

Fiber-based adsorbents tailored for PLSS ammonia and formaldehyde removal, Phase I Project

SBIR/STTR Programs | Space Technology Mission Directorate (STMD)



ABSTRACT

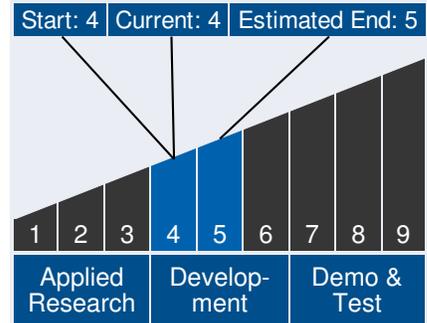
Development of an advanced lightweight Trace Contaminant Control filter will play a critical role in the viability of life support systems for future space and interplanetary missions. Serionix has developed proprietary adsorptive coatings which can be applied to both porous and nonporous substrates to yield functional composite media capable of rapid, efficient, adsorption of trace ammonia and formaldehyde. In preliminary testing, this flexible system has exhibited 7 times higher ammonia capacity relative to conventional phosphoric-impregnated activated carbon. The primary objective of this Phase I effort is to design and demonstrate a lightweight, high performing system for removal of ammonia and formaldehyde from next generation spacecraft and space suits. Systems for both vacuum-swing and single use adsorption will be extensively evaluated. Secondary performance characteristics such as pressure drop, flammability, and gravimetric/volumetric efficiency will be quantified internally while media prototypes will be delivered to NASA for evaluation. Building off of a successful Phase I demonstration, the focus of Phase II will be to optimize the system and prototype components to yield mass and volume savings for NASA life support systems. Parallel goals include demonstration of full-scale manufacturing capability and commercialization into industrial applications.



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Technology Maturity



ANTICIPATED BENEFITS

To NASA funded missions:

Potential NASA Commercial Applications: Because ammonia and other VOCs pose a great risk to the health of astronauts aboard the International Space Station (ISS) and Crew Exploration Vehicle (CEV), this technology will potentially be of great value to broader NASA missions in addition to the primary focus of PLSS contaminant control.

To the commercial space industry:

Potential Non-NASA Commercial Applications: Army: there is

Management Team

Program Executives:

- Joseph Grant
- Laguduva Kubendran

Program Manager:

- Carlos Torrez

Continued on following page.

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substantial overlap in the performance requirements for military collective protection systems and spacecraft/personal life support systems. We are actively pursuing commercial and demonstration opportunities with the Department of Defense related to our previous Army SBIR contract. Industrial Application: the single-use media has been successfully demonstrated in a leading chip manufacturer's cleanroom for 6 months. We have received a purchase order for 1200 square feet, and are pursuing related opportunities in a broad range of additional markets. Residential application: the single-use media is also effective at removing ammonia and other pet odor components in residential settings. The visual indication of filter life has proven to be a great feature for improving customer awareness of air quality and filter performance. Serionix has received tremendous interest and feedback from pet owners, and has decided to actively pursue the billion dollar residential air purifier market.

Management Team (cont.)

Principal Investigator:

- James Langer

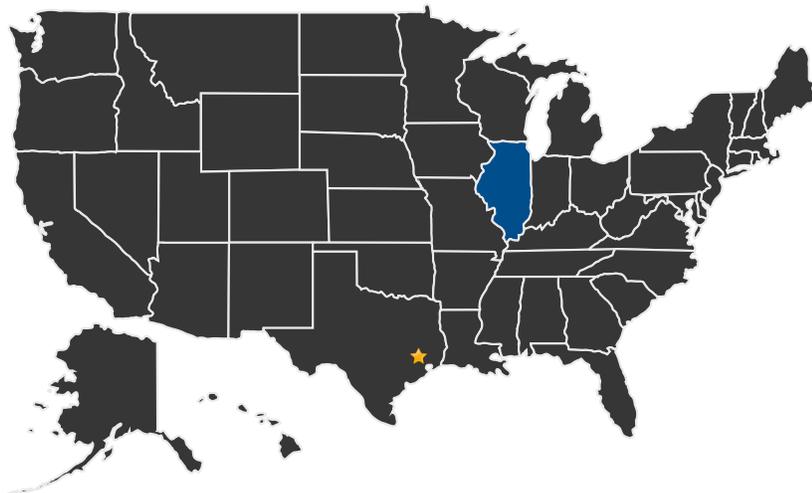
Technology Areas

Primary Technology Area:

Human Health, Life Support, and Habitation Systems (TA 6)

- └ Extravehicular Activity Systems (TA 6.2)
 - └ Portable Life Support System (TA 6.2.2)

U.S. WORK LOCATIONS AND KEY PARTNERS



■ U.S. States
With Work

★ Lead Center:
Johnson Space Center

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Other Organizations Performing Work:

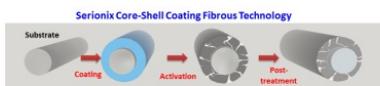
- Serionix (Champaign, IL)

PROJECT LIBRARY

Presentations

- Briefing Chart
 - (<http://techport.nasa.gov:80/file/23221>)

IMAGE GALLERY



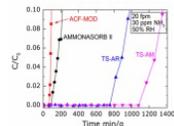
Rapid kinetics, low residence time



Regenerable, porous adsorbents



High breakthrough capacity



Single pass, high capacity, color changing polyelectrolyte adsorbent



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DETAILS FOR TECHNOLOGY 1

Technology Title

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Potential Applications

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