INSTITUTO DO PETRÓLEO E DOS RECURSOS NATURAIS

CATALOGUE OF SPECIALIZED SERVICES

LAB TESTS AND TECHNICAL AREAS FOR RESEARCH, SERVICES, TRAINING AND SPECIALIZED CONSULTANCY

THE INSTITUTE

- CREATED IN 2014
- EXTENSION OF THE CENTER OF EXCELLENCE IN RESEARCH AND INNOVATION IN PETROLEUM, MINERAL RESOURCES AND CARBON STORAGE (CEPAC), CREATED IN 2007.
- INFRASTRUCTURE: 5000 M² OF AREA CONSTRUCTED IN THE SCIENCE AND TECHNOLOGY PARK (TECNOPUC).
- COMPOSED OF FOUR FLOORS OF LABORATORIES OF HIGH COMPLEXITY AND THREE FLOORS OF RESEARCHERS OFFICES AND ADMINISTRATIVE INFRASTRUCTURE.
- MULTIDISCIPLINARY TEAM COMPOSED OF PROFESSORS, RESEARCHERS, LABORATORY ASSISTANTS, ADMINISTRATIVE PROFESSIONALS AND PUCRS UNDERGRADUATE/GRADUATE STUDENTS.

AREAS OF EXPERTISE

- **PETROLEUM AND DERIVATIVES;**
- **NATURAL RESOURCES;**
- **ENERGY AND THE ENVIRONMENT.**

MISSION

TO PROMOTE AND TO PROVIDE SUSTAINABLE GROWTH OF RESEARCH ACTIONS, DEVELOPMENT, INNOVATION AND SERVICES IN THE AREA OF PETROLEUM AND NATURAL RESOURCES;
TO COLLABORATE WITH THE UNIVERSITY IN RESEARCH ACTIONS
TO OPERATE IN THE MARKET WITH EXCELLENCE AND QUALIFICATION IN SERVICES AND RESEARCH PROJECTS.

VISION

IPR WILL BE ONE OF THE MOST IMPORTANT INTERNATIONAL REFERENCE INSTITUTES IN RESEARCH, DEVELOPMENT AND INNOVATION (RD&I), TECHNICAL QUALITY IN LABORATORY ANALYSES, AND PRODUCTION OF CERTIFIED REFERENCE MATERIALS IN THE AREA OF PETROLEUM AND DERIVATIVES, NATURAL RESOURCES, ENERGY, AND THE ENVIRONMENT BY 2026, ENSURING THE SUSTAINABILITY OF ITS ACTIVITIES.

VALUES

EXCELLENCE AND SUSTAINABILITY:

- PEOPLE (ETHICS, COMMITMENT, RESPECT, FAIRNESS, HOSPITALITY)
- INNOVATION (CREATIVITY, DISRUPTIVENESS)
- QUALITY (PROFESSIONALISM, CONTINUOUS IMPROVEMENT, REFERENCE)

LABORATORIES

ENVIRONMENTAL MONITORING LABORATORY (LMA)

ENVIRONMENTAL MONITORING LABORATORY (LMA)

ABOUT THE LABORATORY

LMA performs research and sampling services for water and soil, field measurements of physicochemical parameters, geophysical surveys and microbiological analyses for environmental, hydrogeological, geotechnical and geobiological studies.

AVAILABLE EQUIPMENT AND OFFERED SERVICES:

• Bladder and peristaltic pumps: low flow groundwater sampling, up to 30 meters.
• MP20 flow cell with multiparameter probe: measurement of temperature, pH, redox potential, electrical conductivity and dissolved oxygen in the field.*
• AP 900 multiparameter probe: measurement of temperature, pH, redox potential, electrical conductivity, dissolved oxygen, turbidity, TDS and salinity in wells and surface waters. *
• Water/oil interface meter: measurements of groundwater level and free phase thickness, up to 30 m depth.
• Deep water level meter: groundwater level measurements up to 900 m deep.
• Leveloggers: automatic water level meters and groundwater temperature variations in wells.
• Automatic Slug/Bail Test: hydraulic conductivity tests in wells.
• Guelph Permeameter: soil infiltration/permeability tests.
• Hand auger: soil sampling.
• 8-channel SuperSting™ automatic and manual Xtal Control X5 resistivity meters: definition of underground electrical properties.
• Differential GPS (DGPS): highly accurate coordinate acquisition for topography and georeferencing.
• Magnetotelluric ADU-07e: naturally induced electromagnetic data survey, used in regional surveys to identify the resistivity variations of rocks in the subsurface.*
• RAS 24 seismograph: refraction seismic surveys, MASW to identify underground wave propagation properties.*
• Soil CO_2 Flux chambers: CO_2 flux measurements from soil to atmosphere, soil moisture and temperature measurements.
• Canisters: gas sampling and storage, steam and atmospheric air.
• Ion Torrent: next-generation sequencing (16S or 18S)*
• UV Transluminator - DNA/RNA visualization on gels stained with fluorescent dyes.
• Thermocycler – amplify segments of DNA via the polymerase chain reaction (PCR).
• Bioruptor (sonicator) – used for fragmentation of cells, DNA and tissues, with a cooling system ensuring temperature control.
• Qubit – DNA, RNA and protein quantification by fluorescence.
• Ultrafreezer – storage of biological samples at -80°C for cryopreservation.

***Tests in development/implementation stage**

GEOCHEMISTRY AND PETROPHYSICS LABORATORY (LGP)

GEOCHEMISTRY AND PETROPHYSICS LABORATORY (LGP)

ABOUT THE LABORATORY

LGP develops experimental and numerical models of geochemical processes aiming for characterization, formation and alterations of oil and gas reservoirs resulting from injection and production of fluids, as well as special core analyses, for research projects and service purposes.

TESTS AND STUDIES CONDUCTED AT LGP:

• High pressure and temperature tests/reactions with materials such as rocks, cement, polymers and ceramics;
• Multiphase coreflooding experiments/tests;
• Petrophysical analyses (absolute porosity/permeability, relative permeability, capillary pressure);*
• Chemical equilibrium, dissolution/precipitation kinetics and reactive transport numerical modeling.

AVAILABLE EQUIPMENT:

• Pressure vessels for batch experiments with temperature and pressure control, sampling and in situ pH measurement;
• Automated corefooding system for separate CO_2 and aqueous solutions injection;
• Ultra-centrifugue for oil/water imbibition and drainage processes (URC-628);
·• Automated relative permeability system for oil/water/gas (RPS700);
• Saturation and cleaning system for core samples;
• Workstations and software for numerical modeling.

***Tests in development/implementation stage**

CHEMICAL ANALYSES LABORATORY (LAQ)

CHEMICAL ANALYSES LABORATORY (LAQ)

ABOUT THE LABORATORY

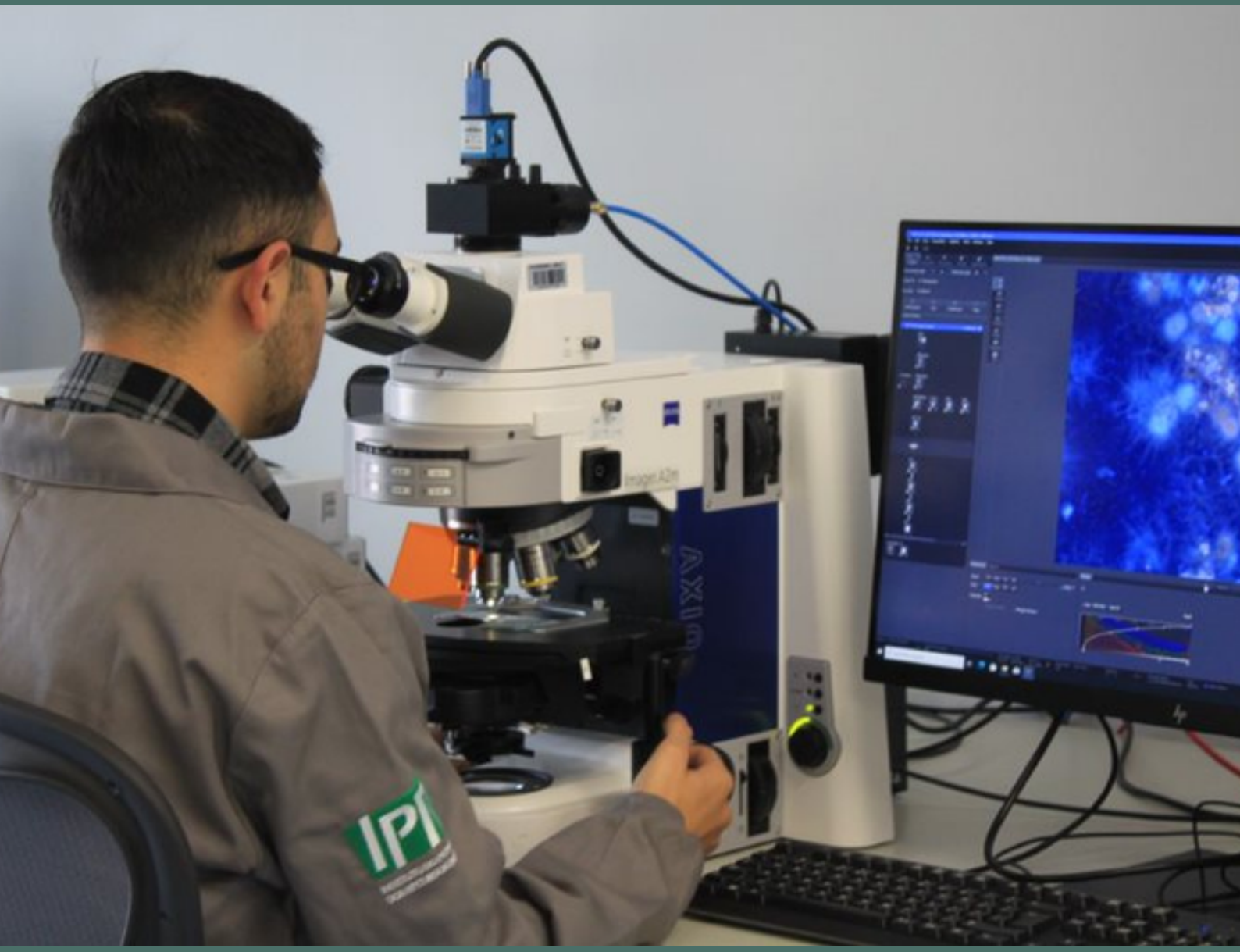
LAQ develops analytical methods for researches and technical services. The laboratory is equipped with modern devices that can achieve accurate results and support innovation.

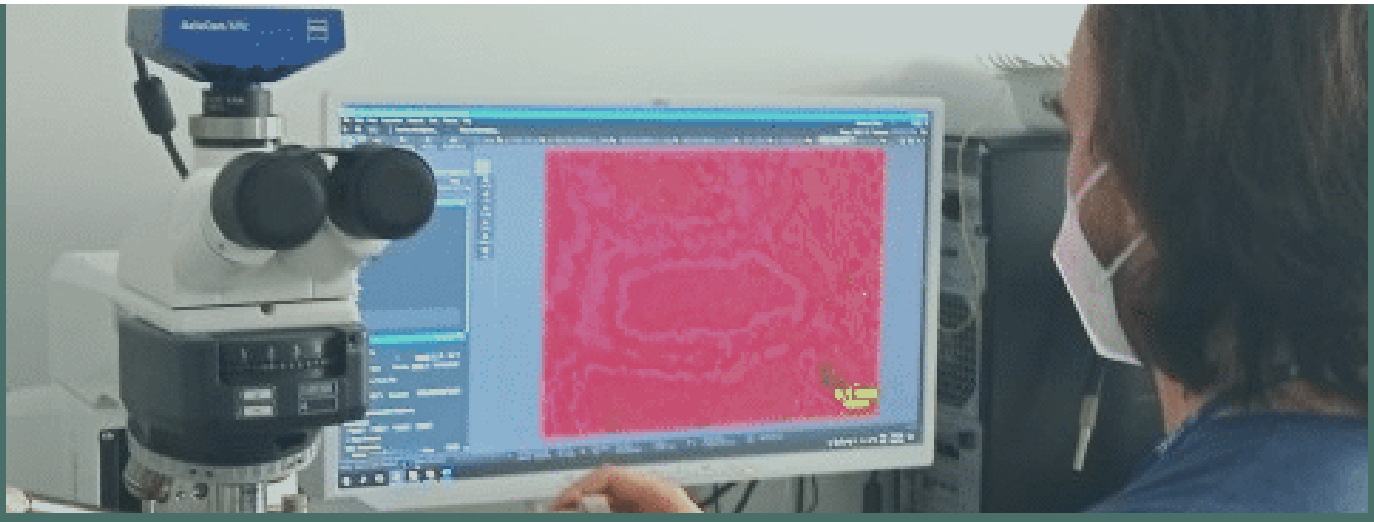
EQUIPMENTS:

- Elemental Analyzer (S in soil, ore and organic material)
- TruSpec CHN Elemental Analyzer (C, N and H in soil, ore and organic material)
- Gas chromatograph FID/TCD/FPD detectors and methanator (atmospheric gas and hydrocarbonates in gas)
- Gas chromatograph with ECD/FID detectors and methanator (determination of organic compounds)
- Gas chromatography-mass spectrometer (GC-MS) (determination of organic compounds)
- Isotope Ratio Mass Spectrometry (IRMS) detector (stable isotopes H, C and O)
- Physical-chemical analyses (pH, conductivity, turbidity and color)
- Ion Chromatograph (anions in aqueous matrices)
- Magnetic Suspension Scale (PTGA)*
- UV-visible spectrophotometer (organic and inorganic compounds by complexation in aqueous matrices)
- Fourier Transform Infra-Red Spectrophotometer (organic compounds)
- Inductively Coupled Plasma Optical Emission Spectrometer (ICP-OES) (metal alloys, soil, aqueous matrices and ore)
- Pilot plant for gas hydrate synthesis and hydrate formation inhibitors test*

***Tests in development/implementation stage**

ROCK CHARACTERIZATION LABORATORY (LCR)





ROCK CHARACTERIZATION LABORATORY (LCR)

ABOUT THE LABORATORY

LCR develops research and technical services for universities, industry and general purposes. LCR's technical conditions can provide a wide range of analysis for soil, cement, polymers, fossils, and rocks samples.

EQUIPMENT AND ANALYSES:

- X-ray microtomography (µCT) – Including biological (smaller specimens) and dental samples
- X-ray diffractogram (XRD)
- Rietveld quantification method (for XRD analysis)
- X-ray fluorescence (XRF)
- Cold Cathodoluminescence (optical-CL)*
- Epifluorescence microscopy
- UV-VIS Microscope spectrophotometer with epifluorescence module for vitrinite reflectance measurement (%Ro)*
- Thin section preparation
- Qualitative and quantitative petrographic analysis
- Micrograph documentation
- Core description and sampling

***Tests in development/implementation stage**

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