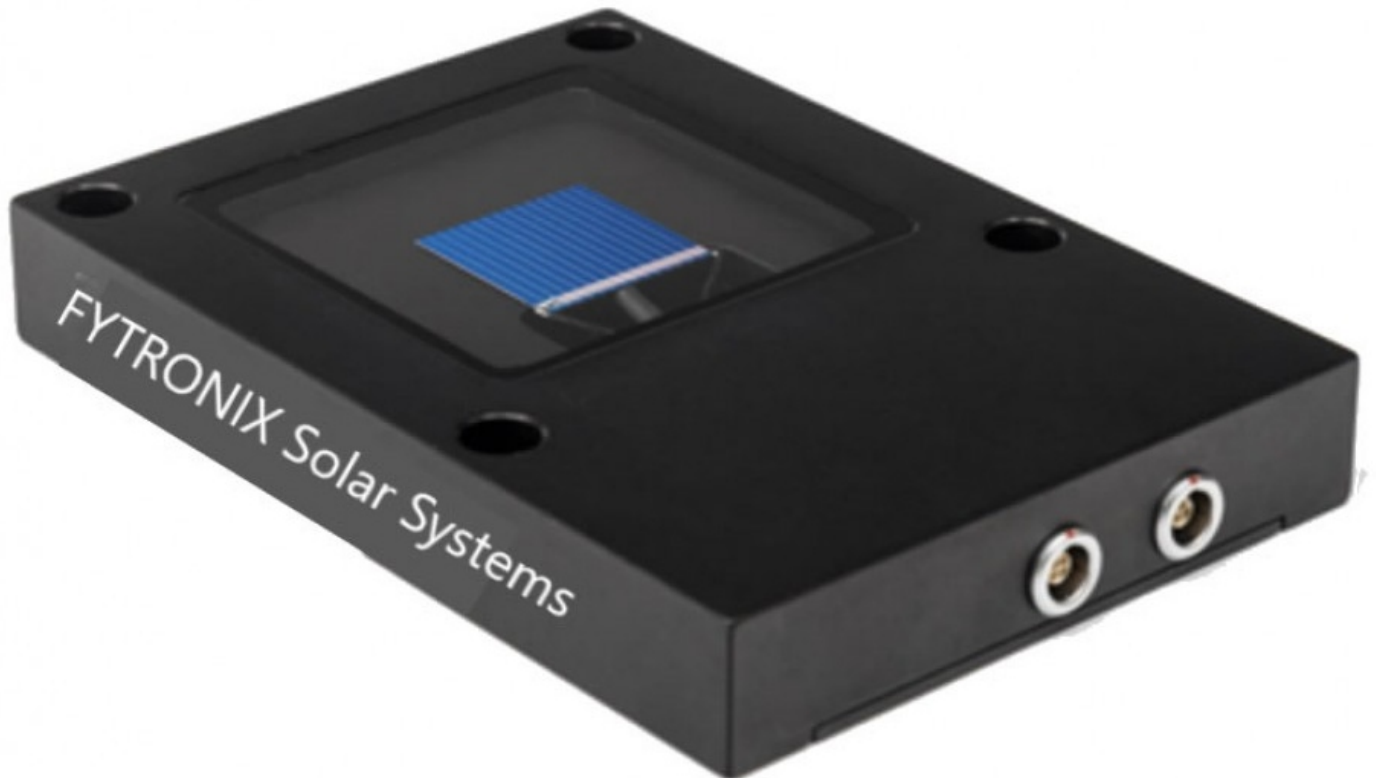
Voltage range: ± 10 V, ± 20 V, ± 40 V (optional)

Current range: 100 pA to 1A or optional

- I-V software
- I-t software



REFERECE SOLAR CELL



The reference cell is used for the determination of solar simulator irradiance levels. FYTRONIX uses it to calibrate the solar cells indoor. The calibration is done against an established set of reference cells calibrated at NREL These references are measured each year at the International Spectroradiometer Intercomparison (ISRC) to ensure trace-ability. This all results in a lower cost reference cell that is very well suited for indoor applications.

Key features Silicon Reference Cell:

- Lower cost reference cell
- Irradiance and temperature readout
- Calibrated against traceable reference set
- Protective Quartz (standard) or KG glass window
- Integrated with Tracer IV software
- Several filter options (KG# window) to match spectral response
- Including full calibration report (IV curve plot, I_{sc} , V_{oc} , I , V_{mpp} , Fill Factor and Efficiency)
- Including 4-wire cable to measure cell
- Including PT100 connector (LEMO) to measure temperature

Models:

- Silicon Reference Cell (FYS-1001)
- Open Silicon Reference Cell (FYS-1002)



HYDROTHERMAL SYSTEM



FYTRONIX HYDROTHERMAL SYSTEM includes

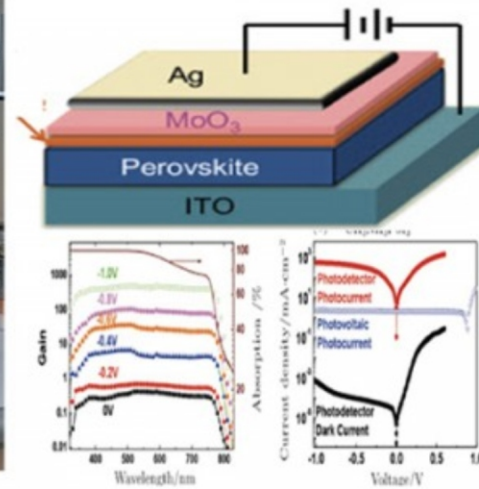
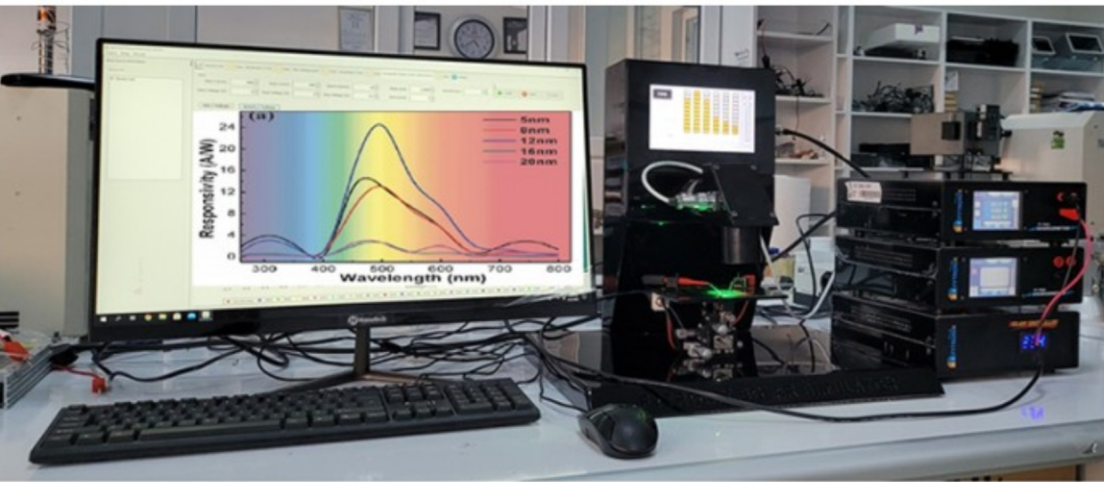
The hydrothermal system produce all materials from the solutions such organic materials and metal oxides and all-in solutions for various applications.

FYHD-8000 produce materials from the solution as POWDER AND THIN FILMS on any substrate.

The FYHD-8000 is a complete functional and nanomaterial production system.



PHOTORESPONSE CHARACTERIZATION SYSTEM



FYTRONIX 000 SYSTEM measures the followings

System includes a Solar Simulator system adjusts automatically the intensity of light 0.1 W/m^2 - 1500 W/m^2 to analyze photodiode characteristics under solar light

System measures automatically current-voltage (I-V) and current-time (I-t) characteristics of Schottky diode, pn junction , photodiode and photodetector and so on.

System measure automatically current-voltage (I-V) and current-time (I-t) characteristics of Schottky diode, pn junction , photodiode and photodetector under various wavelengths.

System measures automatically photocurrent-wavelength ($I_{ph}-\lambda$) characteristics of Schottky diode pn junction, photodiode and photodetector under various intensities
System measures automatically photoresponsivity characteristics of solar cells, photodiode and photodetector



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ELECTRONIC DEVICES CHARACTERIZATION SYSTEM



FYTRONIX SEMICONDUCTOR DEVICE CHARACTERIZATION SYSTEM includes

I-V and C-V, G-V Characterization System

This system analyze all electrical characteristics of photodiode, Schottky diode, heterojunction diode and sensors under dark and illumination conditions

This system is a complete current-voltage (I-V) , impedance and conductance Characteristics under dark, light illumination.

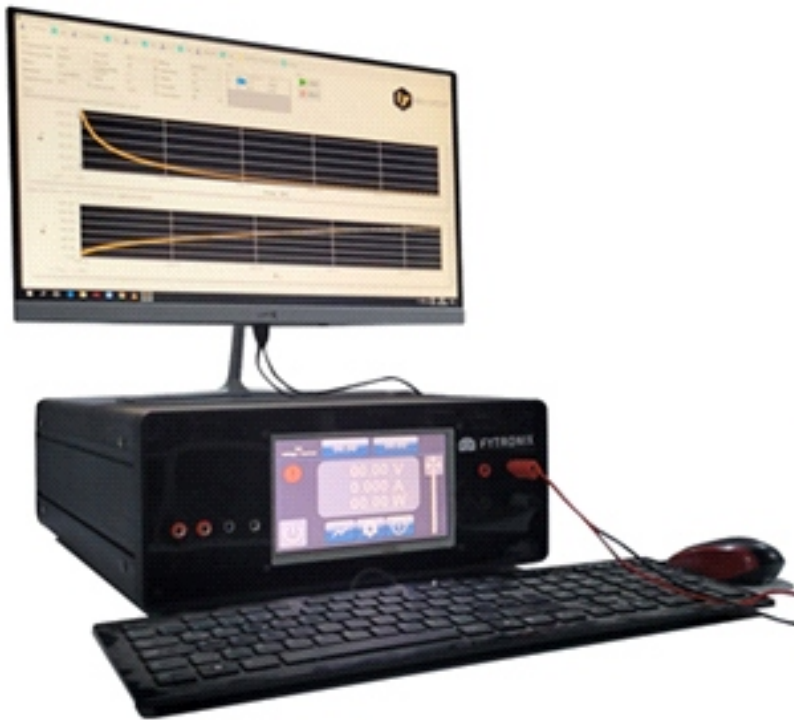
The system contains the following elements: Automatic Light controlling Solar Simulator

Source meter

Probe Holder and electric connection cables



DIELECTRIC MEASUREMENT SYSTEM



System measure AC conductivity and dielectric parameters of powder and thin film materials. System have software for measurements of all dielectric parameters and AC conductivity parameters of powder sample and thin film samples at variable frequencies as a function of temperature and a part of software for analysis of the results.

The system measures automatically ϵ_r -f characteristics of all materials at various temperatures.
The system measures automatically ϵ_r -f characteristics of all materials various temperatures.
The system measures automatically $\ln\sigma_{AC}$ -f characteristics of all materials various temperatures
The system measures automatically Cole-Cole characteristics of all materials various temperatures.
The system measures automatically ϵ_r -T characteristics of all materials at various frequencies.
The system measures automatically ϵ_r -T characteristics of all materials various frequencies
The system measures automatically $\ln\sigma_{AC}$ -100/T characteristics of all materials various frequencies.
The system measures automatically Cole-Cole characteristics of all materials various temperatures



ELECTRICAL CONDUCTIVITY MEASUREMENT SYSTEM



System measure electrical conductivity of semiconductor, organic semiconductor, superconductor and metals as a function temperature.

Temperature range: RT to 450 K

Method: Two probe method or four probe method

Conductivity type: DC electrical conductivity

Sample: Powder, thin film or pellet

PID temperature controller

Heating rate: 1-10 °C/min



SPIN COATER



This spin coater coat the organic materials and metal oxides and all-in solutions.
The spin coater is a complete solution coating system.

Specifications

Spin rate: 100-12000 RPM

3 spin coating methods

Static spin coating method

Dynamic spin coating method

Multi RPM spin coating method

Nanofilm coating method

5 variable RPM program or

9 Variable RPM program

Acceleration: 1-5000 RPM/sec

Deceleration: 1-5000 RPM/sec

Film thickness range 10 nm -10 μ m

Easytouse and maintenance free design

Rotational 7 Inch LCD touch screen

Vacuum chucks

Vacuum pump

Vacuum free chucks (optional)



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FOUR PROBE ELECTRICAL CONDUCTIVITY SYSTEM



FYTRONIX FOUR PROBE CHARACTERIZATION SYSTEM includes

This SYSTEM measures electrical conductivity of conducting materials.

The system is a complete FOUR PROBE CHARACTERIZATION SYSTEM.

The system contains the following elements: Sourcemeter Probe station

Computer control or manual

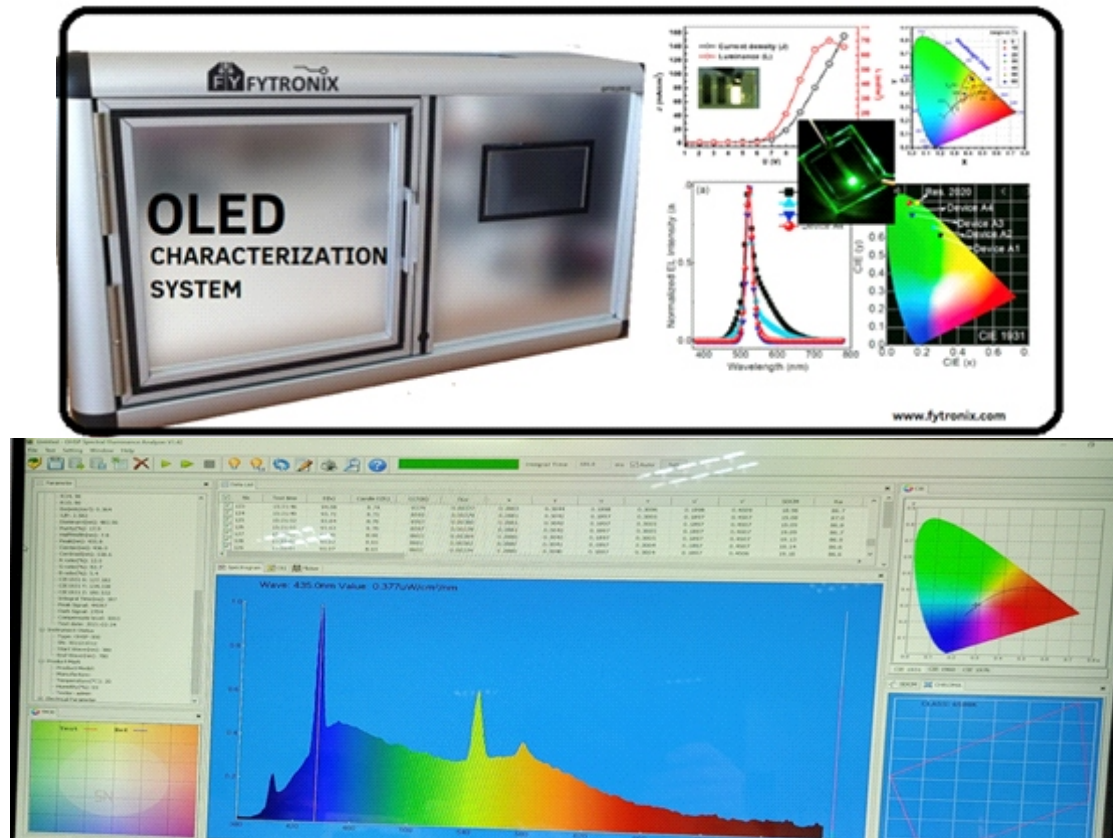
FYTRONIX FYTRONIX FOUR PROBE CHARACTERIZATION SYSTEM performs the followings

Electrical conductivity of conducting materials The resistance of conducting materials

System measure the following resistance



OLED CHARACTERIZATION SYSTEM



OLED Characterization System

This system analyze all electrical characteristics of organic light emitting diode (OLED). This system is a complete system including current-voltage (I-V), Current Efficiency-voltage (J-V), Luminance-Voltage (L-V) of OLEDs and spectroscopic analysis of OLED..

ELECTRICAL CHARACTERISTICS OF OLED

- System measure the followings
- Current-voltage (I-V) of OLEDs
- Current efficiency-voltage (I_{eff} -V) of OLEDS
- Luminance-voltage (L-V) of OLEDS
- Colour x,y coordinate determination of OLEDs

ELECTROLUMINANCE CHARACTERISTICS OF OLED

- Systems analyze the followings
- color coordinates of OLED
- color index of OLED
- Irradiance –wavelength spectra of OLED
- color temperature of OLED.





FYTRONIX IPCE CHARACTERIZATION SYSTEM includes

This system analyze quantum efficiency (IPCE or EQE) characteristics of solar cells, photodiode, photodiodes and sensors as a function of wavelength.

The system contains the following elements:

I-V source meter

Quantum efficiency system

USA Spectral monochromator

Voltage range: -20 V to +20 V

Current range: 100 pA to 1 A

Measurement parameters:

Wavelength range: 300 nm- 1100 nm

- Electronic device cell probes for all devices
- 1 Laptop computer under Windows 7 or more



HYDRAULIC PRESS

**FYTRONIX
8000 MODEL
PRESS**



FYTRONIX Hydraulic Press is used for various applications;

Prepare pellet for KBR pellets

Prepare pellet for XRF applications

Prepare pellet of powders for electrical and optical measurements

Mechanical tests

Pressure: 0-15 ton

Press Die: 8 mm, 10 mm and 13 mm for 10 tons (optional)

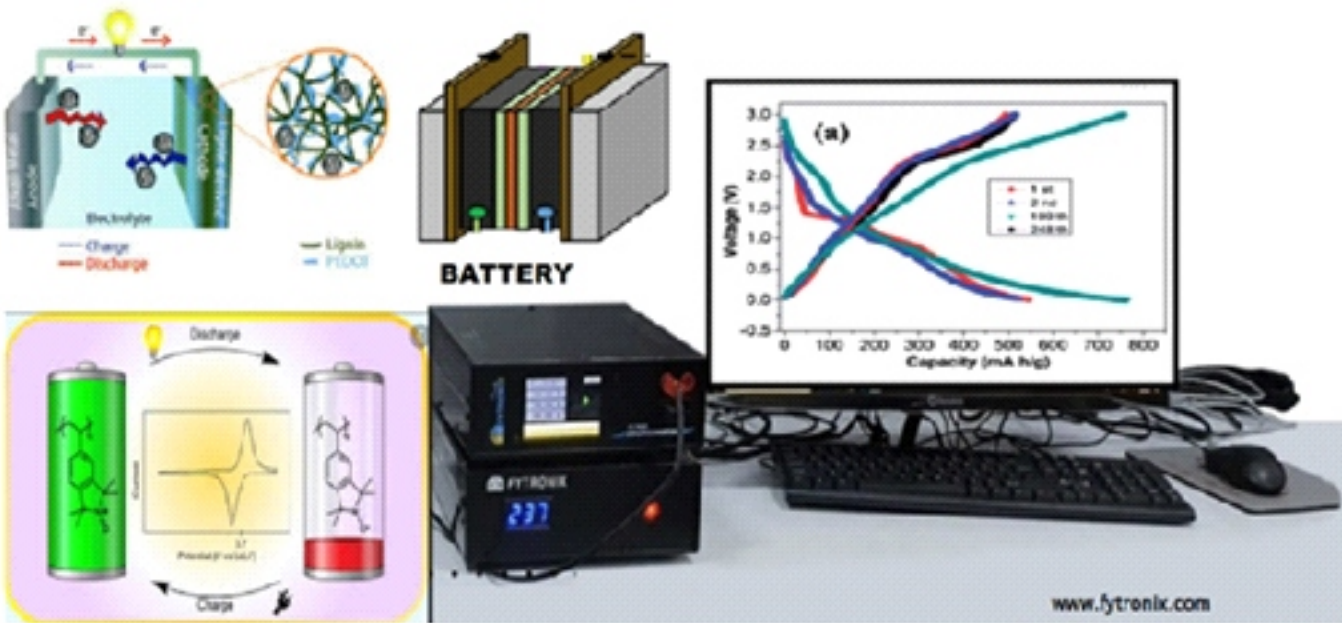


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BATTERY AND SUPERCAPACITORS CHARGE DISCHARGE ANALYZER



BATTERY AND SUPERCAPACITOR CHARGE-DISCHARGE ANALYZER FY-BC 9000

Battery TESTER (BT) is a charge and discharger which measures the charge and discharge-time characteristics.

- Constant current discharging; measurement (CC)
- Constant power discharging measurement
- Constant voltage discharging measurement (CV)

Impedance analyzer

Frequency range: 100 mHz-15 Mhz

Impedance measurements

Real and imaginary impedance measurements

Nquist plots

System include

Battery analyzer

Software

Connections cable

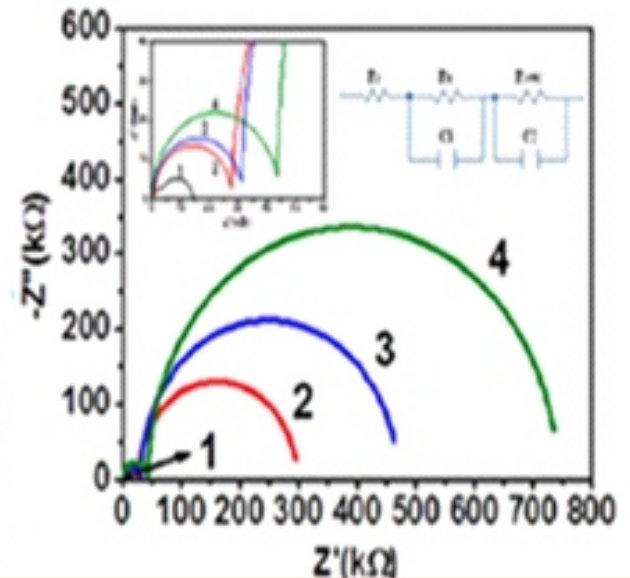
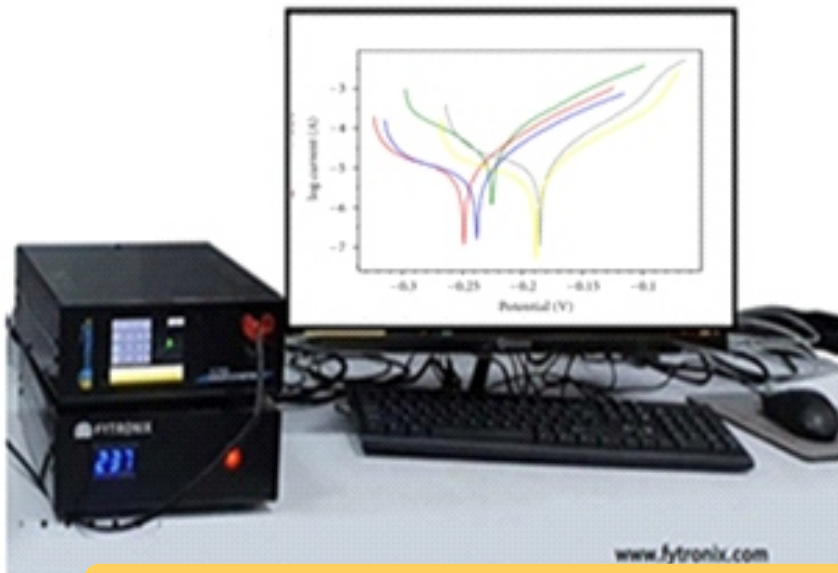


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CORROSION TEST ANALYZER



System includes

Impedance ANALYZER

Nyquist characteristics (real and d imaginary impedance)

Frequency range: 1 mHz-10 MHz

Sourcemeater

Voltage range. -20 V to 20 V or more (negative and positive voltages)

Current range: 1 nA-500 mA

Current-voltage characteristics

Electrochemical Impedance Spectroscopy (EIS)

Electrochemical Impedance Spectroscopy or EIS has been successfully applied to the study of corrosion systems in recent years. One benefit of EIS over direct current (DC) methods is the possibility of utilizing extremely small amplitude signals without disturbing the properties which are being measured significantly.



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OPEN SYSTEM NITROGEN CRYGONIC CRYOSTAT



LOW TEMPERATURE CRYOSYAT includes

Low temperature cryostat

Sample holder for electrical measurements and optical measurements (optional)

Technical datasheet

Cryogen open system for temperature measurements

OPEN SYSTEM NITROGEN

Includes low temperature cryostat, vacuum pump and sample holder for electrical and optical measurements

Temperature range: RT-80 K cryostat for I-V, I-T and C-V measurements

Temperature controller

Digital temperature controller

PID controlling

USB connection

Auto controlling

Heating rate controlling

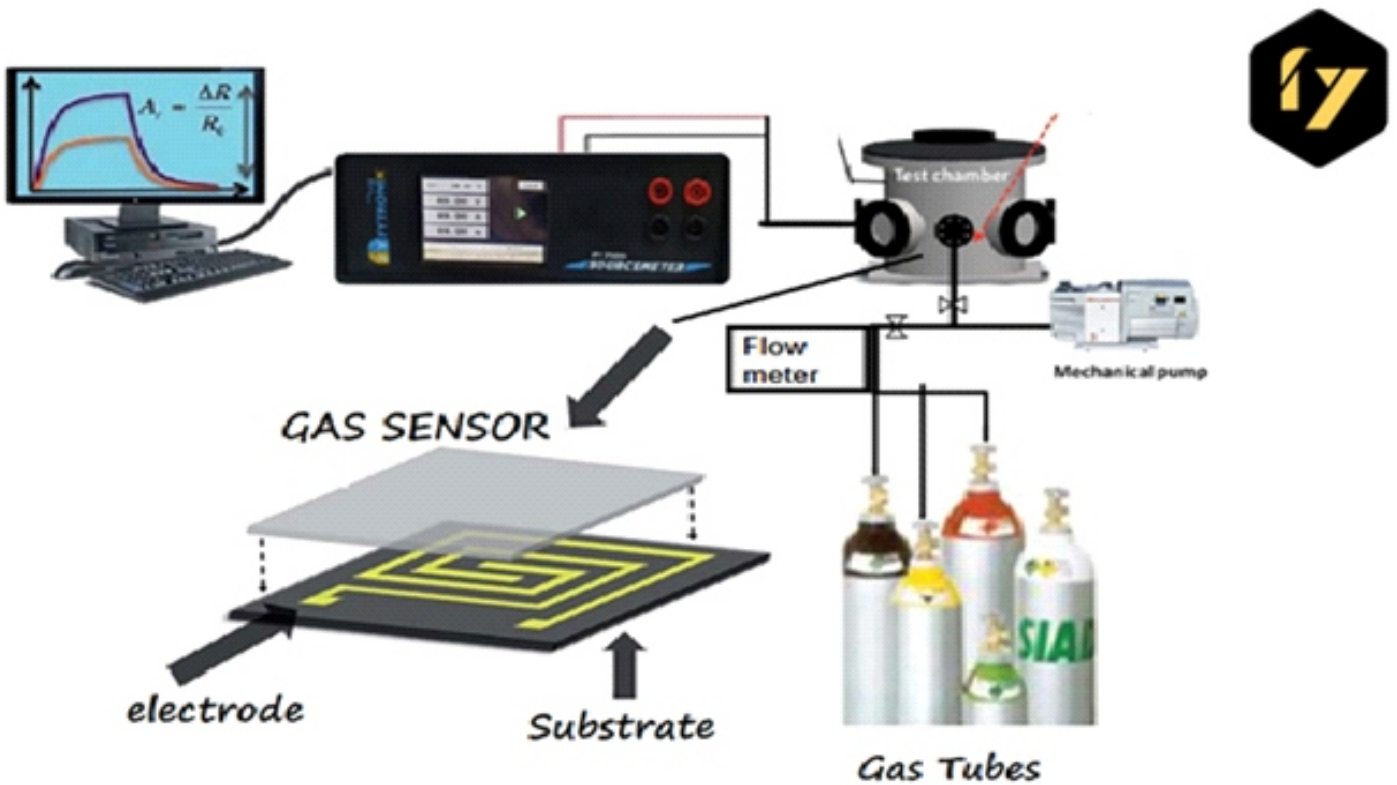


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GAS SENSING MEASUREMENT SYSTEM



SPECIFICATIONS OF THE SYSTEM

1. The system measures automatically current-time characteristics of gas sensors
 2. The system measures automatically resistance-time characteristics of gas sensors
 3. The system measures automatically response-time characteristics of gas sensors
- Specifications of Gas sensing system

1. Gas sensing system should have gas flowmeter, sourcemeter, cryostat, and software
2. Mass flowmeter should have the followings

- Flow meter range: 0–5000 SLPM
 - Steady state control range: 0.01% – 100% of full scale
 - Standard accuracy calibration, NIST-traceable: $\pm 0.6\%$ of reading or $\pm 0.1\%$ of full scale
 - Optional high-accuracy calibration, NIST-traceable: $\pm 0.5\%$ of reading or $\pm 0.1\%$ of full scale
 - Repeatability: $\pm(0.1\%$ of reading + 0.02% of full scale)
 - Typical control response time: as fast as 30 ms
 - Warm-up time: < 1 s
3. Sourcemeter should have the followings
- Voltage range: 0- 48 V



HALL EFFECT MEASUREMENT SYSTEM



0.55Tesla permanent magnet (+/-0.03Tesla)
Conductive sample mounting board
Heater embedded into sample mounting board

- Temperature increased automatically, ranging from RT to 450K).

System automatically measure

Mobility

Carrier concentration

Resistivity

Hall coefficient

Conductivity

Sheet resistance

Four probe resistance measurement

Measurement ranges:

- resistivity range: 10-4 to 107 Ohms-cm

- Hall voltage range: 1 μ V to 2000 mV

- mobility: 1 to 107 cm²/V.s

Density (cm⁻³): 10⁷ ~ 10²¹

Magnet : Permanent magnet (diameter: 50mm)

Magnet Flux Density: 0.55T nominal +/-1% of marked value
Stability: 2% over 1 years
Uniformity: +/- 1% over 20mm diameter from center
Pole Gap: 26 mm

Current source: Range: 1nA-20mA Compliance: 12V

Sample holder: Sample board

Electronic Contact switching card



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ULTRASONIC SONICATOR

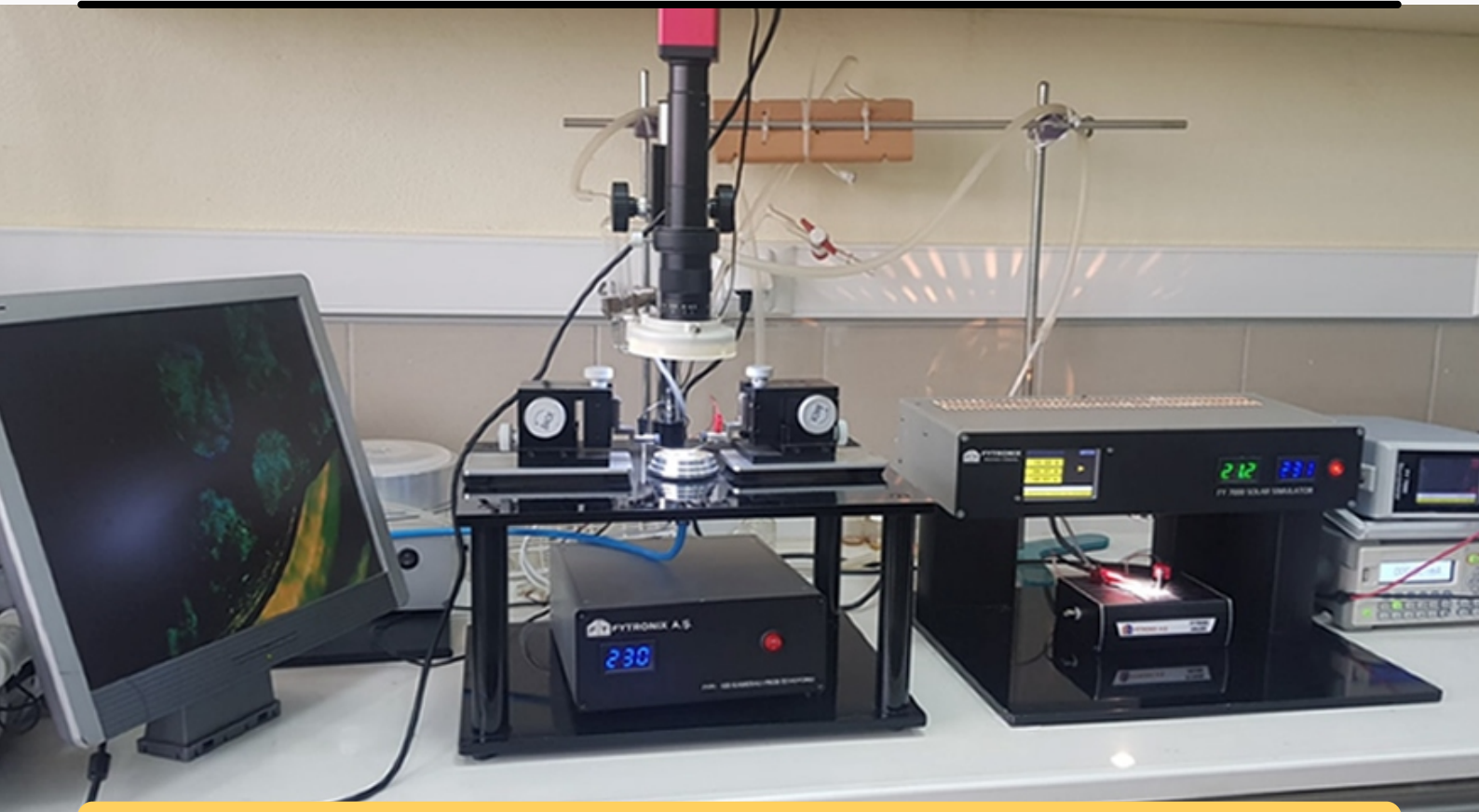


Ultrasonic processor is one of the commonly used equipment for laboratory sample pretreatment. It is widely used in nano-industry, biology, chemical, pharmaceutical, dye, optics, jewelry, aerospace, hardware, automobile manufacturing and other fields

Ultrasonic homogenizers are multi-function and multi-purpose instruments that utilize intense high frequency sound to induce cavitation in liquid. As the cavitation bubbles collapse, high shearing energies disrupt animal and plant tissue, and lyse yeast, bacteria and spores. The ultrasonicator can also be used for non-biological applications such as emulsification, nanoparticle dispersion, intense washing or acceleration of chemical reactions (sonochemistry).



THIN FILM TRANSISTOR CHARACTERIZATION SYSTEM



FYTRONIX THIN FILM TRANSISTOR CHARACTERIZATION SYSTEM includes

This SYSTEM analyzes transfer and output characteristics of thin film transistors , TFT, OFET

The system is a complete THIN FILM TRANSISTOR CHARACTERIZATION system. The system contains the following elements:

Sourcemeter / Probe station / Voltage range: -50 V to +50 V or any range
Computer control or manuel

FYTRONIX THIN FILM TRANSISTOR CHARACTERIZATION system performs the followings

Source-drain IV characteristics under various gate voltages
Gate Voltage-Current characteristics under various drain voltages
Phototransistors Source-drain IV characteristics under various gate voltages



SOLAR CELL TEST HOLDER



This holder can be used to measure current voltage characteristics of the solar cell

- 1.Reference solar cell
- 2.Moveable electrodes
- 3.Vacuum chuck
- 4.Vacuum pump
- 5.BNC banana connectors



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PRESS DIE



Press die
10 ton
Pellet preparation



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