

SPECTRAL EVOLUTION

PV Cell Development with a Spectroradiometer and RT Sphere

A UV/VIS/NIR spectroradiometer can be used to study and test the optical properties of different photovoltaic (PV) cell designs and coatings using a reflectance/transmittance (RT) sphere. To see the effect of sunlight striking a PV cell and compare the effects of different materials, textures, and coatings, a spectroradiometer with an RT sphere that can measure reflectance, transmittance, and absorption becomes indispensable.

PV cells convert sunlight to electricity. The first stage in this conversion is absorbance of light in the useful spectral range. Different treatments are used to increase film absorbance including antireflective coatings. The effectiveness of different designs and treatments can be compared by measuring reflectance, transmittance and absorption.

Spectral Evolution spectroradiometers cover the full UV/VIS/NIR range from 350-2500nm. An RT sphere allows you to collect all diffuse light reflected from a sample since the inside of the sphere is a perfect reflecting diffuser—total hemispherical reflectance can be measured. With the high resolution spectra obtained from a Spectral Evolution spectroradiometer, the RT sphere can deliver detailed information about the PV cell's spectral features.

The 4 inch R/T sphere is lightweight and portable, delivered with a stand as well as a ¼-20 mount for use with tripods. When used with a SPECTRAL EVOLUTION spectrometer or spectroradiometer such as the SR-4500 and SR-4500A, it delivers detailed information for measurements transmittance and reflectance modes at two varying light intensity levels.

The RT sphere allows you to collect all diffuse light reflected from a sample – measuring total hemispherical reflectance. You can measure reflectance and transmittance, and calculate absorption at varying bulb intensity levels. A white reference is provided for both reflectance and transmittance measurements. The RT sphere, similar to other field accessories, is connected to SPECTRAL EVOLUTION spectrometers and spectroradiometers via an industry standard SMA-905 connector. Like many other Spectral Evolution accessories, the RT sphere can be operated via a one click triggering mechanism, allowing for rapid data acquisition. It is powered by the universal accessory power supply cable for seamless integration into existing SPECTRAL EVOLUTION equipment.

Spectral Evolution spectroradiometers are equipped with DARWin SP data Acquisition software. DARWin SP includes pull down menus for solar simulator evaluation to AM1.5 and AM 1.0 and an energy measurement window that calculates integrated radiance or irradiance over a user-determined wavelength band for the spectrum of interest. DARWin SP saves all spectra and associated data as ASCII for use with other commercial or home-grown analysis software. Contact us today for additional information: sales@spectralevolution.com



RT Sphere can measure reflectance, transmittance, and absorption.



The SR-4500 lab spectroradiometer provides the ultimate in high performance and stable operation with three TE-cooled photodiode arrays,

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