

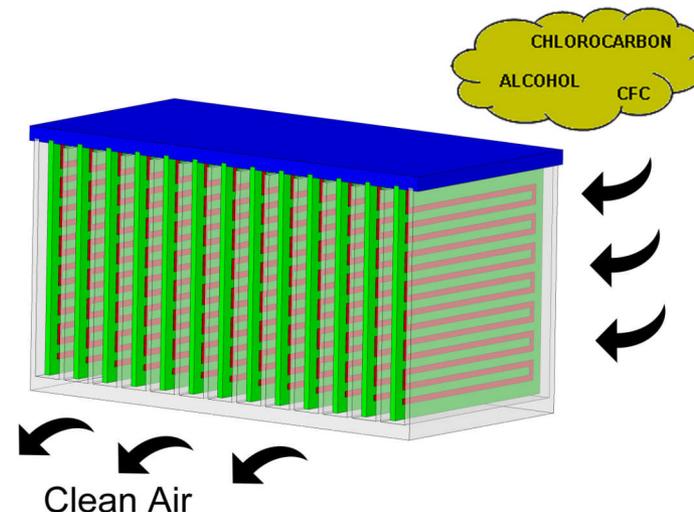
Plasma Air Disinfection System (PADS)

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Proposal No: X3.01-9555

Identification and Significance of Innovation

- Use of plasmas at ambient temperature and pressure to generate highly reactive species to break down VOC molecules
- Novel array of low power, flat ceramic plate plasma reactors arranged with a large, flow through surface area for increased volumetric contact with the air stream
- Low maintenance
- No consumables
- Eliminate or reduce size of adsorbent beds with accompanying reduction in re-supply mass.
- Ease of scaling for a variety of applications.
- Ideal for building systems common to all Advanced Life Support Systems.



Technical Objectives

- Evaluate reactor performance compared to existing reactor types
- Characterize and minimize byproducts of plasma reactions
- Evaluate plasma system compared to existing technologies
- Generate conceptual design of replacement for existing TCCS

Work Plan

The Work Plan has the following tasks:

- Task 1 Define Requirements and Specifications
- Task 2 Design and Manufacture Prototype Plasma Reactor
- Task 3 Evaluate Performance of PADS
- Task 4 Challenge System with More Complex Formulations
- Task 5 Analyze Effluent and Address Harmful Byproducts
- Task 6 Design Concept for a Complete Plasma-Based Air Purification System

NASA Applications

- Replace existing Trace Contaminant Control System with system requiring less re-supply mass.
- Easily scalable system will allow use in any habitat size.
- Could be used in modular systems with common components across entire exploration life support systems.

Non-NASA Applications

- Compact, low maintenance air purification for public areas such as homes, offices, and public transportation.
- Post processing of industrial process streams.
- Possible use in environmental remediation.

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