Incident photon-to-current efficiency (IPCE) measurement apparatus

TYPE: PEC-S10

Specifications

Peccell Technologies, Inc.

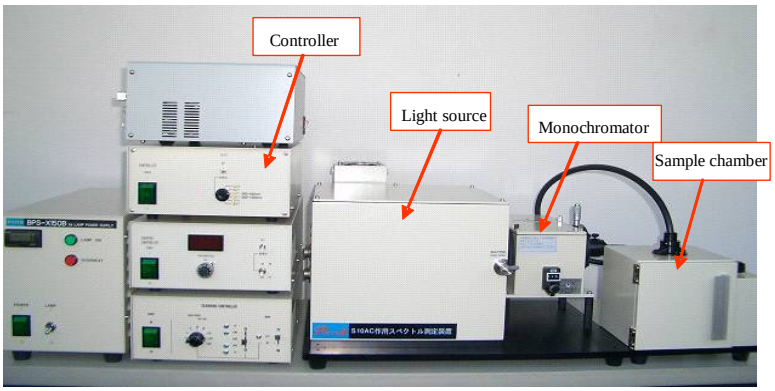
IPCE (Incident photon-to-current efficiency) measurement apparatus
TYPE: PEC-S10

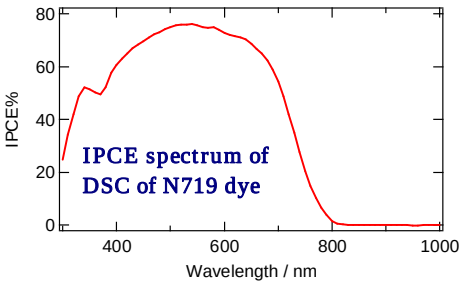
Product summary

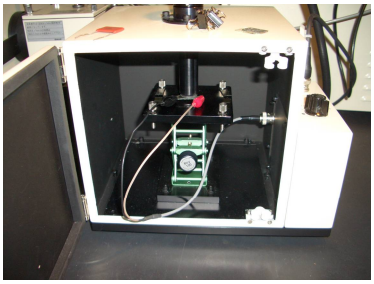
3-minute auto scanning of this system completes measurement of an action spectrum for photoelectric response. Optical fiber leads light to a small irradiation area, making it possible the assessment of small cells (1 cm^2). Sensitivity can be amplified by up to 2000 times for detection of a very weak photoelectric response, for example, in a LB film. A standard cell for calibration of absolute light intensity is attached. A scan range of wavelength is from 300 nm to 1000 nm with a single Xe lamp, and therefore, IPCE spectrum of dye-sensitized solar cell using black dye is able to be measured.

The area for setting PEC-S10 is about 1 m in width and 70 cm in depth. It can be placed on an ordinary laboratory desk.

Small change in a specification of PEC-S10 is allowed for your research requirement.







- A PC in above figures is an option.
- A sample chamber in above figures is attached with the load resistor for AC measurement (option). The I-V amplifier for DC measurement (option) is the same size with the load resistor.

Components

1. ***Lamp house***
   - Lamp : 150W Xe lamp and stabilized power supply
   - Collector optics : Mirror type
   - Filters : L37 and R64
2. ***Monochromator***
   - Focal length : 10 cm
   - Focal ratio : F=3.0
   - Resolution : 2 nm (in the case of diffraction grating of 600 lines)
   - Diffraction grating : 600 lines (blazed wavelength 500 nm)
   - Range of measurement : 300 nm ~ 1100 nm
   - Incident power of monochromatic light : >5 mW cm^{-2} at 470 nm when a wavelength resolution is >25 nm.
3. ***Sample chamber***
   - Body : Light-resistant chamber with a holder for an optical fiber
   - Size : 20cm x 20 cm x 20 cm
   - Sample stage : Laboratory jack
4. ***Optical fiber*** : ϕ6 mm (116 optical fibers bundled)
5. ***Controller*** for driving a monochromator, a filter unit, and other devices
6. ***Si-diode for calibration*** (certificated from 200 nm to 1200 nm attached with a certificate)
7. ***Software*** : STD-PRO for acquiring and analyzing data

Options

For IPCE measurement with DC method (Continuous irradiation)

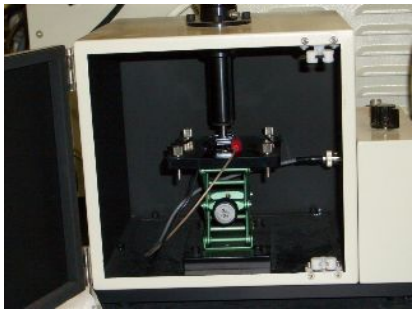
1. ***I-V amplifier*** : Amplifier for DC measurement(×1, ×10, ×100, ×1000) attached with the sample chamber

For IPCE measurement with AC method (Alternating irradiation)

1. ***Chopper unit*** : Freely changeable from 13 Hz to 100 Hz
2. ***Load resistor for AC*** :Load resistor (1Ω, 10Ω, 100Ω, 1000Ω) attached with the sample chamber
3. ***Lock-in amplifier*** :NF LI 5630 or a similar product

- A Windows PC with a RS232C port should be needed.
- For measuring more reliable IPCE spectra in wavelength longer than 800 nm, a filter unit for longer wavelength measurement is available (option).
- The size of optical fiber can be subjected to change for your requirement.

Newly designed optical fiber for a small size of solar cells



An optical fiber for irradiation is newly designed.　An optical fiber of ϕ3 mm (outer diameter 5 mm) enables you to measure IPCE spectra of a solar cell of a 5 mm square active area attached with a mask or clips.

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