

HYDROTHERMAL CONVERSION FACILITY

Alternative Fuel Production from Waste

Supporting Innovation

Hydrothermal Conversion is a promising technology for converting challenging waste streams (food wastes, algae, sewage sludge, micro-plastics, etc.) into various gaseous/liquid biofuels, and high value products. The NRC is a recognized leader in this area and has unique facilities that offer: evaluation/ optimization of hydrothermal processes using client specific feedstocks, production of bio-crude for client specific processes, characterization, and technology/process development.

Contact

Adam Shales

Client Relationship Leader

Tel: 613-991-3245

Adam.Shales@nrc-cnrc.gc.ca

Fuel Production

This facility contains a number of high temperature and pressure batch/continuous reactors that can operate at conditions up to 500°C and 30 MPa, used for liquid fuel production through hydrothermal liquefaction (HTL), bio-crude upgrading, and gaseous fuel production using hydrothermal gasification (HTG) including the use of supercritical water. Batch/bench reactors are often utilized as a first step in testing different feedstocks, catalysis or conditions.



Continuous HTL System

The NRC's HTL pilot unit (up to 5 kg/h) is designed and custom fabricated for testing, developing, and demonstrating the HTL technology, and is one of very few in Canada at this scale. It allows for the technology development of HTL processes at scales relevant to an industrial installation.

Hydrothermal Dual-Reactor Gasifier

A dual reactor system for a two-step gasification of waste feedstock using a novel heat transfer mechanism. It is operated semi-continuously at pressure and temperatures above the critical point of water, taking advantage of the beneficial properties of supercritical water for conversion of waste to gases, primarily hydrogen.

Product Analysis

Suite of techniques including gas/liquid chromatography, calorimetry, thermogravimetric analysis (TGA), elemental analysis (CHNS, ICP-MS/OES, XPS), FTIR spectroscopy, differential scanning calorimetry (DSC), and viscometry are used to understand the properties/nature of the products and materials obtained.