Low Noise Compact CCD Spectrometer

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SM245

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Wide Spectral Range (up to 200~1050nm)

Enhanced Dark Current Noise

High Speed Data Acquisition

Compact & Modular Design

The choice for high speed data acquisition Applications

Spectral Products is offering the new SM245 high speed 2048-pixel array CCD spectrometer. Thanks to the enhanced design on the electronic board of the SM245, the dark current noise level as well as the data acquisition speed have been improved.

Based on special optical bench design, it supports various applications where spectral or color measurements are required, including high speed data acquisition. The SM245 can accept light directly through its built-in slit or via optical fiber. The durable mechanical housing that encloses the SM245 provides stable optical bench operation over a wide range of temperatures.

Our array detectors(in conjunction with our special UV coating process and customized order sorting filters) allows up to an 850nm measurement window from 200nm to 1050nm (smaller measurement window sizes increase spectral resolution and light sensitivity).

Standard interface of the SM245 series is a USB 1.1/2.0 compatible interface with 16-bit AD conversion. Our USB board can support multichannel configuration up to 8. With this multichannel configuration, a high resolution for wide range or a dual spectrometer system (one for measurement and the other for reference) is possible. We applies new UV enhancing coating on the CCD to increase the UV sensitivity below 450nm comparing with the conventional UV coating that is widely used in CCD spectrometers. By the help of this new UV coating, the signal sensitivity below 450nm can get improved ~2-3 times more in general.

Software support includes an SDK and DLLs for dedicated applications development and Windows OS-based spectral acquisition and analysis software(SMProMX).

Specifications :

Physical Dimension	
Dimensions (mm)	3.54 x 2.76 x 1.73 inches (90 X 70 X 44)
Weight (kg)	0.88lbs (0.4kg)
Fiber Optic Connector	SMA905 N.A.=0.22 Optical Fiber Input
Detector	
Detector	Sony ILX511 (UV Enhanced Coated)
Cooling	None
Windows Material	Quartz or Glass
Spectral Response Range	200-1050 nm
Pixels	2048 (Effective)
Pixel Size	14 µm X 200 µm
Well Depth	62,500 e-
Optical Specification	
Wavelength Range	Full Range: ~200-1050 nm
	UV Range: ~200-450 nm
	VIS Range: ~380-760 nm
	NIR Range: ~550-1050 nm
	Other user customized range is possible
Optical Resolution	~0.3-10 nm, dependent on spectral range, slit width, and fiber core diameter
Dark Noise RMS	< 35 in 16bit @ 35ms integration time
Signal to Noise Ratio (SNR)	> 300 : 1
Stray Light	<0.1 % AVG.
Filter	Second Order Blocking Filter Installed
Electrical Specification	
ADC resolution	16bit (0-65535)
Minimum Integration Time	1 msec
Computer Interface	USB 1.1/2.0 Compatible
Trigger Mode	Free Run Mode
	Software Trigger Mode
	External trigger mode (20-pin connector): TTL Edge trigger input
Computer	
Operating System	Windows XP/Windows VISTA/Win 7/Win 8.1/Win 10 (32/64 bit)
Software	SM32Pro (basic) & SMProMX (advanced)
Software Development Kit	Visual C#/C++, LabVIEW, Matlab, etc

Applications

Multichannel Optical Monitoring and Diagnostics of Plasma

- Real time optical monitoring and diagnostics of plasma process in semiconductor fabrications
- Multichannel based OES (optical emission spectroscopy) sensors in plasma process diagnostics

2. Optical Fiber and OES Sensor

1. Viewport Mount
- Mounted on Process Chamber viewport

Statistical Analysis

Spectrum Database

[FDC]

3. Controller
- Controller configuration for IP information and network (FDC)
- Customized Spectral Calculation Data

EPD of Etch & Cleaning
- Optimal End Point Detection in Etch and Chamber Cleaning Processes

Leak Detection
- Real-time monitoring and detection of leakage caused by outside air inflow

Process Condition Monitoring
- Real-time process gas behavior and process status monitoring as process conditions change

Plasma Information
- Automatic Measurement of Spatial Uniformity with Plasma Key Factors (PI)

EPD of Etch & Chamber Cleaning

- End Point Detection of plasma etch and cleaning process in semiconductor fabrications
- Saving production cost and time loss by optimization of EPD with statistical algorithms

Ultra thin layer of SiO_2 / Si / F+ions / SF_6 plasma / SiF_4 / Mask

SF6/O2 Mixture plasma

START OF ETCH / FILM CLEARS / ETCHANT / SUBSTRATE PRODUCT / FILM PRODUCT / SIGNAL INTENSITY / RF ON / TIME / RF OFF

Fig. 3. Time trace data of (a) process gas species and (b) by-product species.

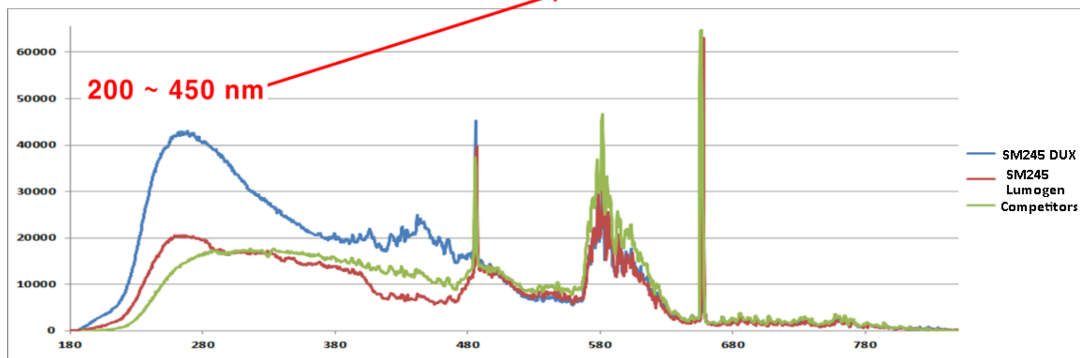
Fig. 4. Generated end-point detection signals; tp (process gas species) and tb (by-product).

Sang Jeen Hong et. al. (2013)

Highly Deep UV Enhanced Coated CCD

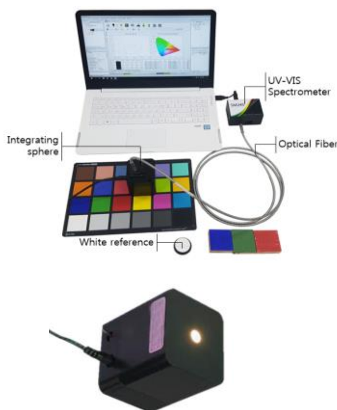
- Responsivity to high deep UV (200-450 nm) is 2-3 times higher than general UV enhanced spectrometers
- Signal to noise ratio (SNR) more accurate when UV spectrum measurement results are acquired

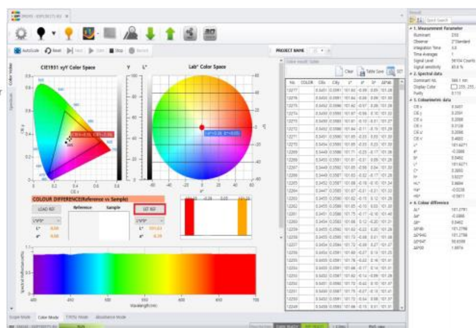
Main peak of Si / N2 / OH / CCL / SiCl etc

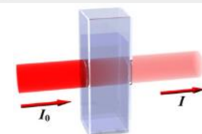


Compact Color and Absorbance Measurement System (COLMAN)

- Reflectance and transmittance mode can provide color measurement using photometric and radiometric values
- Compact spectrophotometer for real time analysis of chemical and optical properties of samples



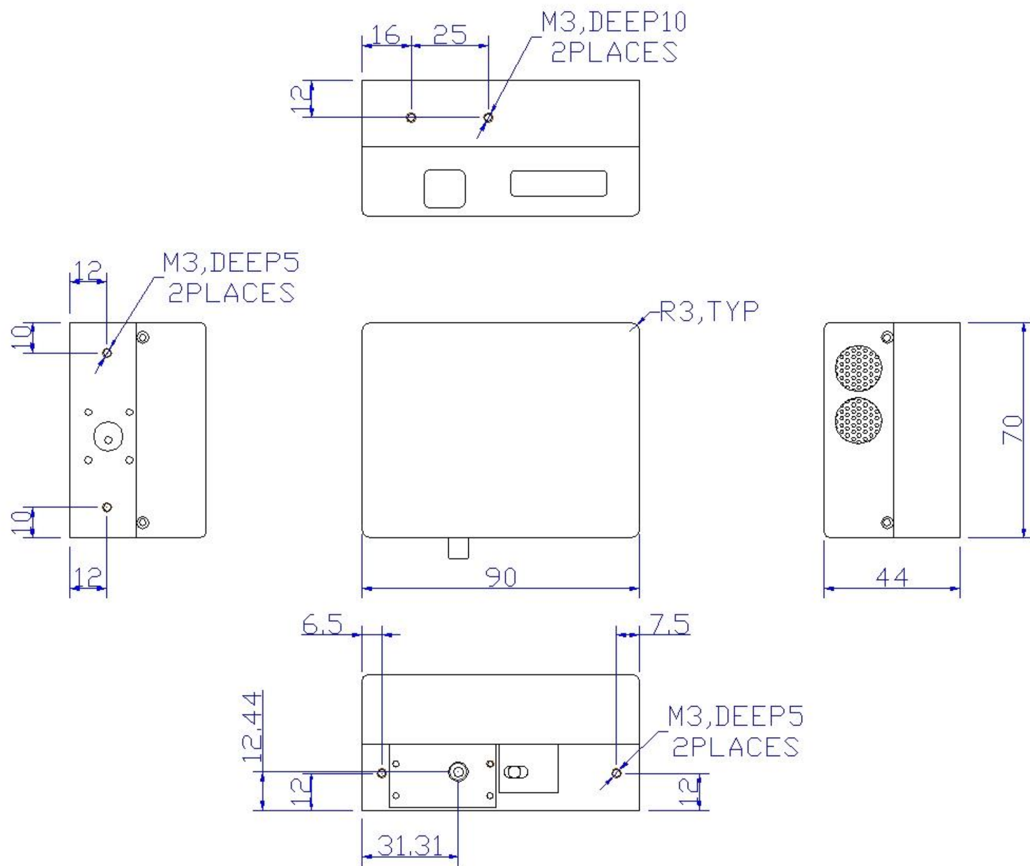




Transmission (T) = I / I_0

Absorbance (A) = $-\log_{10}(T)$

Case Dimension:



Units in mm

Ordering Information : Please indicate product number plus description when ordering

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