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# SENAI INNOVATION INSTITUTE OF ELECTROCHEMISTRY

By transforming chemical energy into electrical energy, the processes studied and carried out by this field of science have brought us incalculable gains. Found in products that range from utensils that have revolutionized our everyday life, such as mobile phones, up to innovations that have saved millions of lives, such as the pacemaker, the electrochemistry is always around us.

Aware of this importance, Senai launched the first Institute of Innovation in Electrochemistry in Brazil, with laboratories and a highly qualified staff. With the support of the Fraunhofer Institute (Germany), it conducts research applied to the industry, developing innovative products and processes, which result in competitiveness and sustainability increase for various industrial sectors.

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# ELECTROCHEMISTRY

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## RESEARCH LINES

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Support is given to R&D&I projects and industries receive the results in detailed reports in the following lines:

- **Corrosion**
- **Biocorrosion**
- **Paints and coatings**
- **Electrochemical sensors**
- **Batteries**
- **New materials**
- **Nanotechnology applied to electrochemistry**



## APPLIED RESEARCH AND TECHNOLOGICAL INNOVATION

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- **Corrosion solutions, such as smart paints and anti-corrosion coatings**
- **New products for the treatment and inhibition of corrosion**
- **Surfaces with new functionalities**
- **Electrochemical sensors for industrial process control, diagnostic methods, health and environmental monitoring.**





## PAINTS

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When it comes to the most traditional areas of the industry, to gain prominence through innovation is fundamental. Therefore, the proposed projects for the industries involve:

- **New coatings for specific applications**
- **Smart paints (auto-regenerative paints, corrosion inhibitors, lubricants, antibacterial paints, self-cleaning paints, among others)**
- **Recycling of industrial paints**
- **Specific sectors (automotive, marine, furniture, construction, among others)**
- **Standardized tests for industrial paints**



## ELECTROCHEMICAL SENSORS

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- **Sensors and rapid diagnostic devices for human and animal health**
- **Industrial, analytical and environmental monitoring**
- **Miniaturization and portability of analytical systems at low costs**



## NEW MATERIALS

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Senai's Institute of Innovation in Electrochemistry also participates in the development of new materials, including:

- **Nanostructured materials (ceramics, composites and metal alloys, etc.) of high performance in the presence of abrasive materials and of high mechanical strength, suitable for use in extremely harsh industrial environments**
- **Powder Metallurgy and Metallurgy of the SPS (Spark Plasma Sintering) technique**
- **Biomaterials, metallic alloys and composites with high mechanical strength and high resistance to corrosion**



## NANOTECHNOLOGY

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In an increasingly competitive industrial branch, the solutions of Senai's Institute are developed in projects to be implemented by the enterprise, including:

- **Application of nanotechnology for the development of new types of paints, ceramics, mortar, cosmetics, lubricants, metal alloys, composites and biomaterials, among others**



## ELECTROCHEMICAL PROCESSES

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Monitoring of industrial processes with simulations in pilot projects for:

- **Waste electrochemical treatment**
- **Electrowinning**
- **Electrorefining**
- **Electro-bioleaching**
- **Precipitation, separation, oxidation**
- **Electro-flocculation**



## BATTERIES

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In order for the enterprise to apply and innovate in this area, Senai's Institute of Innovation in Electrochemistry develops projects that encompass:

- **Metal-air**
- **Lithium-ion**
- **Fuel cells**
- **Advanced lead-acid**
- **Development of new types of materials (anodes, cathodes, electrolytes and separators)**
- **Recycling of batteries and components**

### FOR FURTHER INFORMATION, CONTACT:

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