SPELEC

The intuitive
spectroelectrochemistry

**PEOPLE
YOU
CAN
TRUST**

Metrohm
DropSens

The best of two worlds

Spectroelectrochemistry is a hyphenated technique that takes the advantages of electrochemistry and optical methods in a single experiment, providing the whole vision of chemical processes that take place on the electrode surface. For this reason, spectroelectrochemistry is currently one of the most popular techniques for gathering molecular, kinetic, and thermodynamic information from the reactants, intermediates, and/or products involved in electron transfer processes being useful in a huge variety of fields.

SPELEC instruments, based on the operando concept, are the only fully- integrated equipments dedicated to spectroelectrochemistry. All components, (bi)potentiostat/galvanostat as well as light source and spectrometer are integrated in the same instrument. This configuration allows that a key factor, such as real synchronization (non-triggered), is achieved between both techniques.

«Spectroelectrochemistry is a powerful technique that combines electrochemistry and spectroscopy»

ONE SOFTWARE FOR ADVANCED RESEARCH

In comparison with the modular standard set-ups, only one software is required to run spectroelectrochemical measurements. DropView SPELEC is the only dedicated spectroelectrochemical software with specific data treatment tools making accessible time-resolved spectroelectrochemistry to everyone.

3 INSTRUMENTS IN ONLY 1

Although SPELEC instruments are designed for performing spectroelectrochemical measurements, they can be also used independently and activated/deactivated via software only as (bi)potentiostat/galvanostat, or as an optical instrument.

COVERING ALL RANGES

SPELEC instruments cover a wide spectral range for performing UV-VIS, VIS-NIR, NIR or Raman spectroelectrochemistry. Depending on your system under study, and the ranges of interest, you may choose between the different compact fully integrated models available.

Available models

	SPELEC	SPELEC1050	SPELECNIR	SPELECRAMAN	SPELECRAMAN638	SPELECRAMAN532
LIGHT SOURCE	200-400 nm (deuterium) 400-1100 nm (halogen)	200-400 nm (deuterium) 400-1100 nm (halogen)	400-2500 nm (tungsten halogen)	785 nm laser	638 nm laser	532 nm laser
SPECTROMETER	200-900 nm	350-1050 nm	900-2200 nm	50-3000 cm^{-1}	60-4350 cm^{-1}	70-4500 cm^{-1}
POTENTIOSTAT	± 4 V ± 40 mA	± 4 V ± 40 mA	± 4 V ± 40 mA	± 4 V ± 40 mA	± 4 V ± 40 mA	± 4 V ± 40 mA
DIMENSIONS	25 x 24 x 11 cm (L x W x H)	25 x 24 x 11 cm (L x W x H)	25 x 24 x 11 cm (L x W x H)	25 x 24 x 11 cm (L x W x H)	25 x 24 x 11 cm (L x W x H)	25 x 24 x 11 cm (L x W x H)

Just one software dedicated for spectroelectrochemistry...

SPELEC instruments are controlled by DropView SPELEC, the only software in the market dedicated to spectroelectrochemistry. It is thought and designed for (and by) those that want to treat spectroelectrochemical data in just one click.

ANALISYS IN ONE CLICK

Specific spectroelectrochemical data treatment tools are available to facilitate the analysis. Discover the one-click functions accessible to new and expert users.

REAL SYNCHRONIZED DATA

Electrochemical and spectroscopic signals are independent (non-triggered) but simultaneous. Optical acquisition starts/finishes measuring at the same time than the electrochemical reaction, obtaining information during the whole experiment.

LIVE ACQUISITION

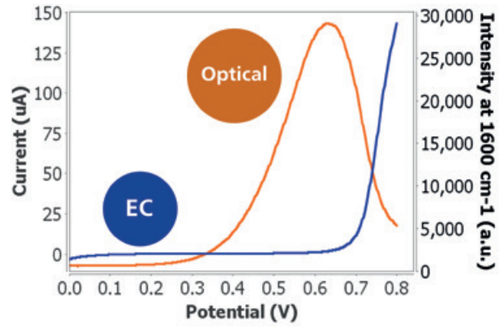
Spectra are continuously recorded and shown during the measurement. You do not need to wait until the end of the experiment to understand the behavior of the system under study.

AUTOMATIC CONTROL

The shutter of the lamps is also automatically controlled for setting dark and reference spectra as well as for running the experiment. In addition, the laser power is controlled with DropView SPELEC, allowing you optimize it according to the properties of the sample under study.

«Real synchronization matters»

... with many data treatment tools.

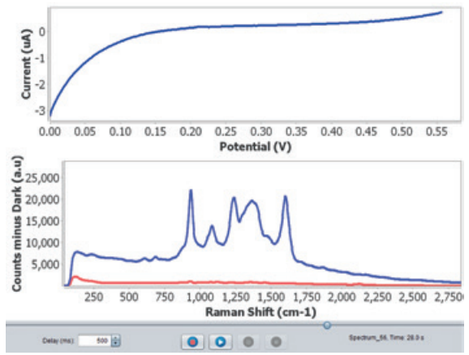


WORKSPACE

3 axis representation to compare optical and electrochemical signals in a single graph.

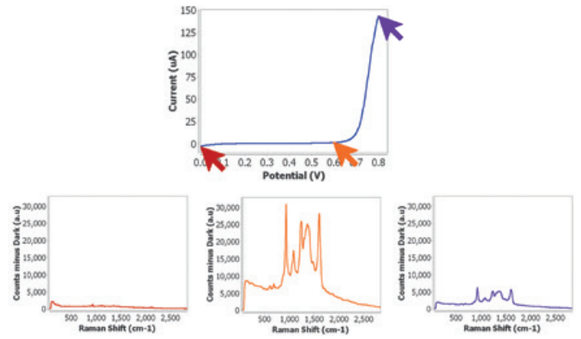
EXPERIMENT FILM

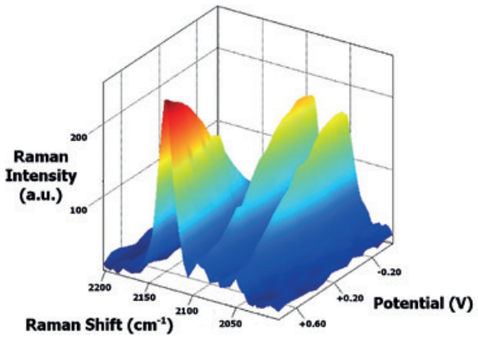
Overview your experiments and save them as video files.



VISIBLE SPECTRUM AT EC POINT

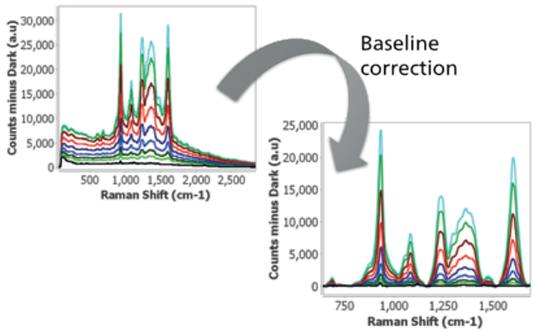
Easy visualization of the spectrum associated with each electrochemical point.





3D PLOT

Outstanding representation of the data and easy visualization of the results.

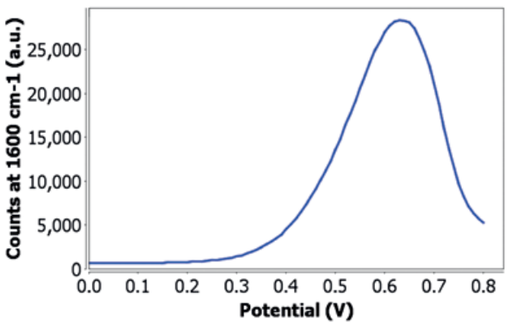


BASELINE CORRECTION

Remove the background signal to define the relevant bands.

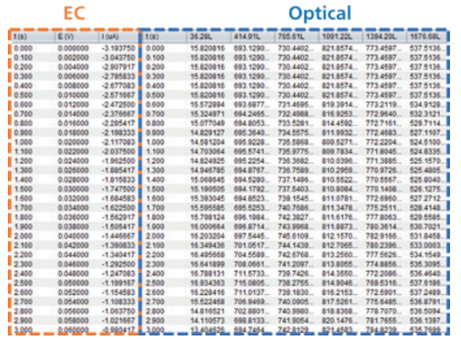
SPECTRA VS EC

Track the evolution of the optical signal with potential.



DATATABLE

Export straightforward EC and optical data, showing their perfect synchronization.



Looking for spectroelectrochemical accessories?

SPELEC instruments can be used with any kind of cells and set-ups, however you have also available Metrohm DropSens cells and accessories specifically designed for the SPELEC line.

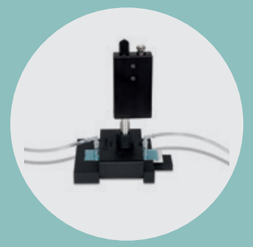
Simplify your spectroelectrochemical set-up with optical cells to perform reflection or transmission experiments with SPEs or conventional electrodes. Complete your optical configuration with the fibers, probes and accessories from our catalogue.

SPECTROELECTROCHEMICAL CELLS FOR SCREEN-PRINTED ELECTRODES

Cells suitable to perform UV-VIS, NIR or Raman spectroelectrochemical experiments with screen-printed electrodes. Reflection and transmission cells are available. Benefit from an easy sensor replacement thanks to an opening and closing system with magnets.

SPECTROELECTROCHEMICAL CELLS FOR CONVENTIONAL ELECTRODES

Cells suitable to perform UV-VIS, NIR or Raman spectroelectrochemical experiments with conventional electrodes. Reflection (UV-VIS, NIR and Raman) and transmission (UV-VIS and NIR) cells are available, allowing an easy optimization of the focal distance. If your spectroelectrochemical setup includes a microscope, a specific Raman cell is designed for these measurements.



SPECTROELECTROCHEMICAL REFLECTION CELLS FOR THIN-LAYER FLOW-CELL SCREEN-PRINTED ELECTRODES

Cells for performing UV-VIS, NIR or Raman spectroelectrochemical measurements in flow conditions in combination with the TLFCL-CIR format SPEs.

REFLECTION AND TRANSMISSION UV-VIS AND NIR FIBERS

Optical fibers designed for UV-VIS or NIR measurements. Reflection probe shows 6-around-1 fiber bundle design, allowing the optimization of the optical measurements.

RAMAN PROBES FOR DIFFERENT WAVELENGTHS

Raman probes allow the excitation of the sample and the collection of Raman signal. Different wavelength probes are available: 532, 638 and 785 nm.

Ordering codes and description

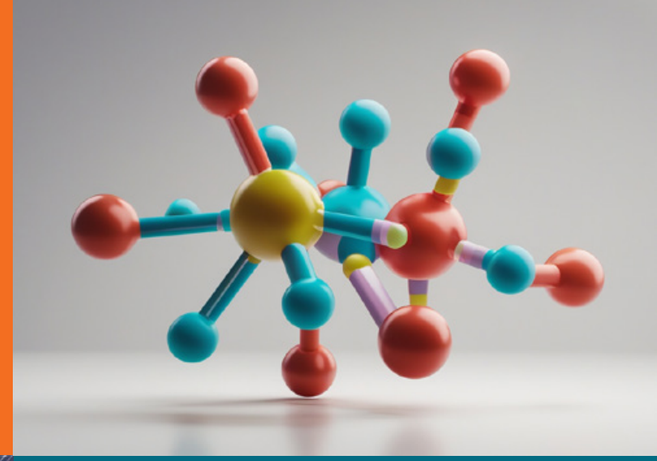
UV-VIS and NIR	
DRP-CLENS	Collimator lens for TRANSCELL
DRP-CUV	Cuvette holder for PTGRID-TRANSCELL
DRP-FLKIT	Fluorescence kit
DRP-FLKITSPE	Fluorescence kit for screen-printed electrodes
DRP-LEDRGB	LED light red green blue
DRP-LEDUV275	LED light-UV 275 nm
DRP-LEDVIS395	LED light-VIS 395 nm
DRP-PTGRID-TRANSCELL	Transmission cell with conventional electrodes
DRP-REFLECELL	Reflection cell for screen-printed electrodes
DRP-REFLECELL-C	Reflection cell for conventional electrodes
DRP-REFLEPACK-VIS-UV	Pack for reflection experiments with screen-printed electrodes
DRP-RPROBE-VIS-NIR	Reflection probe VIS-NIR
DRP-RPROBE-VIS-UV	Reflection probe VIS-UV
DRP-TFIBER-VIS-NIR	Transmission fiber VIS-NIR
DRP-TFIBER-VIS-UV	Transmission fiber VIS-UV
DRP-TLFCL-REFLECELL	Reflection cell for thin-layer flow-cell integrated screen-printed electrodes
DRP-TRANSCELL	Transmission cell for transparent screen-printed electrodes
DRP-TRANSPACK-VIS-UV	Pack for transmission experiments with screen-printed electrodes
DRP-VKITSPELEC	Verification kit for SPELEC and SPELEC1050
DRP-VKITSPELECNIR	Verification kit for SPELECNIR
RAMAN	
DRP-RAMANCELL	Raman cell for screen-printed electrodes
DRP-RAMANCELL-C	Raman cell for conventional electrodes
DRP-RAMANCELL-M	Raman cell for microscope
DRP-RAMANPROBE	Raman probe for SPELECRAMAN
DRP-RAMANPROBE532	Raman probe for SPELECRAMAN532
DRP-RAMANPROBE638	Raman probe for SPELECRAMAN638
DRP-TLFCL-RAMANCELL	Raman flow-cell for thin-layer flow-cell integrated screen-printed electrodes
DRP-VKITSPELECRAMAN	Verification kit for SPELECRAMAN
DRP-VKITSPELECRAMAN532	Verification kit for SPELECRAMAN532
DRP-VKITSPELECRAMAN638	Verification kit for SPELECRAMAN638

Why spectroelectrochemistry will improve your research?

Spectroelectrochemistry provides valuable information in a huge variety of different fields. Discover more applications!

ORGANIC AND INORGANIC CHEMISTRY

- Investigation of vibrational properties of phthalocyanines, porphyrins, organometallics, coordination complexes, dyes, etc.
- Study of the stability, degradation and redox-induced color changes
- Understanding electronic coupling, charge delocalization, intraligand transitions and oxidation ligand-to-ligand charge transfer transitions



MATERIAL SCIENCE

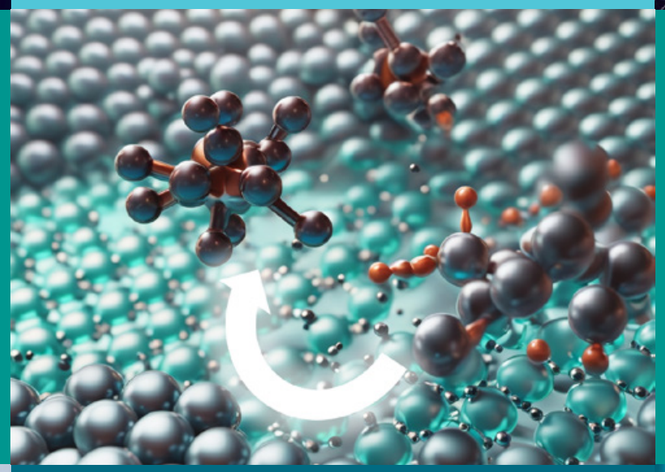
- Characterization of morphological and structural properties of carbon nanostructures, nanoparticles, polymers, perovskites, semiconductors, nanocrystals, alloys, composites, etc.
- Study and monitoring of electronic states and doping and degradation processes
- Evaluation of electrochromic capabilities and modulation of optical properties

ENERGY

- Elucidation of the structure-property relationships of material employed in solar cells.
- Study of the degree of charge delocalization in rechargeable batteries

ELECTROCATALYSIS

- Analysis of the structure and the electrocatalytic activity of new catalysts
- Monitoring and quantification of water oxidation reaction, oxygen and hydrogen evolution, reduction of CO_2, ammonia oxidation, etc.
- Determination of the stability and conversion of complexes



CORROSION

- Identification and monitoring of the transformation of products generated during corrosion processes
- Study of the inhibition of corrosion processes on metallic (copper, iron, etc.) surfaces
- Elucidation of the interactions and the reactions of different ions with metallic surfaces

FUNDAMENTAL CHEMISTRY

- Elucidation of reaction mechanisms
- Identification and quantification of intermediates and generated products
- Calculation of electrochemical and optical parameters

SENSING

- Detection and quantification of a huge variety of chemical compounds
- Development of novel sensing platforms to improve the sensitivity capabilities
- Overcoming the limitations of other methods, avoiding complex instrumentation and tedious protocols, saving cost, time, etc.

BIOLOGY AND LIFE SCIENCE

- Monitoring of denaturation, renaturation, hybridization, and interaction processes
- Detection of biological compounds and resolution of biological mixtures
- Study of DNA, neurotransmitters, antioxidants, antitumor agents, proteins, enzymes, etc.

ENVIRONMENTAL

- Monitoring of pollutants in filtration processes
- Quantification of painkillers in wastewater
- Direct observation of amalgamations

Quality

3 year instrument warranty
Conditions apply

Metrohm DropSens is a company certified in ISO 9001 and in ISO 13485 (for the 'manufacture of sensors for medical devices') Quality Management Systems

Further information

Please contact your Metrohm representative or Metrohm DropSens at sales.dropsens@metrohm.com

Metrohm DropSens,
Parque Tecnológico de Asturias C/ Faya 28
33428 Llanera (Asturias) Spain
www.metrohm-dropsens.com

www.metrohm.com

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