

# TECHNOLOGY DEVELOPMENT

*Plasma Expertise to provide a comprehensive technology development solution.*

PyroGenesis is proud to have the team with the largest plasma expertise in the world. Working out from our Montreal-based manufacturing facility, our team offers innovative approaches to solve your problems in the most economical way possible.

PyroGenesis' technology development services can be classified into 2 main categories:



Process Development Services



Custom Plasma Reactors

## INDUSTRY SECTORS:

- Mining & Metallurgy
- Defence
- Environment
- Oil & Gas
- Advanced Materials

## CAPABILITIES:

- Process Design & simulation
- Proof of concept testing
- 3D Modeling
- Custom Fabrication
- Pilot testing

If you have a technology development project, please contact us and we will be pleased to evaluate how we can help.



**ONE OF THE LARGEST  
CONCENTRATION OF  
PLASMA EXPERTISE**

**PROCESS DEVELOPMENT  
TAILORED TO YOUR  
SPECIFIC NEEDS**

**ISO 9001:2008**

**FULL TURNKEY SOLUTIONS**

**PROVEN R&D EXPERTISE  
(ie. US NAVY)**

**ACADEMIC PARTNERSHIPS**

## **Customers:**

**HPQ Silicon Resources**

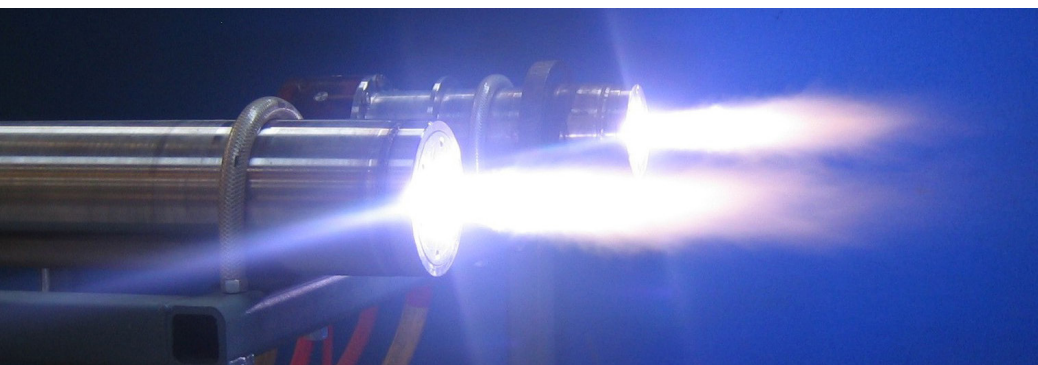
**US Air Force**

**US Navy**

**Universities  
(ex. McGill University, Canada;  
Polytechnique Montreal, Canada)**

For more information, please contact:

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HIGH GRADE QUARTZ

TRANSFORMED  
INTO



HIGH GRADE SILICON

APPLICATION



SOLAR PANELS

**EXAMPLE OF A PROJECT: PUREVAP™ WITH HPQ SILICON RESOURCES**

PyroGenesis has been mandated by HPQ Silicon Resources to develop a technology to produce silicon metal directly from quartz. PyroGenesis developed the PUREVAP™ process to transform quartz into a solar grade silicon metal, in one-step, creating a simple, clean, and cheap alternate to conventional technologies.

**PROJECT MILESTONES TO DATE:**

- Transformed low purity quartz (97.5%) into high purity silicon
- Produced 4N (99.99%) silicon from low purity quartz
- Removed aluminum, boron, calcium & phosphorous with consistently high efficiencies (between 67% and 97%)
- Quantity produced per batch during testing phase increased from less than 0.1 g to 8.8 g; nearly a hundredfold increase
- Reached 4N+ purity level of Silicon Metal (99.99+% Si) using 98.14% SiO<sub>2</sub> by adding a solid purifying agent into the feedstock

	Capacity (MT)	Capital Cost (USD)	Spot Price (USD/kg)
Conventional Technology	~ 20,000	> \$1.5G	~ 17
PUREVAP™		~ \$38-75M	~ 2

**CONTACT US TO DISCUSS YOUR PLASMA BASED PROJECT.**

*PyroGenesis Canada Inc. is a world-renowned high-tech company operating in the field of high temperature processing of materials and waste, which counts the US Navy and the US Air Force amongst its discerning client base.*



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