

# Characterization Laboratory

## Analytical Methods

**T**he Characterization Laboratory fields an arsenal of modern chemical and micro-structural techniques. Its staff often develop novel analytical approaches in cases where standard laboratory procedures cannot be applied. The laboratory collaborates principally with the Canadian oil and gas sector, the coal industry and power generating utilities.



*X-Ray Fluorescence Analysis*

## **New Analytical Methodologies for the Canadian Energy Industry**

### **CETC's Characterization Laboratory analyzes:**

- crude oils, petroleum distillates and associated wastes and residues;
- environmental catalysts and additives;
- thermal and metallurgical coals, fly ashes and other deposits and residues;
- semivolatiles in ambient air and point source emissions (diesel and gasoline engines);
- biomass, wood pellets, chunk wood and their wastes and residues; and
- sludges and other wastes.

## **Analytical Development and Standardization**

Private sector clients benefit from our analytical-related activities and support internal programs and the private sector by:

- evaluating and developing novel analytical methods and instrumental technologies to identify physico-chemical properties that influence fuel processability and product quality;
- participating in the creation and maintenance of fuel standards and analytical procedures; and
- applying standard characterization procedures to assess the quality of fuels.

In cooperation with industry, the Characterization Laboratory uses modern techniques to identify important properties of hydrocarbons, catalysts and related materials.

*The Characterization Laboratory plays a leading role in setting national and international standards for fuels and analytical procedures through ASTM, ISO and CGSB.*

Our team is comprised of experienced scientists and technologists who received specialized training. They also can provide non-routine analysis adapted to your requirements.



*CHN Analyzer - Auto Sampler*

### **Analytical Facilities**

The Characterization Laboratory specializes in the analysis of process-derived chemicals, fuels, fuel-related products and by-products in either solid, liquid or gaseous state. The laboratory provides clients with physical, chemical, elemental, spectroscopic, chromatographic and molecular characterization data and their interpretation, range of options for potential applications, and if necessary, modification strategies to meet particular product specifications.

#### ***Clients use the Characterization Laboratory's capabilities for:***

- identifying environmental pollutants;
- characterizing unwanted residues from petrochemical processes;

- developing novel methods for measuring NO<sub>x</sub> in catalyst performance evaluation;
- documenting product quality;
- verifying laboratory competency in standard procedures;
- investigation of accidents involving hydrocarbons and related chemicals; and
- conducting American Society for Testing and Materials (ASTM), Canadian General Standards Board (CGSB) and other standardized test procedures.

The Characterization Laboratory also specializes in chromatographic preparations and characterization capabilities that meet and exceed environmental regulations and target levels. The laboratory can provide:

- sampling, handling and sample preparation for analysis of environmental related samples in hazardous containment room;
- accepted sample preparation protocols and test methods endorsed by the Environmental Protection Agency (EPA), CGSB, ASTM and the International Organization for Standardization (ISO);

- research services to modify known methods and protocols or to develop new ones to meet a particular analytical need;
- X-ray diffraction and fluorescence, infrared spectroscopy with or without thermogravimetric analysis;
- gas and ionic chromatographic techniques with specific detection modes; and
- high and medium resolution mass spectrometry coupled to gas chromatography.

#### ***The Characterization Laboratory has external service agreements for complementary analytical techniques such as:***

- Neutron activation analysis;
- Proton induced X-ray emission;
- Transmission electron microscopy;
- Secondary ion mass spectrometry;
- Atomic absorption spectrometry;
- Graphite furnace atomic absorption spectrometry;
- Inductively-coupled plasma emission;
- X-ray photoelectron spectroscopy;
- Small-spot X-ray photoelectron spectroscopy; and
- Scanning Auger microscopy.

### ***For further information, please contact:***

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