



## CHARACTERIZATION LABORATORY

CLEAN ENERGY TECHNOLOGIES



*The Characterization Laboratory (CL) specializes in the analysis of process-derived chemicals, fuels, biofuels and biomass products, fuel-related products and by-products in the solid, liquid or gaseous states. Registered to ISO 9001:2000, the Laboratory conducts physical, chemical, elemental, spectroscopic, chromatographic and molecular characterization and data interpretation. It also provides analytical services directly to clients, often adapting specialized techniques to suit special circumstances.*

The Characterization Laboratory analyzes samples from bench and pilot-scale research, supporting the CANMET Energy Technology Centre-Ottawa's (CETC-Ottawa's) technology programs. Its capabilities include a broad range of spectrometric, chromatographic and classical analytical techniques, the use of which is supported by a comprehensive quality assurance program. The delivery of analytical services in support of CETC-Ottawa programs include conducting American Society for Testing and Materials (ASTM), Canadian General Standards Board (CGSB), International Organization for Standardization (ISO) and other standardized test procedures.

The Laboratory is also involved in research and development supporting the Natural Resources Canada (NRCAN) sustainable development goals, including particulate matter research to supply source emission profiles for apportionment of particles due to transportation sources in ambient air.



X-ray Fluorescence

Our team is comprised of Research Scientists, Chemists, and Chemical Technologists with extensive experience in the analysis of fuel related samples. This experience is applied in the team's ability to modify known methods and to develop new ones to meet a particular analytical need. Members of the Characterization Laboratory participate in setting national and international standards for fuels and analytical procedures. They are also actively involved in NIST/EPA PM2.5 Working Group for organic speciation and Air Quality projects with Environment Canada.

The laboratory is equipped with modern analytical instrumentation for performing routine analytical test methods. By acquiring state-of-the-art laboratory equipment, such as an analyzer capable of analyzing ultra-low level sulphur fuels (ppb levels), the analytical capabilities are kept current with industry standards. Other instrumentation includes:

- Thermogravimetric Analysis coupled with Fourier Transform Infrared Spectroscopy (TGA-FTIR);
- X-ray diffractometer (XRD) and X-ray fluorescence spectrometer (XRF);
- Gas chromatographs (GC) fitted with various detection systems including flame ionization (FID), Flame photometric (FPD), Nitrogen-phosphorous (NPD) and medium resolution mass selective detectors (MSD);
- Scanning Electron Microscope/Energy Dispersive X-ray Spectrometer (SEM/EDS) for imaging and elemental/chemical analysis and mapping; and
- GC/MSD fitted with a thermal desorption unit (TDU) for analysis of semivolatiles on filters and volatile organics trapped in sorbents.

The lab's GC-FID system is configured with a complete simulated distillation package. The laboratory's high resolution gas chromatography mass spectrometer (HRGCMS) is capable of obtaining accurate mass to charge ratio of molecular fragments and permits the quantification of trace dioxins, furans, polyaromatic hydrocarbons, and polychlorinated biphenyls found as environmental contaminants and detecting trace biomarkers in air particulate matter.


With active involvement in standards development and research into novel analytical techniques and methodologies, the Characterization Laboratory strives to meet the unique needs of the energy technology R&D programs.




*A gas chromatograph equipped with a high-resolution mass spectrometer (HRGC/MS)*

### **Your Invitation to Work with Us**


We are interested in collaborating with you. Please contact the Business Office to discuss your particular needs.

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### **For Further Information Please Contact:**

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