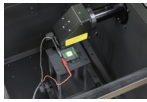


# SM-250 IPCE Measurement system



The intensity of irradiation ( $\text{mW} / \text{cm}^2$ ) at each wavelength is measured with a calibrated silicon photodiode, and the current value of the measurement sample is measured based on irradiation intensity. The dedicated software (SR\_PRO) can automatically display the spectral response and quantum efficiency of various solar cells and photoelectric conversion elements. Our unique xenon lamp optical system and high-efficiency monochromator make it possible to irradiate high intensity monochromatic light ( $5 \text{ mW} / \text{cm}^2$ ), making it ideal for evaluating organic solar cells (dye-sensitized, organic thin films, perovskite solar cells).

- Spectral response (A/W) and quantum efficiency (QE) can be measured in the wavelength range of 300 to 1150 nm.
- Ideal for IPCE/QE evaluation of organic solar cells (dye-sensitized, organic thin film, perovskite solar cells).
- The short circuit current density  $J_{sc}$  ( $\text{mA} / \text{cm}^2$ ) can be calculated based on the spectral response spectrum.
- The internal quantum efficiency (IQE) can be obtained with the optional diffuse reflection measurement unit.

## Measurement procedure

- ① Place the calibrated detector SiPD for measuring light intensity at the sample position and then measure photo current.

$$IR(A)$$

- ② Calculate the irradiation light intensity with the spectral response SRR (A / W) of the calibrated detector SiPD.

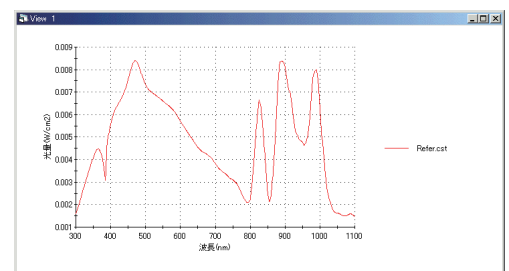
$$IR(A)/SRR(A/W)=R(W)$$

- ③ Place the sample at the sample position and measure the output photocurrent.

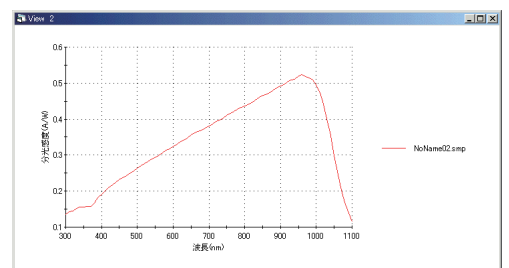
$$IS(A)$$

- ④ Calculate the spectral response SRS (A / W) of the sample.

$$SRS(A/W)=IS(A)/R(W)$$



Irradiation intensity measurement data



Spectral response measurement data



## Specifications

Measurement Wavelength range	300~1150nm (Option: 300~2000nm)
Wavelength width (Wavelength purity)	Variable (0~24nm)
Wavelength precision	1nm
Irradiation Intensity	Max. 5mW/cm <sup>2</sup> or more (at wavelength 470nm)
Effective Irradiation area	10 x 10mm (Irradiation area : approx. 14x14mm)
Irradiation direction	360 degree variable (vertical, horizontal angle)
Positional non-uniformity	± Within ±5%
Irradiation light stability	Within ±1%
Focal length	80mm from the tip of the lens to the focal plane
Height of light axis	140mm from the bottom of the system to the focal plane
Focal length of monochromator	250mm(MgF2 prevention of ultraviolet deterioration)
Optical system of monochromator	Asymmetrical Deformed Czerny-Turner Mount
Aperture ratio of monochromator	F=4.3
Stray light of monochromator	1 x 10 <sup>-4</sup> or less (at 546.1nm with ±5nm)
Operation system for monochromator	Sine bar mechanism, Wavelength linear scanning
Ammeter	Current acquisition: 10pA ~ 1A, Voltage application: ±20V
Software (measurement items)	Spectral response/quantum efficiency Short circuit current density calculation
Software (graph)	X : Wavelength(nm) Y : Irradiation intensity (mW)/ Spectral response (A/W) /Quantum efficiency (QE)



## Standard configuration

- Xenon lamp 150W Ozone free cartridge type (air cooling)
- Xenon lamp house (power supply)
- Monochromator (M25)
- Grating 600lines/mm, blazed at 500nm
- High order light cut filter (U-330, L-37, R-64)
- Exiting light condensing unit: 10x10mm uniform irradiation
- Ammeter (Current acquisition: 10pA ~ 1A, Voltage application: ±20V)
- Controller (WL scan, high order light cut filter switching, shutter switching)
- Interface unit
- Sample chamber (opened in three direction)
- Desktop base
- Silicon photo diode detector ( with spectral response absolute value calibration data )
- Detector holder
- Connection cable (alligator clips)
- Software (SR\_PRO)
- Note type PC, GP-IB-USB cable, USB cable



## Optional accessories

- Diffuse Reflection Measurement Unit ( for calculating Internal Quantum Efficiency )
- InGaAs detector ( for long wavelength measurement )
- Mechanical chopper ( for AC measurement )
- Exiting light condensing optical system
- Lock-in amplifier
- Various gratings
- Various high order light filters
- Various ammeters
- Various sample stage, measurement cables



## External dimensions

- Power supply : AC100V ±10V 50/60Hz 10A
- Main unit : Approx. W1120× D450× H780mm
- Weight : Approx. 50Kg

●記載の仕様および外観は予告なしに変更する場合があります。

< SM-250-1708010N >



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