SiC Fibers Market by Type (First Generation, Second Generation, Third Generation), Form (Continuous, Woven), Phase (Amorphous, Crystalline), Usage (Composites, Non-Composites), End-use Industry and Region - Global Forecast to 2031

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Report description:

The SiC fibers market is estimated at USD 0.70 Billion in 2024 and is projected to reach USD 3.34 Billion by 2031, at a CAGR of 25.0% from 2024 to 2031. Third generation fiber's performance in ultra-high-temperature environments and their ability to withstand structural integrity over such long time intervals make them particularly useful for application in next-generation turbine engines including in LEAP engines and advanced power generation systems.

''In terms of value, continuous form of SiC fibers accounted for the largest share of the overall SiC fibers market.''

In 2023, continuous SiC fibers in SiC fibers market have the largest market share due to their ability to be easily integrated into advanced composite structures making them the choice for next-generation engine systems. For example, in LEAP engines, they play a very visible role. Continuous SiC fibers are becoming increasingly in demand as industries work towards getting closer and closer to lighter, stronger, and fuel-efficient materials. Thus, as the end-use industries seek advanced materials there is an expected increase in demand for continuous SiC fibers.

''In terms of value, the crystalline SiC fibers are projected to be the fastest growing phase of SiC fibers .''

Crystalline SiC fibers are projected to be the fastest-growing in phase segment in SiC fibers market, due to its advantages over other fibers. Oxide fibers, superalloys, and amorphous SiC fibers degrade very quickly at elevated temperatures. However, Sylramic SiC fibers which are a type of crystalline SiC fiber retain strength and stiffness to very high-temperature levels, above 1400C (2252F) due to the particular chemical composition, structure, and low oxygen content. It offers superior creep resistance

along with thermal stability and is highly suitable for high-performance applications in aerospace, defense, and energy. Advances have been achieved in SiC fibers not only for breaking through functional barriers but also in response to increased demands for high-temperature-resistant materials in various sectors.

''In terms of value, the usage of SiC fibers in composites is projected to be the fastest in the forecast period.''

The fastest-growing usage of SiC fibers in composites is based on tremendous progress in material properties and the ability to withstand extreme conditions. NASA's research, especially at Glenn Research Center, has played an important role in propelling increased demand for SiC fibers in ceramic matrix composites for high-temperature structural applications beyond 2700F. High-strength SiC fibers patented as "Sylramic-iBN" and "Super Sylramic-iBN" are specially processed to provide high mechanical and environmental properties. Protective boron-nitride coatings and advanced CVI techniques have transformed the CMCs made of SiC/SiC from NASA into products that are much more resistant and quite highly resistant to extreme heat and stress, but still allow for customization under specific design and performance requirements. Thus, these developments have been very much driving the adoption of SiC composites for high-performance industries.

"During the forecast period, the SiC fiber market in aerospace & defense is projected to be the fastest growing end-use industry."
During the forecast period from 2024 to 2029, the aerospace & defense industry is expected to be the fastest-growing end-use industry in the SiC fibers market. The SiC fibers are unmatched in their performances in high temperature as well as high-stress applications, such as advanced aircraft and space vehicle engines. These fibers can resist up to 2,732F and thus are well suited for use in next-generation aerospace engines, such as the GE9X installed in the Boeing 777X, or advanced military engines such as the GE3000 for the US Army's ITEP program. Although the market faces disruptions in terms of reductions in aircraft delivery and more issues on the supply chain, high-performance material demand within both the components of the engine and aerospace technology development is a factor pushing the growth of SiC fiber usage in the aerospace & defense sector at a very rapid pace.
"During the forecast period, the SiC fibers market in North America region is projected to be the largest region."
North America is the largest market for SiC fibers because of its strong aerospace, defense, and energy sectors, which are a driver for the demand for high-performance materials such as SiC fibers. The region is dominated by large aerospace manufacturers, Boeing, Lockheed Martin, and General Electric, which have comprehensive use of SiC fibers in critical engine components in commercial and military applications. It also continues to invest in space exploration and defense projects led by the NASA and U.S. Department of Defense; this investment promotes increased demand for SiC-based CMCs in rockets, space vehicles, and advanced military engine components. Second, North America has a strong research infrastructure led by institutions and private companies that develop SiC fiber technology, which creates innovation and potentially expands its market shares.
This study has been validated through primary interviews with industry experts globally. These primary sources have been divided into the following three categories:
-□By Company Type- Tier 1- 55%, Tier 2- 25%, and Tier 3- 20%
-□By Designation- C Level- 50%, Director Level- 30%, and Others- 20%
-□By Region- North America- 15%, Europe- 15%, Asia Pacific- 65%, Middle East & Africa (MEA)-2%, Latin America- 3%.
The report provides a comprehensive analysis of company profiles:
Prominent companies NGS Advanced Fibers Co., Ltd. (Japan), UBE Corporation (Japan), COI Ceramics, Inc. (US), Specialty Materials, Inc. (US), MATECH (US), Suzhou Saifei Group Ltd. (China), Haydale Technologies Inc. (US), GE Aerospace (US), Ningbo Zhongxing New Materials Co., Ltd. (China), and BJS Ceramics (Germany).
Research Coverage

This research report categorizes the SiC Fibers market By Type (First Generation, Second Generation, Third Generation), By Form (Continuous, Woven, Others), By Phase (Amorphous, Crystalline), By Usage (Composites, Non-composites), End-Use Industry (Aerospace & Defense, Energy & Power, Industrial, and Other End-Use Industries), Region (North America, Europe, Asia Pacific, the Middle East & Africa, and Latin America). The scope of the report includes detailed information about the major factors influencing

the growth of the SiC Fibers market, such as drivers, restraints, challenges, and opportunities. A thorough examination of the key industry players has been conducted in order to provide insights into their business overview, solutions, and services, key strategies, contracts, partnerships, and agreements. Product launches, mergers and acquisitions, and recent developments in the SiC Fibers market are all covered. This report includes a competitive analysis of upcoming startups in the SiC Fibers market ecosystem.
Reasons to buy this report:

The report will help the market leaders/new entrants in this market with information on the closest approximations of the revenue numbers for the overall SiC Fibers market and the subsegments. This report will help stakeholders understand the competitive landscape and gain more insights to position their businesses better and plan suitable go-to-market strategies. The report also helps stakeholders understand the pulse of the market and provides them with information on key market drivers, restraints, challenges, and opportunities.
The report provides insights on the following pointers:

-□Analysis of key drivers (Rising demand from LEAP engines), restraints (High cost of SiC fibers, availability of substitutes), opportunities (Reduction in SiC fibers cost, Emergence of Chinese players), and challenges (Liquidity crunch, technological challenges in manufacturing of low-cost SiC fibers) influencing the growth of the SiC Fibers market

-□Product Development/Innovation: Detailed insights on upcoming technologies, research & development activities, and service launches in the SiC Fibers market.

-□Market Development: Comprehensive information about lucrative markets ? the report analyses the SiC Fibers market across varied regions.

-□Market Diversification: Exhaustive information about services, untapped geographies, recent developments, and investments in the SiC Fibers market

-□Competitive Assessment: In-depth assessment of market shares, growth strategies and service offerings of leading players like NGS Advanced Fibers Co., Ltd. (Japan), UBE Corporation (Japan), COI Ceramics, Inc. (US), Specialty Materials, Inc. (US), MATECH (US), Suzhou Saifei Group Ltd. (China), Haydale Technologies Inc. (US), GE Aerospace (US), Ningbo Zhongxing New Materials Co., Ltd. (China), BJS Ceramics (Germany), Nanoshel LLC (US), Skyspring Nanomaterials, Inc. (US), TISICS LTD. (UK), National Aeronautics and Space Administration (US), the Institute of Energy Science & Technology (Japan), National University of Defense Technology (China), Free Form Fibers (US), among others in the SiC Fibers market.

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