Spectroelectrochemical Instrument

Refs. SPELEC, SPELEC1050

SPELEC is the world's only equipment in the market for performing SPECTROELECTROCHEMISTRY studies combining in only one box a Lightsource (UV-VIS-NIR wavelength range: 215-400 nm Deuterium, 360-2500 nm Tungsten halogen), a Bipotentiostat/Galvanostat (± 4 V DC potential range, ± 40 mA maximum measurable current) and a Spectrometer wavelength range: 200-900 nm (ref. SPELEC) or wavelength range: 350-1050 nm (ref. SPELEC1050).

All the components are perfectly fitted and synchronized, thus offering for the first time in the market a fully integrated synchronized spectroelectrochemical instrument.

The equipment can also be used independently as a Spectrometer or as a Bipotentiostat/Galvanostat.

SPELEC is controlled by the DROPVIEW SPELEC Software for Windows, which provides powerful functions such as:

- **Shutter** lamp control (automatic dark and reference)
- **Real Time** panel that collects the generated spectra not only during the electrochemical measurement but continuously at any time.
- Spectroscopic measurements shown in **Counts**, **Absorbance**, **Transmittance** or **Reflectance** during the Electrochemical process.
- Plot of **Optical Spectra vs. Electrochemical Curves** at a specified wavelength (Voltabsorptogram, Chronoabsorptogram or Derivated ones).
- Plot overlay, peak integration, smoothing, subtraction, derivative curve, baseline fitting.
- 3D plotting of curves.
- Export to .csv all synchronized data.
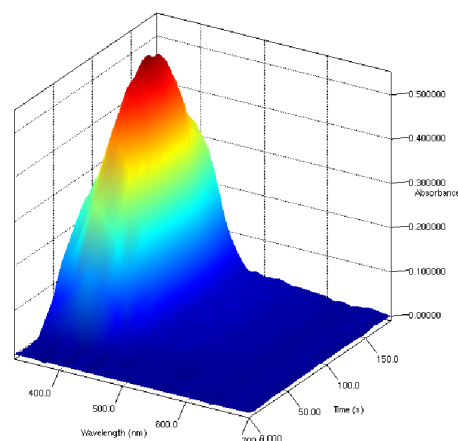
SPELEC can be used with electrochemical sensors or electrochemical cells with three electrodes: working electrode, reference electrode and auxiliary electrode. Also, it can be used in bipotentiostat mode, with a two-working electrodes system sharing the same reference electrode and auxiliary electrode.

SPELEC can be used with standard cuvette holders or spectroelectrochemistry cells, but also with the new innovative Metrohm DropSens cells for Transmission or for Reflection spectroelectrochemistry experiments using screen-printed electrodes.

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General specifications	
Power	12 V DC
PC interface	USB
LED indicators	Power
Dimensions	25 x 24 x 11 cm (L x W x H)
Weight	1950g

Light Source	
Wavelength range	200-400 nm (deuterium); 350-2500 nm (tungsten halogen)
Stability	<0.2% (standard deviation)
Time to stable output	<0.1% per hour (after 30-minute warm-up) 6 minutes (deuterium); 1 minute (tungsten halogen)
Ignition delay	<2.0 seconds (delay for cold start-up may be longer)
Bulb life	>1,000 hours @ 240 nm (time)
	<50% @ 240 nm (decrease of intensity)
	Continuous operation (testing conditions)
Fiber optic connector	SMA 905

Spectrometer	
Detector	Linear silicon CCD array
Pixels	2048
Pixel size	14 µm x 200 µm
Pixel well depth	~62,500 electrons
Fiber optic connector	SMA 905
Wavelength range	200 – 900 nm (ref. SPELEC)
	350 – 1050 nm (ref. SPELEC1050)
Optical resolution	~0.3-10.0 nm FWHM
Signal-to-noise ratio	250:1 (at full signal)
A/D resolution	16 bit
Dark noise	50 RMS counts
Dynamic range	8.5×10^7 (system);
	1300:1 for a single acquisition
Integration time	1 ms to 65 seconds
Stray light	≤0.05% at 600 nm; <0.10% at 435 nm

Potentiostat/Galvanostat	
Operating modes	BiPotentiostat, Potentiostat, Galvanostat
DC-potential range	±4V
Current ranges (potentiostat)	±1 nA to ±10 mA (8 ranges)
Maximum measurable current	±40 mA
Potential ranges (galvanostat)	±100 mV, ±1 V (2 ranges)
Applied Potential Resolution	1 mV
Measured Current Resolution	0.025 % of current range (1 pA on lowest current range)
Applied Current Resolution	0.1 % of current output range
Measured Potential Resolution	0.012 % of potential range
Potential Accuracy	±0.2 %
Current Accuracy	≤0.5 % of current range at 100 nA to 10 mA

The equipment can also be used independently as a Spectrometer or as a Bipotentiostat/Galvanostat. SPELEC can be used with standard cuvette holders or spectroelectrochemistry cells, but also with innovative DropSens cells and screen-printed electrodes.

www.metrohm-dropsens.com

Metrohm
DropSens