



*****For Immediate Release*****

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The All American Composite

California firm vertically integrates ceramic composites manufacturing.

(Westlake Village, CA). MATECH, a small California advanced materials company, has done what even the “big boys” have yet to accomplish in ceramic composites manufacturing—integrate ceramic fiber manufacturing, fabric weaving, interface coating formation, and ceramic composite component fabrication into a single, all US made domestic operation. Even more dramatic, the entire process was performed under one roof!

This development is significant due to the myriad of high temperature defense and civil applications that ceramic matrix composites (CMCs) can perform. CMCs, with their high strength ceramic fiber reinforcements, “slippery” interface coatings, and high temperature ceramic matrices, can outperform even the most advanced and rare of refractory metals and alloys for next generation turbine engines, missile and rocket propulsion, high temperature heat shields, and efficient energy generation. Moreover, CMCs are about half to one third the weight of their metallic counterparts. While metals and metallurgy dominated the progress of the 19th and 20th centuries, CMCs represent one of the “game changing” new materials of the 21st century.

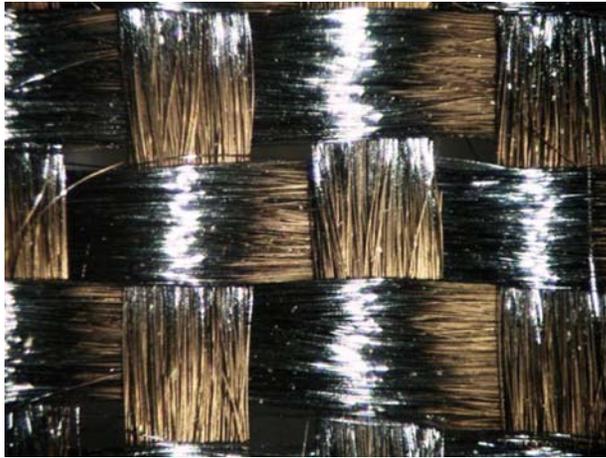
Of greater significance is that CMCs are composed of the most abundant and ubiquitous of elements—silicon, carbon, and nitrogen—none of which need to be imported from foreign sources. In addition, these elements are extremely cheap! The US is heavily reliant on foreign sources for some of the most critical metals used in commercial aviation, electronics, and defense. The simple precursors needed for ceramic fibers and CMCs, however, are both “infinitely abundant” and entirely domestic. MATECH, starting with these precursors succeeded in transforming them into complex ceramic composites, including the woven ceramic fiber fabric, the interface coatings, and the dense ceramic matrices. Therefore, MATECH is proud to call our CMCs the All American Composite.

How did this begin? It starts with the fibers. All structural silicon carbide (SiC) based ceramic fibers available today are manufactured in Japan or from fibers manufactured in Japan. Beginning a decade ago, MATECH began developing silicon nitride carbide (SiNC) ceramic fiber and, more recently, followed by the development of stoichiometric silicon carbide (SiC) fibers. Both fiber types are manufactured as 500 filament fiber tow in continuous kilometer lengths. MATECH’s SiC-1900X and SiNC-1400X ceramic fibers represent the first US made fibers of their kind attempted in nearly 20 years. As critical engineering materials for America’s defense capabilities, these fibers represent a key advance towards US self-reliance and self-sufficiency in an increasingly unstable world.

Armed with these new domestically-sourced ceramic fibers, leading defense and aerospace materials manufacturers now have the opportunity to develop high temperature ceramic composites for critical national security applications and commercial applications without fear of foreign supply chain uncertainties, thereby ensuring American self-reliance into the future. The next challenge is scale-up.

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MATECH



Optical Micrograph of MATECH's SiNC-1400X Ceramic Fiber Woven Fabric.



MATECH's "All American Ceramic Composites" can be fashioned into Simple and Complex Shapes, such as the Turbine Vane Element shown above.

About MATECH:

Since its founding in 1989, MATECH has become recognized as a world-class research and development laboratory in the areas of glass, ceramic, and high temperature composites. In the past decade, MATECH has emerged as the world's premier developer of high temperature and ultra-high-temperature ceramic fibers. MATECH's fibers include silicon nitride/carbide (SiNC), stoichiometric silicon carbide (SiC), hafnium carbide (HfC), tantalum carbide (TaC), yttrium aluminum garnet (YAG), silicon oxycarbide (SiOC), and zirconium oxycarbide (ZrOC). The development of MATECH's ceramic fibers has occurred with the support of contracts and grants from the following US Government agencies: National Science Foundation; US Navy; US Air Force; Missile Defense Agency; and Department of Energy (DOE).

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