CANMET
MINING AND
MINERAL
SCIENCES
LABORATORIES

APPLIED MINERALOGY

THE CHALLENGE

Solving processing and environmental problems, or avoiding them in the first place, often requires an understanding of materials at a microscopic level. As a result, industry has a continual need for mineralogical characterization of ores, concentrates, tailings, process products and process residues, sludges and effluents. The challenge for industry is to increase recoveries and raise productivity, while maintaining environmental compliance.

NRCAN CAN HELP

CANMET-MMSL's specialists in applied mineralogy are at the forefront of technology development in mineral characterization and quantitative mineralogy. We work with industry to improve process efficiencies, to minimize mineral losses, and ensure stability of minerals and metals in industrial waste. Our team has access to a complete array of modern mineralogical instrumentation and extensive chemical facilities. We use state-of-the-art techniques to assist our clients, whether during mine development, mineral processing, extractive metallurgy, or to ensure environmental compliance.

OUR EXPERTISE

CANMET-MMSL has developed a range of expertise through R&D activities:

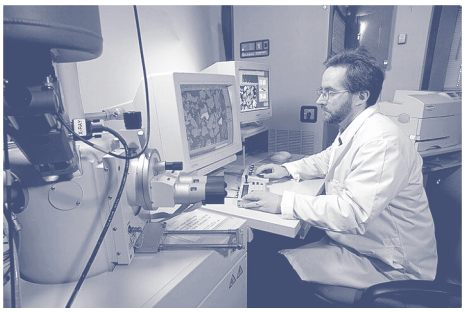
- **Image analysis**
  - Mineral associations and liberation parameters
  - Mineral balances
  - Prediction of optimal grade-recovery
- **Identification and quantification of mineral species**
  - Mineralogical balances for precious and trace elements
  - Quantification of recoverable versus non-recoverable gold
  - Mineralogical balances for contaminants
  - Speciation and distribution of heavy metals
  - Distribution of acid-generating and neutralizing minerals
  - Diamond and kimberlite indicator minerals
- **Characterization of metallurgical circuits**
  - Source identification of dusts
  - Mine tailings and waste rock
  - Slags, leach residues and sludges
  - Assessment of mill performance
- **Trace element detection and characterization**
  - Electron microprobe
  - Secondary ion mass spectrometry (SIMS)
  - Synchrotron light source analysis
  - Surface analysis by X-ray Photon Spectroscopy (XPS)

SUCCESSFUL PARTNERSHIPS

Projects with industrial clients range from recovery predictions to solving operational problems. Mineralogical characterization can be advantageous from the early stages of exploration through mine development, process optimization, environmental assessment and monitoring, and recycling. CANMET-MMSL:

- Characterized the indicator minerals for diamonds, assisting diamond exploration in the Canadian north
- Identified significant iron quantities in iron ore tailings, and then undertook laboratory tests that showed recovery could be increased by changing operating conditions
- Characterized the mineralogy of gold in an ore, enabling the operator to improve gold recovery
- Characterized platinum group mineralogy for various major world deposits and are considered to be experts in Platinum Group Metals
- Identified and recommended circuit changes in a copper-zinc operation, to address separation difficulties
- Assessed the performance of a lead-zinc mill, to address low recovery
- Determined mineral liberation parameters for companies world-wide, using our expertise in image analysis

Programming a variable pressure scanning electron microscope interfaced to an energy dispersive spectrometer for automated elemental analysis of mineral grains



Programming an automated sample preparation machine to produce polished sections of mineral grains

CONTACT US

CANMET-MMSL's goal is to help find sound, science-based solutions to operational challenges.

Please contact us at:

CANMET Mining and Mineral Sciences Laboratories
555 Booth Street, Ottawa, Ontario K1A 0G1

Tel.: (613) 992-7392
Fax: (613) 947-0983
Email: canmet-mmsl@nrcan.gc.ca

For more information visit our web site at: **www.nrcan.gc.ca/canmet-mmsl**

ISO 9002 Registered