BRIEFING CHART

NASA SBIR/STTR Technologies
A Novel, Ultra-Light Heat Rejection System for Nuclear Power Generation
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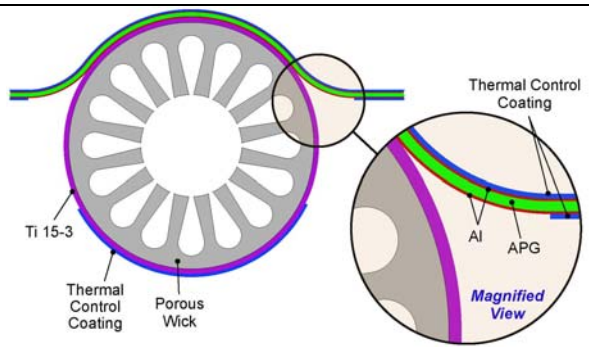
Identification and Significance of Innovation

- **Lightweight Heat Rejection Systems (HRS) are needed for Nuclear Power Generation (NPG) to support interplanetary and planetary-based missions.**
- **These systems are required to operate at high temperatures (~550 K).**
- **The current approach being considered is the use of a composite heat pipe combined with a composite radiator panel.**
- **Our innovation is an Ultra-Light Heat Rejection System (ULHRS) radiator panel material based on advanced fabrication techniques and aluminum encapsulated APG joined to a lightweight titanium heat pipe based on Ti 15-3 alloy.**
- **Our ULHRS will reduce the mass by 20% compared to the carbon composite systems under evaluation and represents a lower-risk approach.**



Our Innovative Ultra-Light Heat Rejection System Concept. Our innovative ULHRS will combine Creare's advances in ultra-light radiator panels and brazing techniques with Thermacore's innovative titanium/water heat pipes based on lightweight, high strength, titanium 15-3 alloy. Our knowledge base, our experience, and our teaming with Thermacore will enable the modification of the process to braze to titanium 15-3, the production of an integrated prototype including heat pipes, and the lightest heat rejection system with the lowest technical risk compared to competing alternatives, including carbon-carbon composites.

Technical Objectives

Demonstrate Manufacturability
Evaluate the Thermal Performance
Plan the Scale-Up

Work Plan

Design Integrated ULHRS
Fabricate Subscale ULHRS
Demonstrate Performance
Plan Scale-Up

NASA Applications

Nuclear power systems
Spacecraft thermal management

Non-NASA Applications

Mobile computers
Radar application
Aerospace
Large-scale power systems
Energy recovery applications

Contacts

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