

Characterization of Rayon Alternatives for the Production of CBCF

Nidia C. Gallego, Glenn R. Romanoski and George B. Ulrich

**Materials Science and Technology Division, Oak Ridge National Laboratory, Oak Ridge, TN 37831
865-574-4838; galleqonc@ornl.gov*

Abstract.

The requirement for containment and thermal protection of the isotopic fuel in radioisotope power systems led to a design and material selection for the General Purpose Heat Source (GPHS) that relied principally on carbon materials. A unique Carbon Bonded Carbon Fiber (CBCF) insulation was developed to provide thermal protection during the extremes of unlikely reentry scenarios. The two principal constituents of CBCF are chopped aerospace-grade rayon and a powdered phenolic resin.

Production of CBCF insulation at ORNL has been sustained for the past three decades by a single lot of aerospace grade rayon purchased from North American Rayon Corporation (NARC) of Elizabethton, TN in 1987. Their principal markets for rayon were for apparel, home furnishings and industrial products. NASA contracted with NARC to produce rayon for solid rocket motor nozzles for the Space Shuttle. Like NASA and other aerospace customers, ORNL stockpiled significant quantities for near- and intermediate-term needs. Due to increased competition from imported rayon, NARC ceased operations in 1996. Although ORNL has a seven- to ten-year supply of rayon at the current rate of consumption, an effort has been initiated to identify a new source to meet long-range needs. A summary of findings from the ongoing search for a fiber to replace NARC rayon for production of CBCF is presented.

Keywords: Carbon Bonded Carbon Fiber, CBCF, Rayon Fiber