Experimental Studies of Carbon Nanotube Materials for Space Radiators

Game-changing propulsion systems are often enabled by novel designs using advanced materials. Radiator performance dictates power output for nuclear electric propulsion (NEP) systems. Carbon nanotubes (CNT) and carbon fiber materials have the potential to offer significant improvements in thermal conductivity and mass properties.

A test apparatus was developed to test advanced radiator designs. This test apparatus uses a resistance heater inside a graphite tube. Metallic tubes can be slipped over the graphite tube to simulate a heat pipe.

Several sub-scale test articles were fabricated using CNT cloth and pitch-based carbon fibers, which were bonded to a metallic tube using an active braze material. The test articles were heated up to 600°C and an infrared (IR) camera captured the results. The test apparatus and experimental results are presented here.

NSMMS
NATIONAL SPACE & MISSILE MATERIALS SYMPOSIUM
TAMPA, FLORIDA JUNE 25 - 28, 2012

Experimental Studies of Carbon Nanotube Materials for Space Radiators

Michael P. SanSoucie
NASA Marshall Space Flight Center
michael.p.sansoucie@nasa.gov
(256) 544-5269

Game-changing propulsion systems are often enabled by novel designs using advanced materials. Promising new technologies may require high operating temperatures and could benefit from use of advanced lightweight materials in a heat rejection system. Radiator performance dictates power output for nuclear electric propulsion (NEP) systems. Carbon nanotubes (CNT) and carbon fiber materials have the potential to offer significant improvements in operating temperature, thermal conductivity, and mass properties.

This poster is found in the Breakthrough Innovations poster section in the exhibit hall.