

Over the past five years, a decrease in the global supply of tungsten has resulted in a significant increase in the value of tungsten concentrates and tungsten intermediates, such as sodium tungstate (ST) and ammonium paratungstate (APT) used for the production of tungsten chemicals and tungsten carbide. The unique properties of tungsten, including its hardness, high melting point and excellent conductivity, help to support continued growth of tungsten markets over the next five years for the production of drill bits, cutting tools, electronics and specialty alloys.

In addition to end-user concerns related to security of supply, North American and European consumers are focused on ensuring consistent high quality of purchased tungsten concentrates and intermediates, which is critical to the production of high-performance tungsten carbides, alloys and specialty compounds. Processing challenges for primary production of high-value tungsten concentrate, ST or APT, from scheelite and wolframite resources include:

- Control of crushing and grinding circuit parameters to minimize sliming of tungsten and generate an optimal particle size distribution that will maximize recovery in primary beneficiation circuits;
- Selection and design of primary beneficiation circuits to achieve economic grade-recovery targets relative to variations in mineralization type, tungsten liberation characteristics and rejection of impurities, and;
- Development of cost-effective process technologies capable of selectively rejecting impurities such as tin, molybdenum, arsenic, iron, calcium, phosphorus, and radioactive elements to consistently produce a high-quality tungsten product that meets market demands.

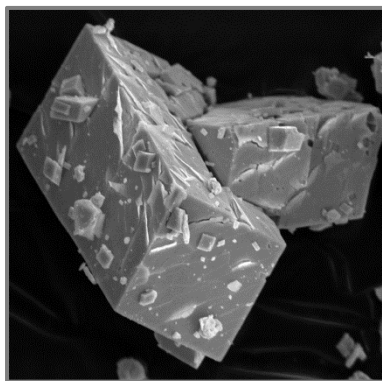


Figure 1: SEM Image of APT Crystals Produced by Thibault & Associates Inc.

Thibault & Associates Inc. provides our clients with innovative processing solutions to meet the grade and recovery challenges faced by tungsten producers by:

- ☑ Focussing on grinding circuit equipment selection and design to maximize tungsten recovery in downstream unit operations, which could include:
 - Integration of particle size classification and gravity separation equipment within mill recycle streams.
 - Multi-stage grinding and advanced process control to meet precise particle size distribution targets and minimize sliming of tungsten (generation of particles < 20 micron).
- ☑ Developing customized primary beneficiation flowsheets based on site-specific ore characteristics to optimize on grade-recovery relationships and profitability through:
 - Integration of high gradient magnetic separation (HGMS) technology for upgrading of wolframite based on optimized equipment design and operating parameters.
 - Development of highly selective reagent schemes and process operating conditions for flotation of wolframite and scheelite ore types. .

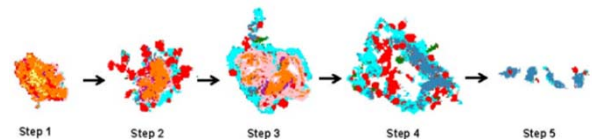


Figure 2: "Shrinking Core Model" for Leaching of Scheelite Developed by Thibault & Associates Inc. using QEMSCAN® Technology

- ☑ Utilizing industrially-proven hydrometallurgical process technologies for production of added-value ST and APT products from scheelite or wolframite concentrate based on selective leaching, solution purification, solvent extraction, product crystallization and recycling of mother liquor to maintain the circuit water balance; and,
- ☑ Completing process development in association with a fully-integrated Dynamic Economic Model (DEM) that simulates the process chemistry and evaluates the economic viability of added-value processing to ST or APT relative to low-grade concentrate production.

Your Vision - Our Innovation™

For over 28 years, **Thibault & Associates Inc.** has applied process technology innovations to comply with our client's project development strategies, transforming natural resources to high value concentrates, ultra-pure metals, speciality chemicals, transportation fuels or power generation.

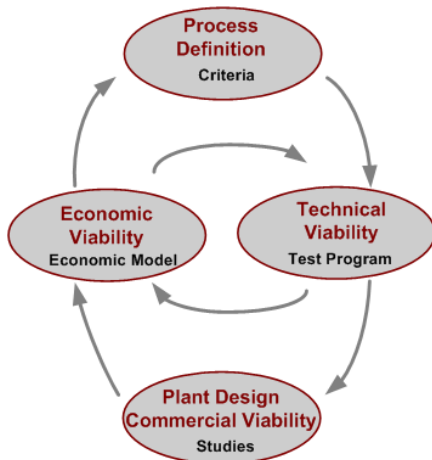
Services

Our firm defines process technology based on the project's earning potential and compliance with product market specifications, environmental protocol and social factors.

We tailor develop process systems to support our client's business plans and our test programs are managed to quantify technical – process design parameters.

As an integral part of process development, we prepare economic models to assess the impact of technical parameters on the project's earning potential.

Our integrated technical and economic studies are based on fully defined process chemistry, equipment selection and plant layout for life of project, heavy industrial process control measures, cost assessment standards, construction and operating practices.



- ✓ Feed characterization and development of process chemistry.
- ✓ Bench scale and pilot test programs.
- ✓ Process simulation and dynamic economic modelling.
- ✓ Independent NI 43-101 technical / economic assessments and feasibility studies.
- ✓ Detailed engineering / multi-discipline plant design, commissioning and aftercare programs.

Speciality

Our clients range from investment firms to heavy industrial producers of base metals, industrial minerals, speciality metals, inorganic chemicals, power, transportation fuels and petrochemicals.

Our project experience covers a wide range of commodities, including:

- ✓ Base metals (Cu, Pb, Zn)
- ✓ Precious metals (Au, Ag)
- ✓ Platinum group metals (Pt, Pd, Rh, Ru, Ir, Os)
- ✓ Oxide metals (W, Sn, Fe, Ti, Al, Cr, Sc)
- ✓ Metals for electronics (In, Y, REO's, Te, Ga, Ge)
- ✓ Specialty chemicals (Sb, V, Mg, K, Si)
- ✓ Battery-grade elements (Graphite, Li, Co, Mn)

In addition to our technical and economic assessment of production opportunities for various commodities, we have specialized in GAP analysis, independent assessment of process development test programs and the transfer of test program data for commercial process plant design, procurement and definitive engineering.

Our most recent tungsten projects include:

In-plant Process Intensification Studies at the Cantung Concentrator

Assessment of Process Flowsheet Intensification for Molybdenum – Tungsten Preconcentration and Hydromet Circuits

Preliminary Design and Economic Assessment of Tungsten Preconcentration and APT Hydromet for Mount Pleasant

Development of APT Hydromet – Purification Technologies for Wolframite Ores

Process Intensification of APT Hydromet for Nui-Phao Processing Facility

Development of Gravity and Flotation Circuits for Wolframite and Schellite Ores



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