Plasma Processes, Inc.

NASA SBIR/STTR Technologies

High Surface Area Iridium Anodes for Molten Oxide Electrolysis

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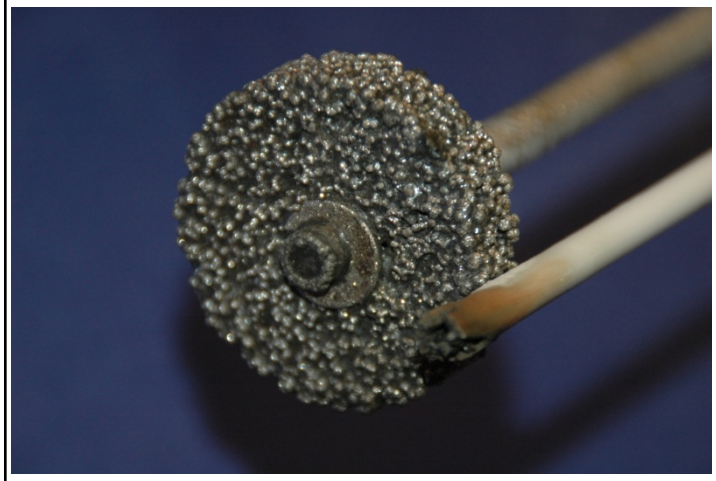
SBIR STTR

Identification and Significance of Innovation

- Oxygen production from lunar resources is needed for in-space life support and fuel use.
- Innovative high surface area iridium anodes for electrochemical processing of lunar regolith were developed and tested during Phase 1.
- High surface area anodes made from iridium coated graphite and porous iridium were not degraded in molten regolith electrolysis tests at MIT.
- Innovative design concepts for long life containers for regolith electrolysis are suggested



Porous Ir anode after molten regolith electrolysis test

Technical Objectives and Work Plan

- Investigate iridium electrodeposition on porous substrates. Develop parameters of electrolysis for uniform iridium deposits on complex shape anodes.
- Design and produce high surface iridium anodes for molten oxides electrolysis.
- Conduct experiments to test the developed anodes in molten silicate electrolysis process (in cooperation with NASA and MIT).
- Prepare preliminary design concept for electrolysis based production unit for oxygen extraction from lunar soil.

NASA and Non-NASA Applications

- Oxygen generators for life-support, habitat and propulsion use. Metal feedstock reactors for in-space fabrication:

  Si - solar cells; Al, Ti, Fe - structural use.
- Iridium lined rocket nozzles, igniters, spark plugs
- Commercial electrodes for chlorine production industry and extractive metallurgy. Dimensionally stable anodes for electroplating industry.

Firm Contacts

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