

Raman Spectroelectrochemical Instrument



01

Ref. SPELECRAMAN, SPELECRAMAN638, SPELECRAMAN532

Combination of Raman and Bipotentiostat/Galvanostat in a **fully integrated synchronized Raman Spectroelectrochemical instrument**.



- Compact Instrument
- Cost-effective
- Extremely easy set-up
- Advanced data acquisition
- Easy data handling integrated in software

SPELEC RAMAN is the only instrument in the market for performing **RAMAN SPECTROELECTROCHEMISTRY studies** combining in **only one box** a **LASER** [wavelength: 785 ± 0.5 nm (SPELECRAMAN) / 638 ± 0.5 nm (SPELECRAMAN638) / 532 ± 0.5 nm (SPELECRAMAN532)], a **Bipotentiostat/Galvanostat** (± 4 V potential range, ± 40 mA current range) and a **Spectrometer** [wavelength range 35-3000 cm^{-1} (SPELECRAMAN) / 50-4370 (SPELECRAMAN638) / 75-4520 cm^{-1} (SPELECRAMAN532)].

All the components are perfectly fitted and synchronized, offering for the first time a **fully integrated synchronized Raman spectroelectrochemical instrument**.

✓ **RAMAN SPECTRA** advantages: compatible with aqueous samples, rapid identification, non-destructive.

✓ **Real time Raman spectroelectrochemistry** with **SYNCHRONIZED RAMAN** and **ELECTROCHEMICAL** measurements:

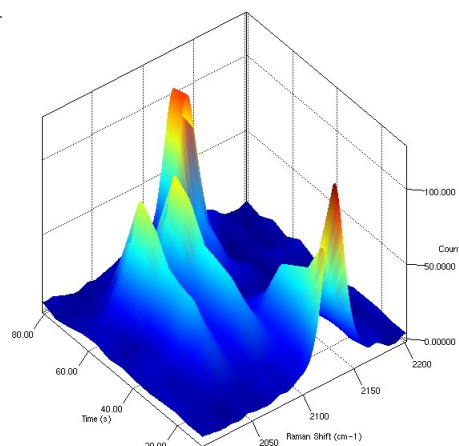
- Surface **characterization**: new materials development, **corrosion** analysis, battery testing,...
- **EC-SERS** for enhanced Raman Spectra increasing detection **sensitivity**.

✓ Ideal for **qualitative & quantitative analysis**: high sensitivity and reproducibility.

✓ **In-situ, real time and synchronized Raman and Electrochemical measurements**.

SPELEC RAMAN is controlled by the **DROPVIEW SPELEC Software**, which provides powerful functions such as:

- **Operando / Time-resolved Raman spectroelectrochemistry**.
- **Power** laser control.
- **Real Time panel** that collects the generated spectra not only during the electrochemical measurement but continuously at any time.
- Spectroscopic measurements in **Counts, Counts minus Dark, Raman Shift** during the electrochemical process.
- Plot of **optical signals vs. potential/time curves** at specified wavelength and Raman Shift.
- Plot overlay, peak integration, smoothing, subtraction, derivative curve, baseline fitting.
- **3D** plotting of curves, **film**.
- Export to .csv all synchronized data.



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The equipment can also be used independently as a **Raman spectrometer** or as a **Bipotentiostat/Galvanostat**.

General specifications	
Power	5 V DC
PC interface	USB
LED indicators	Power
Dimensions	25 x 24 x 11 cm (L x W x H)
Weight	3600g
Potentiostat/Galvanostat	
Operating modes	BiPotentiostat, Potentiostat, Galvanostat
DC-Potential range	±4 V
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
Lightsource - Laser Class 3B	
Wavelength	785 ± 0.5 nm (SPELECRAMAN) / 638 ± 0.5 nm (SPELECRAMAN638) / 532 ± 0.5 nm (SPELECRAMAN532)
Spectral line width	< 0.1 nm (typical < 0.08 nm)
Stability	15 to 45°C
Optical power output	500 mW (SPELECRAMAN) / 300 mW (SPELECRAMAN638) / 50 mW (SPELECRAMAN532)
Output power stability	± 1%
Warm-up time	10 s from cold start; 1.5 s from warm start
Fiber optic connector	FC/PC
Spectrometer	
Detector	2D CCD Array, Back thinned TE Cooled
Pixels	1044 x 64
Wavelength range	787–1027 nm (SPELECRAMAN) / 640–885 nm (SPELECRAMAN638) / 534–700 nm (SPELECRAMAN532)
Raman shift	35–3000 cm ⁻¹ (SPELECRAMAN) / 50–4370 cm ⁻¹ (SPELECRAMAN638) / 75–4520 cm ⁻¹ (SPELECRAMAN532)
Resolution	< 4 cm ⁻¹ (SPELECRAMAN) / < 4.5 cm ⁻¹ (SPELECRAMAN638 and SPELECRAMAN532)
Signal-to-noise ratio	1000 : 1 (at full signal)
Dynamic range	85000 : 1
Integration time	8 ms to 60 min
A/D resolution	18 bit
Fiber optic connector	SMA 905

Specifications are subject to change without previous notice

SERS effect to enhance Raman signals and detect low analyte concentrations in solution can be achieved with silver and gold screen printed electrodes among others already available in our catalogue (ref. 010, C013, 220BT).

SPELEC RAMAN can be used with any kind of Raman cells, but also with the new innovative Metrohm DropSens cells for Raman spectroelectrochemistry experiments for conventional electrodes (RAMANCELL-C) or with screen-printed electrodes (RAMANCELL).