

# CENTRE FOR TRACE ELEMENT ANALYSIS

## Earth & Planetary Sciences

McGill University

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The Centre for Trace Element Analysis (*Geochemical Laboratories*) includes state-of-the-art automated high-volume analytical instrumentation. Staffed by resourceful and versatile Inorganic Chemists, the Centre has the capability of analyzing most major and trace elements in complex silicates and most other materials, as well as aqueous solutions, down to ppt concentration levels. Expert training in the use of analytical instruments is also available.

### Instrumentation and Capabilities

#### **Perkin Elmer Elan 6100 DRCplus ICP-MS system**

with **CETAC ADX-500** Autodiluter system and **ASX-510** Auto Sampler

**Capability:** *Analysis of most elements in the Periodic Table in solution down to ppt levels*

#### **Merchantek LUV 213nm Laser Ablation System**

**Capability:** *Analysis of solid samples for most of the elements in the Periodic Table down to ppb levels. The laser ablation system enables ICP/MS analysis of spot sizes down to 10 micrometers*

**Perkin Elmer AAnalyst 800** atomic absorption spectrometer with longitudinal Zeeman graphite furnace, and **AS-800** autosampler with **USS-800** Slurry sampler, **FIAS-400** flow injection system and **FIAS-THGA** coupling, **AS-90** autosampler

**Capability:** *Rapid elemental analysis of microliter liquid samples and slurries down to ppb levels*

**Perkin Elmer AAnalyst 100** Flame atomic absorption spectrometer with **FIAS-400** and **AS-90** autosampler

**Capability:** *Rapid elemental analysis of liquid samples down to ppm levels*

**Perkin Elmer FIMS-400** Cold Vapour Mercury analysis system with Amalgam accessory and **AS-90** Autosampler

**Capability:** *Rapid analysis of liquid samples for Mercury down to ppt levels*

**Philips PW2440** 4kW X-ray fluorescence spectrometer system with microsampling capability and **PW2540** VRC 168 sample autochanger

**Capability:** *Solid sample analysis for elements from Carbon to Uranium in the Periodic Table down to ppm levels. Can be non-destructive. Suitable for archeological artifacts.*

**Rigaku D/MAX 2400** 12kW rotating anode diffractometer with autochanger

**Capability:** *Identification and Structural analysis of phases in powder samples. Semi-quantitative and quantitative phase analysis*

**Dionex DX-600** Gradient Ion Chromatograph with **AIM-1250** autosampler/fraction collector

**Capability:** *Rapid analysis of liquid samples for anions down to ppm levels*

**ELTRA CS-800** Carbon/Sulphur IR Analyzer

**Capability:** *Rapid analysis of solid samples for Carbon and Sulphur down to ppm levels*

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### Routine Analytical Services *Caveat Emptor*

#### **X-RAY FLUORESCENCE (Philips PW2440 Spectrometer) - silicate & carbonate rocks**

**Fusion method** - 10 major elements (Si, Ti, Al, Fe, Mn, Mg, Ca, Na, K, P),  
including Loss on Ignition and **Ba, Ce, Co, Cr, Cu, Ni, Sc, V, Zn**

*Fully corrected, high accuracy and precision*

**Basic trace element package** - pressed pellet - **Ga, Nb, Pb, Rb, Sr, Th, U, Y, Zr**

Detection limit 1ppm

*Fully corrected, high accuracy and precision*

**Additional elements** - e.g. **As, Bi, Br, Cl, Cd, F, Hf, Hg, I, La, Mo, S, Sb, Se, Sn, Ta, W**

**Semi-quantitative analysis**, *Carbon to Uranium*

Detection limit 100ppm

#### **X-RAY DIFFRACTION (12kW Rotating Anode RIGAKU D/Max 2400)**

Qualitative scans

Semi-quantitative and quantitative analysis

#### **GRADIENT ION CHROMATOGRAPHY (Dionex 4500i)**

Anions (fluorine, chlorine, bromine, phosphate, etc.)

#### **ATOMIC ABSORPTION (Perkin Elmer Aanalyst800, Aanalyst100 & FIMS-400)**

##### **Flame Analysis**

Fusion method with matrix and background correction - quantitative analysis

Acid digestion (Zn, Cu, Pb, etc.)

Method of Standard Additions also available

**Graphite furnace** with Zeeman background correction

Method of Standard Additions also available

**Hydride analysis** (Hg, As, Sb, Se, etc.) - detection limit 0.5 ppb

#### **ICP-MS (Perkin Elmer ELAN DRCplus)**

Rare Earth (Lanthanides) Element Package and other elements upon request.

Detection limits between 0.001ppb and 1.0ppb

#### **MISCELLANEOUS ANALYTICAL PROCEDURES**

Classical (wet) Analysis

Carbon dioxide - combustion

Sulphur (10ppm and higher) - combustion

Moisture - 105°C (H<sub>2</sub>O)

Loss on ignition (LOI) determination

Loss on ignition (LOI) determination in nitrogen atmosphere

Ferrous Iron/Ferric Iron (Total iron known) - titration

#### **CUSTOMIZED TRAINING IN ANALYTICAL INSTRUMENT USE available**