

Manufacturing of Nanocomposite Carbon Fibers and Composite Cylinders

Marshall Space Flight Center, Alabama

Pitch-based nanocomposite carbon fibers were prepared with various percentages of carbon nanofibers (CNFs), and the fibers were used for manufacturing composite structures. Experimental results show that these nanocomposite carbon fibers exhibit improved structural and electrical conductivity properties as compared to unreinforced carbon fibers. Composite panels fabricated from these nanocomposite carbon fibers and an epoxy sys-

tem also show the same properties transferred from the fibers.

Single-fiber testing per ASTM C1557 standard indicates that the nanocomposite carbon fiber has a tensile modulus of 110% higher, and a tensile strength 17.7% times higher, than the conventional carbon fiber manufactured from pitch. Also, the electrical resistance of the carbon fiber carbonized at 900 °C was reduced from 4.8 to 2.2 ohm/cm. The manufacturing of the

nanocomposite carbon fiber was based on an extrusion, non-solvent process. The precursor fibers were then carbonized and graphitized. The resultant fibers are continuous.

This work was done by Seng Tan and Jianguo Zhou of Write Materials Research for Marshall Space Flight Center. For more information, contact Sammy Nabors, MSFC Commercialization Assistance Lead, at sammy.a.nabors@nasa.gov. Refer to MFS-32943-1.