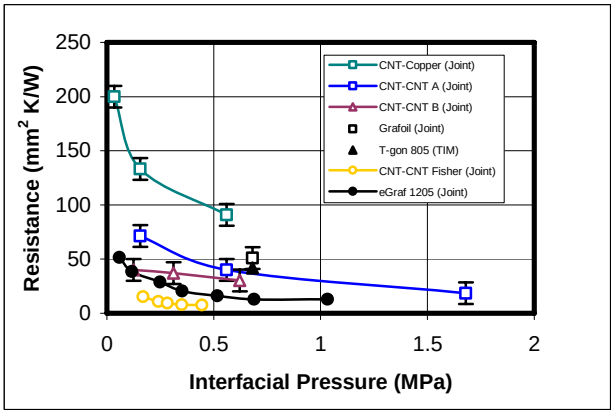
BRIEFING CHART

NASA SBIR/STTR Technologies
High-Conductance Thermal Interfaces Based on Carbon Nanotubes
PI: Jay C. Rozzi, Ph.D./Creare Incorporated, Hanover, NH
Proposal No.: 05-2-S6.07-9233

Identification and Significance of Innovation

- **A key element in the design of effective thermal management systems for demanding SMD applications the thermal interface material (TIM).**
- **Thermal switches for JWST have a low conductance in the closed position, due to the metal-to-metal TIM.**
- **This increases cool-down time and coolant resource usage.**
- **Conventional TIMs (Grafoil, eGraf, T-gon) cannot be used in this application.**
- **Our Phase I proof-of-concept CNT-based TIM exceeded the performance of any material currently available for thermal switch applications.**
- **We expect that, with development during Phase II, our innovation can potentially exceed the thermal performance of any available TIM including Grafoil, eGraf, and T-gon.**



Measured Thermal Resistance of Various CNT Configurations Compared to Standard TIMs. These results demonstrate the dramatic potential of our innovative, CNT-based TIM in a double-sided configuration. Notably, Grafoil, eGraf 1205, and T-gon 805 cannot be applied to thermal switches.

Technical Objectives

Optimize the Performance of the CNT-Based TIM
Evaluate the Performance of our TIM
Demonstrate in a Prototypical Configuration

Work Plan

Develop Specifications
Optimize Processing Conditions
Manufacture and Test Samples
Design and Plan Demonstration
Demonstrate Prototype

NASA Applications

Thermal switches for JWST
High-power solid state lasers
STIK for HST
Cooling of electrical components

Non-NASA Applications

Terrestrial electronics and laser systems
Footprint reduction of components in power systems, communications and other thermal management applications

Contacts

Jay C. Rozzi, Ph.D., Creare Inc., jcr@creare.com, 603-640-2367