Supporting Technologies

Fundamental Research and Development

Objective

This task provides support to the CFCC Program industrial teams by conducting more generic or fundamental research in the areas of composite design, materials characterization, test methods, and performance-related phenomena.

Approach

The team is developing the technologies necessary to design, characterize, analyze and test CFCC materials, processing methods, and components. Initially Supporting Technologies focused on the design **of** composites, emphasizing mechanical modeling, characterization of materials and constituents, and the development of methods, equipment, and facilities. The CFCC Program has progressed, and now the products of this task are being applied to materials and components fabricated by the industrial teams. Thorough testing and characterization are paramount to design **with** any new material. Facilities, techniques, and expertise developed under Supporting Technologies are being used to better understand CFCC materials and processes, to examine factors that influence material properties and behavior, and provide the information needed to utilize CFCCs in applications of interest.

Products and Capabilities

Supporting Technologies has developed the specialized techniques and equipment necessary for the evaluation of CFCC materials and components. These include:

Mechanical models and computer codes such as CLASS 2 and MRLife used in the design of composites and components, and the prediction of performance and life.

An Interfacial Test System for measuring the forces acting between fibers and matrices, the understanding of which is crucial for controlling composite properties and performance.

The *Thermal Conductivity Microprobe*, an instrument for in-situ measurement of constituent thermal properties.

Standardized test methods for measuring engineering properties of the materials for use by component designers.

Non-destructive characterization techniques for quality control and assurance, and detection of damage incurred in service.

Laboratory facilities dedicated to the testing in *simulated service environments*, the results of which can be used determine *performance envelopes* for CFCC materials.

Team Members

Argonne National Laboratory
Argonne, IL

Materials Sciences Corp.
Washington, PA

Oak Ridge National Laboratory
Oak Ridge, TN

Office of Industrial Technologies
Washington, DC

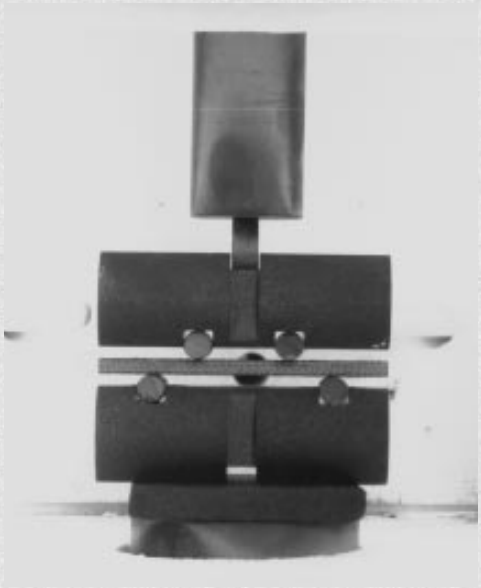
The Pennsylvania State University
University Park, PA

University of Cincinnati
Cincinnati, OH

University of Tennessee
Knoxville, TN

University of Washington
Seattle, WA

Virginia Polytechnic Institute
Blacksburg, VA



Thorough testing and characterization of CFCCs is crucial to the understanding, acceptance, and utilization of these advanced materials in industrial applications.

Team Contact

Michael Karnitz
Oak Ridge National Laboratory
P.O. Box 2008
MS-6065
Oak Ridge, TN 37831-6065
TEL: (423) 574-5150
FAX: (423) 574-6098
e-mail: karnitzma@ornl.gov

CFCC

Continuous Fiber Ceramic Composite Program

A 10-year joint R&D effort initiated in 1992 to develop processing methods to produce reliable and cost-effective CFCC components for industrial applications.

CFCCs are light, strong, and corrosion-resistant materials capable of performing at high temperatures.

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