

# Spectroelectrochemical Instrument



01

## Refs. SPELEC, SPELEC1050



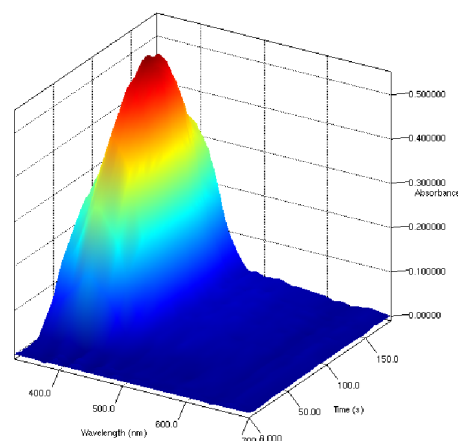
**SPELEC** is the world's only equipment in the market for performing SPECTROELECTROCHEMISTRY studies combining in only one box a Lightsource (UV-VIS-NIR wavelength range: 215-400 nm Deuterium, 360-2500 nm Tungsten halogen), a Bipotentiostat/Galvanostat ( $\pm 4$  V DC potential range,  $\pm 40$  mA 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) <0.1% per hour (after 30-minute warm-up)
Time to stable output	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 $\mu\text{m}$ x 200 $\mu\text{m}$
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 x 10 <sup>7</sup> (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](http://www.metrohm-dropsens.com)