

BioLogic

Advanced

Local & Bulk Corrosion Studies

Electrochemical solutions for research and industry

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Your corrosion challenges. Our proven solutions.



Corrosion research spans from standardized testing to cutting-edge investigations. Each research area demands specialized instruments and techniques. Whether you're validating materials against industry standards or exploring novel corrosion mechanisms, we have the right solution for your specific application. Electrochemical studies of corrosion systems can be split into four general categories



Industrial standards

Corrosion standards offer established corrosion tests on specific materials and alloys. ASTM and JIS compliant procedures can be used to investigate uniform, galvanic, or localized corrosion. Our solution delivers the accuracy and stability needed for reproducible results across tests and operators.

Research advantages

- 6 ASTM and 1 JIS compliant techniques
- Materials screening under same conditions thanks to synchronizable channels and multi-electrodes configurations (CE to ground)
- High-quality accessories compliant with ASTM standards such as the Avesta cell

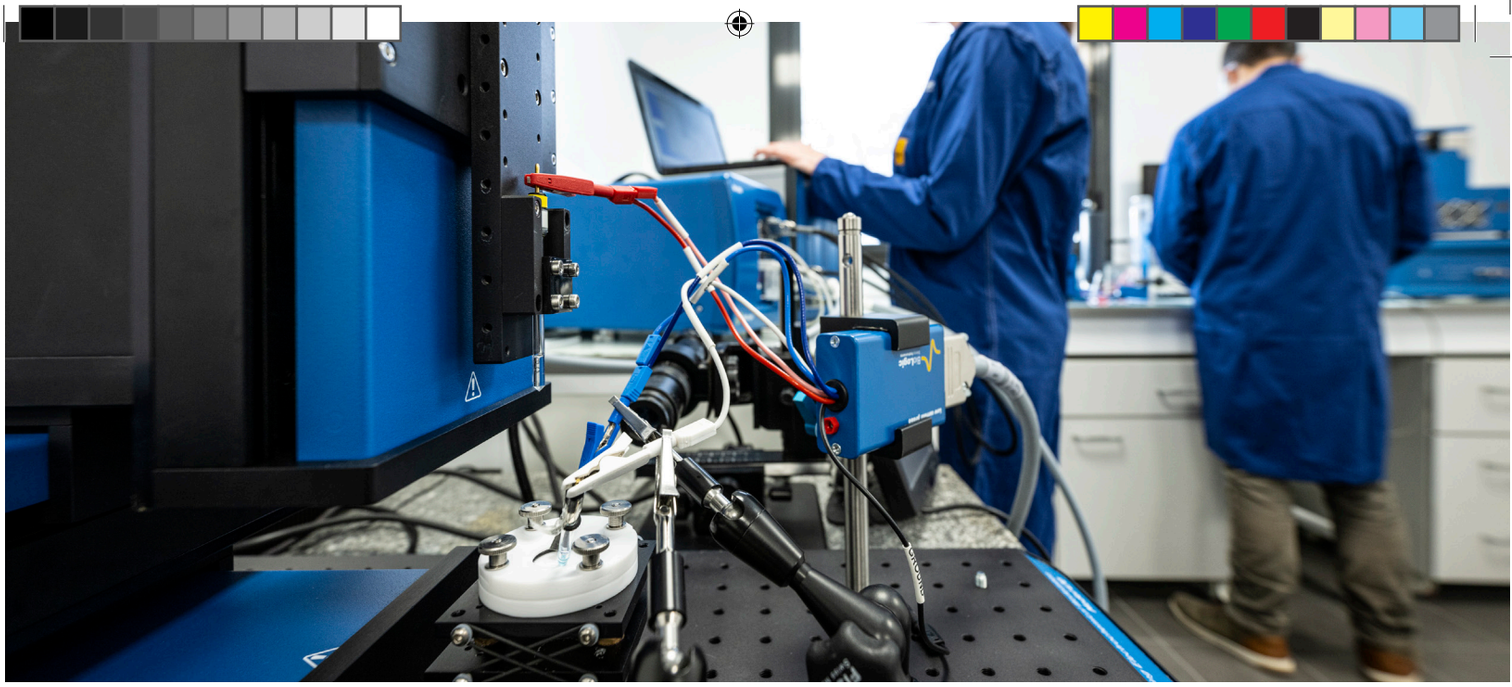
Kinetic/basic studies

Fundamental electrochemical characterization of a corrosion system is important to understand the processes involved. It includes the determination of kinetics parameters, such as corrosion potential, corrosion current, and Tafel parameters.

Research advantages

- Tafel plot and corrosion parameters determination with pre-set techniques and analysis
- Accurate and easy control of experimental conditions with BluRev RRDE/RDE, fully integrated to EC-Lab® software, and robust even in highly corrosive conditions
- Precise iR drop determination and compensation of potentiostatic and galvanostatic techniques using ZIR

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Advanced studies

Standard procedures can be inadequate for the study of a corrosion system, for example they can lead to surface destruction, take too long, or do not provide the information of interest. When this is the case advanced instruments and techniques should be considered. We offer reliable instruments with powerful EC-Lab software for cutting-edge corrosion research.

Research advantages

- Automated Rp tracking (over long period of time) with Corrosimetry technique
- Determination of corrosion parameters with less disturbance to the corrosion system than classical DC methods (such as LPR technique) thanks to CASP and VASP techniques
- High-quality EIS data for characterizing high impedance coating with ULC-z cable (not sensitive to experimental environment)

Local investigation

Corrosion is often a very localized process. Scanning probe electrochemistry offers truly local information to understand the processes occurring. Corrosion often starts at grain boundaries, inclusions, or surface defects. Probing these localized phenomena demands high spatial resolution and precise electrochemical measurements.

Research advantages

- Reveal how corrosion initiates and spreads at the local level thanks to high-resolution electrochemical measurements with M470
- High throughput screening of corrosion properties of novel materials
- Modular and customizable with local techniques including SVET, LEIS, and SKP

Our Premium Potentiostats

BioLogic's Premium Potentiostats are built for corrosion research, offering the sensitivity, stability, and flexibility needed to characterize even the most challenging processes.

Key advantages

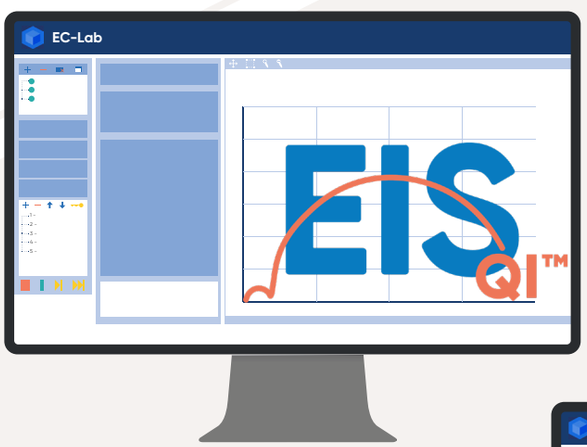
- Ultra-low current detection: down to ±10 nA (±100 fA with ULC cable)
- Analog filtering for reliable measurements in noisy environments
- Floating mode for safe use with grounded cells
- Wide potential range and excellent stability for diverse applications
- Fast response times to capture transient corrosion events

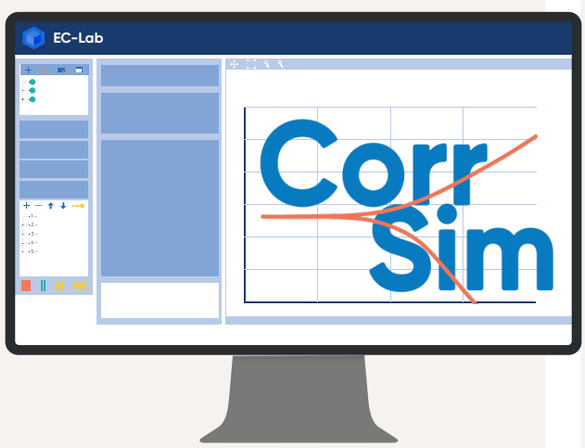


Corrosion Solutions: A fit for every need

From ASTM-compliant corrosion tests to advanced EIS investigations, BioLogic offers a complete corrosion research platform. Our modular instruments adapt to your needs, from high-precision measurements with the ULC-z cable to dynamic studies using BluRev™. For local corrosion analysis, the M470 provides detailed mapping of surface reactivity for a true micro-scale understanding of corrosion mechanisms.







EC-Lab®

Control & Analysis Software

- Corrosion-dedicated techniques
- Advanced data analysis & insights

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Single Channel

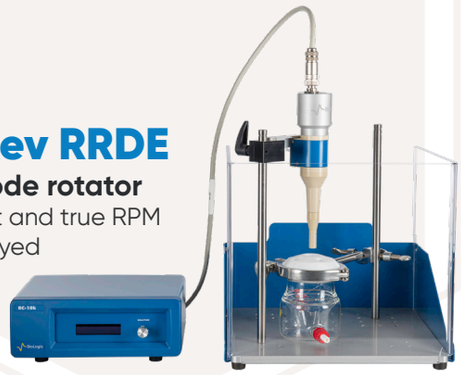
Premium Potentiostat

- Down to ±100 pA
- EIS up to 11 MHz

BluRev RRDE

Electrode rotator

- Target and true RPM displayed





Multi Channel

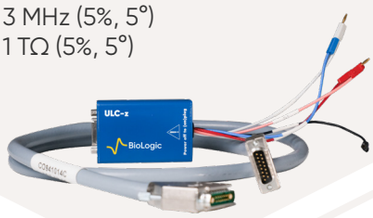
Premium Potentiostat

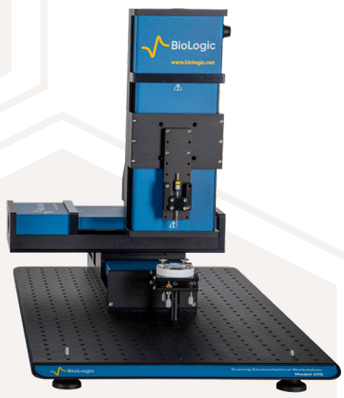
- Up to 16 channels
- Down to ±100 pA
- EIS up to 11 MHz

ULC-z Cable

Ultra Low Current

- Down to ±100 fA
- Up to 3 MHz (5%, 5°)
- Up to 1 TΩ (5%, 5°)





M470

Scanning electrochemical workstation

- Customize with LEIS, SKP, SVET & more.
- Differentiate local corrosion effects
- 110 mm range on all axis



Avesta Cell



Corrosion Cells

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Proven Accuracy, Trusted Results

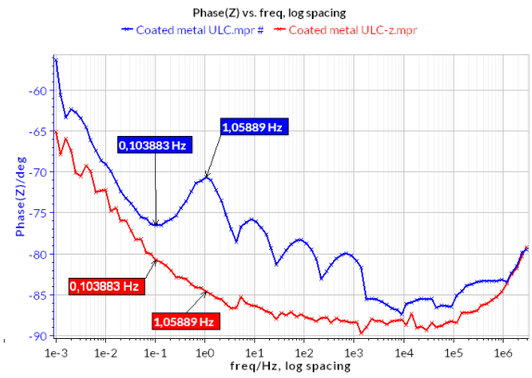
Insights in Action

For corrosion scientists, reliable data is essential. BioLogic solutions deliver more than precise specifications, they enable advanced techniques such as ultra-low current EIS, VASP for polarization resistance, and local electrochemical analysis with the M470 — helping researchers better understand and monitor corrosion phenomena.

High-Impedance EIS with ULC-z

Electrochemical Impedance Spectroscopy (EIS) is a cornerstone of corrosion research. With the ULC-z option, BioLogic potentiostats minimize parasitic impedance, ensuring accurate results even on high-impedance samples. This gives researchers the confidence to characterize coatings, films, and protective layers with precision.





Noise comparison: cable (blue) vs. ULC-z (red)

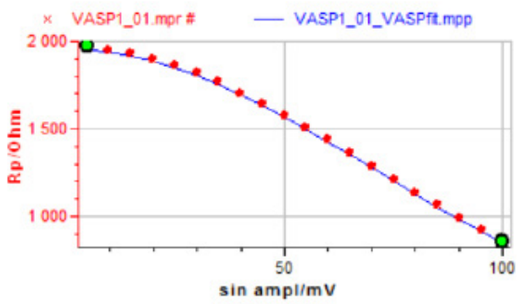






Innovative VASP Technique

BioLogic's integrated **Voltage Amplitude Step Perturbation (VASP)** method provides a new way to determine polarization resistance (Rp) without lengthy experiments. In corrosion monitoring, this means faster, more reliable insight into degradation processes, helping researchers study real-time changes in protective coatings or alloys.

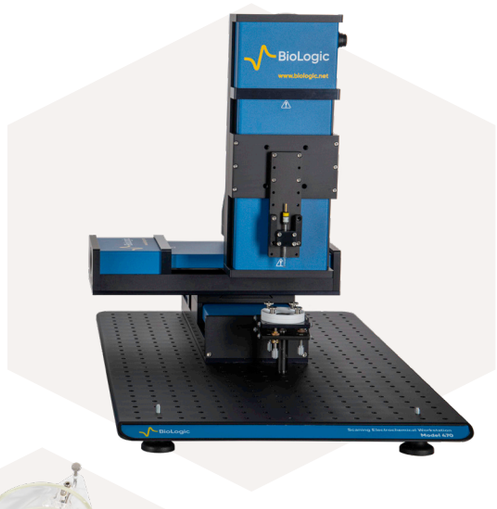


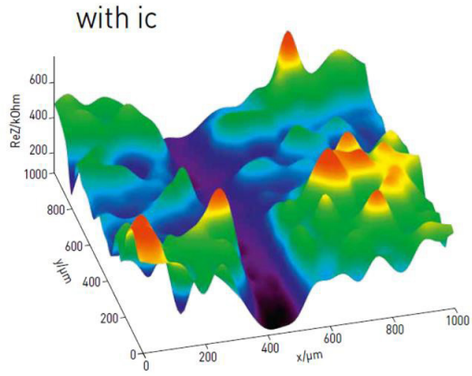
VASP Plot with fitting curve

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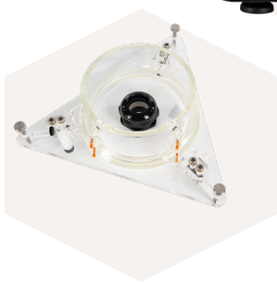
Local Techniques with the M470

Corrosion often starts locally, at microstructural or interfacial defects. The M470 scanning electrochemical workstation enables high-resolution local electrochemical analysis. For example, intermittent contact-SECM can be used to study metal surfaces, revealing heterogeneities and local corrosion initiation sites with unparalleled clarity.





ic-SECM scan

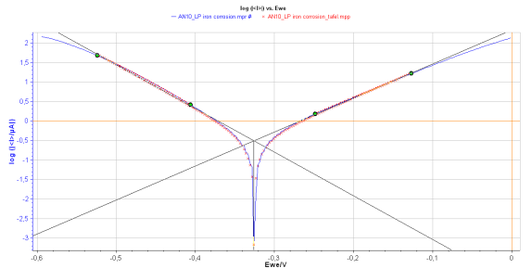




Determining Corrosion Rates

Accurately quantifying corrosion rates with Tafel plots is essential for assessing material durability. BioLogic potentiostats and the ULC option ensure reliable Tafel data, delivering resolution down to 100 fA and ultra-stable measurements for deeper insights into material behavior under real-world conditions.





Tafel Plot

How to make reliable EIS measurements with EIS QI™

Three quality indicators **(THD, NSD, & NSR)** are available in EC-Lab® to ensure the reliability of EIS measurements.

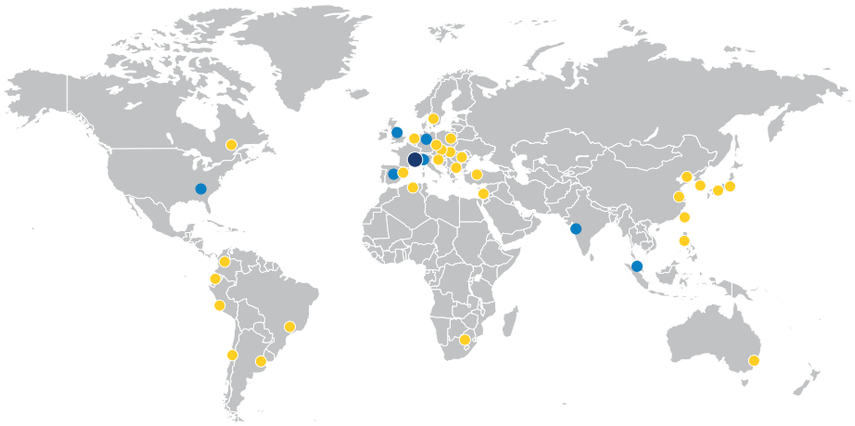
Non-Stationary Distortion (NSD)

NSD indicates whether the system's response is stable over time. If the system evolves or drifts during the experiment, the measured impedance can be distorted.

NSD quantifies time-dependent deviations, helping identify when measurements don't show true, steady-state behavior. NSD is expressed as a percentage, where lower values indicate more reliable, stationary measurements. In EC-Lab®, NSD is calculated over the duration of the measurement to ensure the integrity of the EIS data.

EIS QI™

We serve our customers worldwide through our subsidiaries offices and our extensive distribution network.



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Always by your side. Wherever you are.

We here at BioLogic pride ourselves on the quality and robustness of our instruments. However if you, for whatever reason, encounter a problem with your instrument, our global support network will help find you a solution quickly and effectively.

If you need more information, or perhaps a little inspiration, you can browse our ever-growing support database with hundreds of Learning Center articles, application/technical notes and support videos at www.biologic.net.

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Shaping the future. Together.