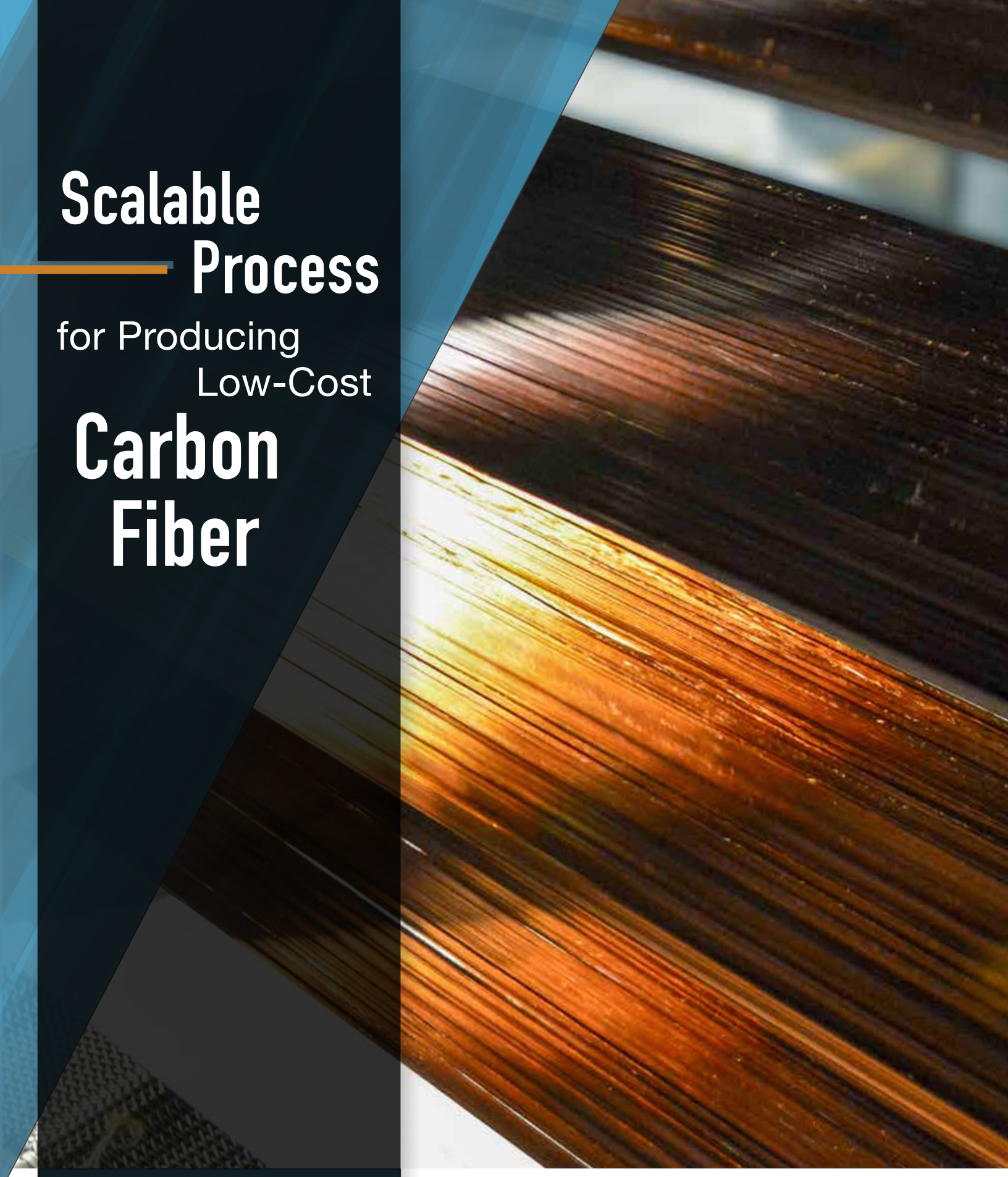
Scalable Process

for Producing Low-Cost

Carbon Fiber



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Method of Producing Carbon Fibers
from Multipurpose Commercial Fibers

Researchers at ORNL have developed a method for producing industrial-grade structural carbon fiber and flame-retardant fibers from commercially available acrylic fiber precursor materials developed primarily for textile applications. Using the methods of this invention, the production costs for the resultant carbon fibers can be less than fifty percent of traditional carbon fiber production methods.

Today, the cost of the carbon fiber material remains at relatively high specialty material prices prohibiting widespread adoption of carbon fiber-containing composite materials in the automotive manufacturing industry, which requires lower commodity pricing. The lower-cost carbon fiber produced by ORNL has demonstrated tensile strength, tensile modulus and strain to failure values exceeding 400 ksi, 40 Msi, and 1% respectively. These properties meet the performance criteria prescribed by some automotive manufacturers for carbon fiber materials suitable for use in high-strength composite materials for use in high-volume vehicle applications.

Potential Applications:

- Lighten the weight of vehicles by use of material throughout body and chassis
- Build turbine components and longer blade designs for applications in wind energy
- High-strength, lightweight pressure vessels for storage of gas
- Next level of performance for sporting goods and recreational equipment

What is Carbon Fiber?

Carbon fiber is a strong, stiff, lightweight enabling material for improved performance in many applications; however, its use in cost sensitive, high-volume industrial applications such as automobiles, wind energy, oil and gas, and infrastructure is limited because of relatively high cost.

The Department of Energy's Carbon Fiber Technology Facility (CFTF) — a semi-production scale facility at Oak Ridge National Laboratory, offers a highly flexible, highly instrumented carbon fiber line for demonstrating advanced technology scalability and producing market-development volumes of prototypical carbon fibers.

Continuous Fibers

Unidirectional Tapes and Prepegs

Woven Fabrics and Prepegs

Chopped or Milled Fibers

Nonwovens

Advantages:

Production of carbon fiber from low-cost commercially available multipurpose use commodity fiber.

↓ 50%

Cost reduction of greater than fifty percent over traditional carbon fiber production methods.

Exhibits properties equal to or exceeding conventional carbon fibers.

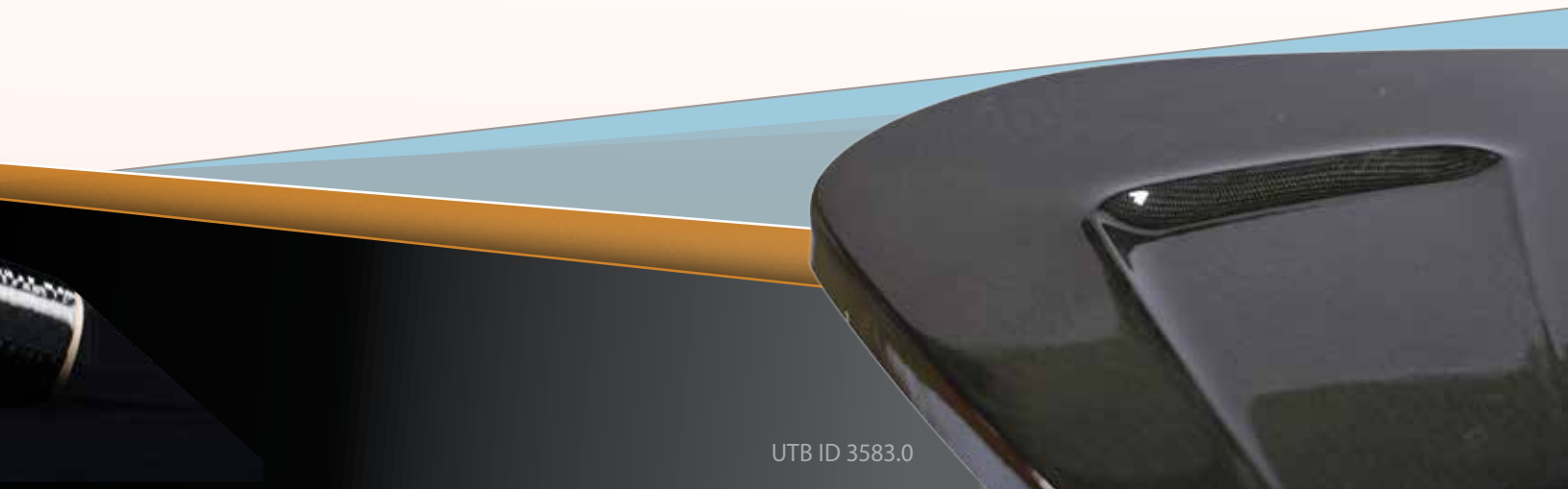
↑ 3X

Capacity increase to greater than three times over traditional carbon fiber conversion process equipment.

Exceeds DOE target mechanical performance for automotive applications.

↓ 60%

Power reduction of up to 60% per unit manufactured carbon fiber compared to traditional carbon fiber conversion techniques.



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