

Silicon Carbide Fibers Market Growth: Projected to Reach USD 8.41 Billion by 2032 | CAGR of 30.8%

The global Silicon Carbide Fibers market, valued at USD 712.4 Million in 2023, is expected to reach USD 8.41 Billion by 2032, growing at a CAGR of 30.8%.

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/EINPresswire.com/ -- Global [Silicon Carbide Fibers market](#) was valued at

USD 712.4 million in 2023 and is expected to grow from USD 886.2 million in 2024 to approximately USD 8,410.5 million by 2032, reflecting a robust compound annual growth rate (CAGR) of 30.8% during the forecast period. In 2023, North America led the

market, accounting for a dominant share of 54.79%. The U.S. market, in particular, is poised for substantial growth, with projections indicating it could reach USD 3.95 billion by 2032. This growth is largely attributed to the superior characteristics of silicon carbide fibers—such as corrosion and oxidation resistance, tunable electrical resistivity, and low density—which make them an ideal reinforcement material in ceramic matrix composites (CMCs), outperforming other inorganic fibers.



Silicon Carbide Fibers Market

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Silicon carbide (SiC) fibers, composed of silicon carbide molecules, are primarily manufactured using methods such as laser-driven Chemical Vapor Deposition (CVD) and the Yajima process. These fibers are highly valued for their exceptional thermal resistance, capable of withstanding temperatures up to 2,700 degrees. Due to these remarkable properties, they are widely used in demanding applications such as gas turbines and nuclear power plants. Furthermore, ongoing technological advancements in SiC fiber production and the increasing use of lightweight materials in aerospace component manufacturing are expected to significantly propel the growth of the global silicon carbide fibers market throughout the forecast period.

The aerospace industry experienced significant disruption due to government-imposed restrictions during the COVID-19 pandemic. Widespread containment measures, supply chain interruptions, and a decline in consumption activities heavily impacted the market. Aircraft manufacturers were forced to shut down production facilities, leading to a critical shortage of skilled labor and a halt in aircraft production. Additionally, the closure of international borders for non-essential trade and travel further paralyzed the aerospace sector. Despite these setbacks, the market is expected to recover more rapidly in emerging economies, where governments are implementing supportive policies to revitalize economic activity. Consequently, the silicon carbide fibers market is anticipated to stabilize in the coming years.

SILICON CARBIDE FIBERS MARKET TRENDS

Silicon carbide fibers were initially expensive due to their limited availability, with commercial production primarily dominated by manufacturers in Japan and the United States. This prompted several global producers to invest in advanced technologies aimed at scaling up the production of SiC-based fibers. Numerous companies and research institutions have since focused on developing efficient manufacturing processes suitable for high-temperature environments. For example, NASA developed and patented Sylramic-iBN—a non-toxic silicon carbide fiber capable of withstanding temperatures up to 1,500°C. Such innovations are expected to drive technological advancements and enable large-scale fiber production. As a result, the growing focus on innovation is set to create lucrative growth opportunities for the silicon carbide fibers market over the forecast period.

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SILICON CARBIDE FIBERS MARKET GROWTH FACTORS

The increasing use of silicon carbide-based fibers in Ceramic Matrix Composites (CMCs) is expected to significantly drive market growth over the forecast period. This surge is largely due to the fibers' outstanding properties, including exceptional thermal resistance, high mechanical strength, corrosion and oxidation resistance, adjustable electrical resistivity, and low density—making them an ideal reinforcement material in CMCs and superior to other inorganic fibers.

Rising demand for CMCs in the energy and power sectors—particularly in applications like heat exchangers and fusion reactor walls—is further boosting product adoption. Notably, the U.S. Department of Energy is actively exploring the use of CMC cladding for fuel rods in light-water nuclear reactors, which is likely to accelerate CMC consumption in the industry. Additionally, the rapid expansion of the aerospace and defense sectors across North America and Europe is expected to further support the growth of silicon carbide fiber usage in CMCs.

RESTRAINING FACTORS

The high cost of silicon carbide fibers remains a key barrier to their widespread adoption across various applications. Ongoing advancements in silicon carbide technology often require large-scale, sophisticated machinery, which drives up production expenses and, consequently, the price of SiC-based fibers. Additionally, since silicon carbide is not abundantly available in its natural form, manufacturers rely heavily on energy-intensive furnace techniques to synthesize the compound from silicon. These complex and costly processes significantly impact the overall manufacturing and processing costs, making affordability a major challenge and restraining market growth during the forecast period.

SILICON CARBIDE FIBERS MARKET SEGMENTATION ANALYSIS

By Form Analysis

Based on form, the silicon carbide fibers market is categorized into continuous, woven, and others. The continuous fiber segment held the largest market share and is expected to maintain its lead throughout the forecast period. These fibers are highly effective in high-radiation environments, making them particularly valuable for nuclear power generation. Additionally, their use in reinforced ceramic matrix composites and continuous filament reinforcements offers exceptional toughness and significant weight reduction—key factors driving the growth of this segment.

Meanwhile, the demand for woven silicon carbide fibers is also on the rise, especially in high-temperature applications. The increasing use of SiC-based composites in hypersonic technologies is further expected to boost the growth of the woven fiber segment.

By Usage Analysis

By usage, the silicon carbide fibers market is divided into composites and non-composites. The composites segment is expected to experience the highest growth rate from 2024 to 2032. Non-oxide silicon carbide fiber-reinforced composites deliver exceptional performance in structural applications and harsh environmental conditions, making them superior to metallic superalloys and monolithic composites. These composites are tailored to meet specific requirements related to lifespan, temperature, environmental conditions, and stress, driving the segment's growth. Additionally, the growing adoption of silicon carbide fibers in non-composite applications, particularly due to their high temperature-resistance properties, is anticipated to significantly boost market growth throughout the forecast period.

By Application Analysis

The Aerospace & Defense segment held the largest share due to the expanding range of product applications in this sector.

The silicon carbide fibers market is categorized by application into aerospace & defense, energy & power, industrial, and others. The aerospace segment led the market in 2023, driven by the

increasing use of fibers in applications such as aircraft engines, turbopumps, and thermal protection systems. This growth is largely attributed to the fibers' heat resistance and lightweight properties.

In the energy & power sector, the demand for SiC-based fibers is rising due to their use in gas turbine engines, nuclear reactor fuel cladding, and radiation blankets, further boosting market growth. The industrial application segment is also expected to experience significant growth, driven by the growing use of SiC fibers in manufacturing reactors, heat exchangers, reformers, and filters in the chemical industry. Additionally, the "others" category, which includes applications in propulsion, plastics, and metals, is expected to contribute to the overall market expansion. As demand for these products increases across various applications, the market is expected to see continued growth.

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REGIONAL INSIGHTS

The silicon carbide fibers market in North America was valued at USD 390.3 million in 2023. The growth of the market in this region is driven by rapid industrialization and advancements in SiC fiber technology. The U.S. holds the largest market share, with increased production of silicon carbide fibers, rising research and development activities, and the expanding aerospace industry all contributing to the growing demand for the product.

In Europe, the strong demand for SiC fibers is linked to rapid industrialization. The use of SiC-based products has surged in applications like preheaters, radiant tubes, and recuperators, which are integral to industrial machinery.

In the Asia Pacific region, market growth is primarily fueled by the rising demand for continuous fibers in energy and power applications, driven by their superior strength and temperature-resistant properties.

In the rest of the world, the Middle East and Africa lead the market. Growing consumption of SiC fibers in chemical manufacturing applications, such as in heat exchangers, reactors, filters, and reformers, is boosting market growth in this region. Additionally, the expansion of the aerospace industry in Latin America is expected to drive significant market growth in the near future.

LIST OF KEY COMPANIES IN SILICON CARBIDE FIBERS MARKET

Key players in the silicon carbide fibers market include Ningxia Anteli Carbon Material Co. Ltd, Specialty Materials, and UBE Corporation. These companies have implemented growth strategies such as expanding production capacity and forming agreements with end-users. Among these leading producers, Ningxia Anteli Carbon Material Co. Ltd operates a processing workshop with two production lines, offering an annual production capacity of 70 kilotons for its product

range.

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LIST OF KEY COMPANIES PROFILED:

- NGS Advanced Fibers Co., Ltd. (Japan)
- Specialty Materials (U.S.)
- UBE Corporation (Japan)
- American Elements (U.S.)
- Nanoshel LLC (U.S.)
- NINGXIA ANTELI CARBON MATERIAL CO. LTD (China)
- Suzhou Saifei Group Ltd. (China)
- Haydale Graphene Industries Plc (U.K.)
- Matech (U.S.)
- BJS Ceramics GmbH (Germany)
- SkySpring Nanomaterials, Inc. (U.S.)

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