

Needle Coke Market Report by Type (Coal-tar Pitch Derived, Petroleum Derived), Grade (Intermediate, Premium, Super Premium), Application (Graphite Electrodes, Silicon Metal and Ferroalloys, Lithium-ion Battery, Carbon Black, Rubber Compounds, and Others), End Use Industry (Aluminum and Steel, Automotive, Semiconductor, and Others), and Region 2024-2032

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Report description:

The global needle coke market size reached US\$ 4.2 Billion in 2023. Looking forward, IMARC Group expects the market to reach US\$ 6.6 Billion by 2032, exhibiting a growth rate (CAGR) of 4.8% during 2024-2032. The increasing demand for high-performance materials in lithium-ion batteries, expanding steel production, ongoing technological advancements, rising electric vehicle (EV) adoption, and the exploration of unconventional oil and gas resources are some of the key factors influencing market growth.

Needle Coke Market Analysis:

- **Market Growth and Size:** The needle coke market is experiencing robust growth, driven by the increasing demand for lithium-ion batteries, steel production, and advanced materials across various industries. The market size reflects a multi-billion-dollar industry, with projections indicating continued expansion due to the rising applications of needle coke.
- **Major Market Drivers:** The increasing EV adoption necessitating high-quality graphite electrodes and lithium-ion batteries, and the expanding steel industry requiring needle coke for ultra-high-power graphite electrodes are prime factors driving the market growth. Besides this, significant technological advancements in manufacturing processes and the exploration of unconventional oil and gas resources are propelling the market forward.
- **Technological Advancements:** Ongoing technological advancements focus on enhancing needle coke quality and production efficiency, ensuring its suitability for critical applications in batteries, steel production, and other high-performance industries. Moreover, innovations in manufacturing processes, such as sustainable and efficient production methods, play a crucial role in

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strengthening the needle coke market.

-□Industry Applications: Needle coke finds diverse applications in steel production, lithium-ion batteries, graphite electrodes, carbon black, rubber compounds, silicon metal, and aerospace, reflecting its versatility across multiple industries. In line with this, its role in the automotive, semiconductor, oil and gas, and refining industries underscores its significance in advanced materials and energy storage.

-□Key Market Trends: The key trends fueling the needle coke market include the increasing demand for super premium grade needle coke for high-performance applications and the expanding use of needle coke in advanced materials for aerospace and automotive sectors.

-□Geographical Trends: The Asia Pacific region dominates the needle coke market, with robust growth attributed to the flourishing steel industry, automotive sector, and the surge in EV manufacturing. Additionally, the growing product demand from North America and Europe driven by the automotive, steel, and aerospace industries is aiding in market expansion.

-□Competitive Landscape: The leading players in the needle coke market are engaging in strategic initiatives such as research and development (R&D), capacity expansions, and mergers to strengthen their market positions. Besides this, vertical integration, supply chain stability, and adherence to environmental standards are critical factors shaping the competitive landscape of the needle coke market.

-□Challenges and Opportunities: The rising focus on sustainable production methods to meet environmental standards and ensuring a stable supply chain for raw materials are creating challenges for the needle coke market. In contrast, the growing demand for needle coke in emerging industries, such as EVs and renewable energy is presenting lucrative opportunities for market expansion.

Needle Coke Market Trends:

Increasing demand for lithium-ion batteries:

One of the primary factors propelling the global needle coke market is the soaring demand for lithium-ion batteries. Needle coke is a crucial raw material in the production of anodes for lithium-ion batteries, which are widely used in EVs, consumer electronics, and energy storage systems. As the world transitions towards a more sustainable and eco-friendly energy landscape, there is a surging demand for EVs. Consequently, this has led to an increased need for high-performance lithium-ion batteries, which, in turn, is bolstering the demand for needle coke. Furthermore, the unique properties of needle coke, such as high thermal conductivity and resistance to thermal shock, making it an ideal choice for manufacturing high-quality anodes that enhance the overall efficiency and performance of lithium-ion batteries is impelling the market growth.

Growing steel industry and the importance of UHP graphite electrodes

The robust growth of the steel industry is contributing to the market growth, as needle coke is a key ingredient in the production of ultra-high-power (UHP) graphite electrodes, which find extensive application in electric arc furnaces for steel production. Needle coke's unique physical and chemical properties, such as low coefficient of thermal expansion and high electrical conductivity, make it an indispensable material for the manufacturing of UHP graphite electrodes. As a result, the steel industry's expansion, driven by urbanization, infrastructure development, and industrialization in emerging economies, has significantly increased the demand for UHP graphite electrodes, thereby bolstering the growth of the needle coke market.

Advancements in the oil and gas sector

The oil and gas sector plays a pivotal role in the needle coke market for the production of high-quality graphite electrodes used in the refining of crude oil. Needle coke's ability to withstand extreme temperatures and harsh chemical environments makes it an essential material for the production of graphite electrodes used in oil refining processes. Consequently, the flourishing expansion of the oil and gas industry is fueling the demand for needle coke. Apart from this, the increasing exploration and extraction of unconventional oil and gas resources, such as shale oil and gas, are heightening the demand for needle coke in various applications within the industry.

Expanding aerospace and automotive sectors

The increasing use of needle coke in the production of specialty carbon materials, including carbon fibers and composites, which find extensive applications in the aerospace and automotive industries is acting as another significant growth-inducing factor. These materials contribute to the lightweight of vehicles and aircraft, thereby enhancing fuel efficiency and overall performance.

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Concurrent with this, the bolstering growth of the aerospace and automotive sectors, driven by technological innovations, increasing air travel, and rising consumer demand for advanced and fuel-efficient vehicles are presenting lucrative opportunities for market expansion. Apart from this, the rising focus on meeting stringent environmental regulations among manufacturers and improving the energy efficiency of their products is propelling the market forward.

Needle Coke Industry Segmentation:

IMARC Group provides an analysis of the key trends in each segment of the market, along with forecasts at the global, regional, and country levels for 2024-2032. Our report has categorized the market based on type, grade, application and end use industry.

Breakup by Type:

- Coal-tar Pitch Derived
- Petroleum Derived

Petroleum derived accounts for the majority of the market share

The report has provided a detailed breakup and analysis of the market based on the type. This includes coal-tar pitch-derived and petroleum-derived. According to the report, petroleum derived represented the largest segment.

The escalating need for high-performance electrodes in electric arc furnaces for steel production is mainly driving the demand for petroleum-derived needle coke. As the steel industry witnesses robust growth, particularly in emerging economies undergoing rapid industrialization, there is a rising demand for ultra-high-power (UHP) graphite electrodes derived from petroleum needle coke which is bolstering the market growth. In confluence with this, significant advancements in steel manufacturing technologies and the increasing preference for more efficient and sustainable production processes in the steel industry are supporting the market growth.

Moreover, the growing demand for coal-tar pitch-derived needle coke is primarily fueled by its crucial role in the production of high-quality graphite electrodes for use in electric arc furnaces. As the steel industry expands, the need for needle coke derived from coal-tar pitch increases, driven by its unique characteristics, including high density, low impurity levels, and favorable electrical conductivity.

Breakup by Grade:

- Intermediate
- Premium
- Super Premium

Super premium holds the largest share in the industry

A detailed breakup and analysis of the market based on the grade have also been provided in the report. This includes intermediate, premium, and super premium. According to the report, super premium accounted for the largest market share.

The increasing use of super premium grade needle coke in the production of ultra-high-power (UHP) graphite electrodes, specifically in applications requiring high thermal conductivity and structural integrity is aiding in market expansion. Industries such as aerospace, automotive, and oil refining, where stringent performance requirements are essential, are increasingly relying on super-premium grade needle coke to manufacture advanced carbon materials, thereby impelling the market growth. Besides this, ongoing technological advancements in these sectors spurring the demand for high-performance materials that can withstand extreme conditions and provide superior conductivity is propelling the preference for super premium grade needle coke to meet the evolving needs of these demanding applications.

The rising demand for intermediate and premium-grade needle coke is propelled by their versatility and suitability for various applications in steel, lithium-ion batteries, and other industries. These grades of needle coke find applications in the production of graphite electrodes for electric arc furnaces and anodes for lithium-ion batteries. Industries seeking a balance between cost-effectiveness and high-performance characteristics often prefer intermediate and premium-grade needle coke.

Breakup by Application:

- Graphite Electrodes
- Silicon Metal and Ferroalloys

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- Lithium-ion Battery
- Carbon Black
- Rubber Compounds
- Others

Graphite electrodes represent the leading market segment

The report has provided a detailed breakup and analysis of the market based on the application. This includes graphite electrodes, silicon metal and ferroalloys, lithium-ion battery, carbon black, rubber compounds, and others. According to the report, graphite electrodes represented the largest segment.

The needle coke's exceptional physical and electrical properties make it an indispensable material for manufacturing high-quality graphite electrodes, which play a vital role in the steelmaking process by providing the necessary electrical conductivity and resistance to extreme temperatures, thereby contributing to the efficiency and sustainability of steel production methods. As a result, the increasing global production of steel through electric arc furnaces (EAFs) is propelling the market growth.

Apart from its extensive application in graphite electrodes, needle coke finds a wide range of usage across the silicon metal and ferroalloys sector for the production of electrodes used in the smelting process. Apart from this, the widespread product utilization in the lithium-ion battery industry in anode production is acting as another crucial factor influencing the market growth.

Furthermore, needle coke is integral to the manufacturing of carbon black, widely used in tire production, and rubber compounds, which is further providing an impetus to the market growth.

Breakup by End Use Industry:

- Aluminum and Steel
- Automotive
- Semiconductor
- Others

A detailed breakup and analysis of the market based on the end use industry have also been provided in the report. This includes aluminum and steel, automotive, semiconductor, and others.

The increasing demand for needle coke across the aluminum and steel industry, in the production of high-quality graphite electrodes used in electric arc furnaces, contributing to efficient metal smelting is bolstering the market growth. In addition to this, the automotive sector's increasing utilization of needle coke for the manufacturing of lithium-ion batteries, essential for EVs is presenting lucrative opportunities for market expansion. Moreover, the growing use of needle coke across the semiconductor industry in the production of silicon metal, a key component in semiconductor manufacturing processes is impelling the market growth. Besides this, needle coke's role in aerospace and oil refining, where its unique properties are harnessed for advanced materials is creating a favorable outlook for market expansion.

Breakup by Region:

- North America
 - o□United States
 - o□Canada
- Europe
 - o□Germany
 - o□France
 - o□United Kingdom
 - o□Italy
 - o□Spain
 - o□Others
- Asia Pacific
 - o□China

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- o Japan
- o India
- o South Korea
- o Australia
- o Indonesia
- o Others
- Latin America
- o Brazil
- o Mexico
- o Others
- Middle East and Africa

Asia Pacific leads the market, accounting for the largest needle coke market share

The market research report has also provided a comprehensive analysis of all the major regional markets, which include North America (the United States and Canada); Europe (Germany, France, the United Kingdom, Italy, Spain, and others); Asia Pacific (China, Japan, India, South Korea, Australia, Indonesia, and others); Latin America (Brazil, Mexico, and others); and the Middle East and Africa. According to the report, Asia Pacific accounted for the largest market share.

The Asia Pacific region's expanding steel and automotive industries, coupled with the surge in electric vehicle adoption are contributing to the growth of the needle coke market. In line with this, the rapid industrialization and infrastructure development in countries like China and India leading to an increased demand for steel, are boosting the demand for needle coke in graphite electrodes. Moreover, the expanding production of lithium-ion batteries for EVs has further heightened the demand for needle coke in the Asia Pacific region.

Concurrent with this, North America's expanding electric vehicle market and the need for high-quality graphite electrodes in steel production are fueling the market growth. Furthermore, the thriving automotive and aerospace industries of Europe, emphasizing advanced materials are aiding in market expansion. Besides this, rapid industrialization and expanding infrastructural development across Latin America and the Middle East and Africa are positively impacting the market growth.

Leading Key Players in the Needle Coke Industry:

The global needle coke market exhibits a competitive landscape characterized by key players vying for market share through strategic initiatives and technological advancements. Major industry participants are engaged in intensive R&D activities to enhance product quality and meet the evolving demands of end-use industries. These companies often focus on vertical integration, securing a stable supply chain, and forming strategic partnerships to strengthen their market position. Additionally, factors such as capacity expansions, mergers, and acquisitions play a crucial role in shaping the competitive dynamics of the needle coke market. The market's competitive nature is further accentuated by the necessity for sustainable and efficient production processes, meeting stringent environmental standards, and adapting to the dynamic demands of key sectors like lithium-ion batteries, steel, oil and gas, and aerospace.

The market research report has provided a comprehensive analysis of the competitive landscape. Detailed profiles of all major companies have also been provided. Some of the key players in the market include:

- Asbury Carbons Inc.
- GrafTech International Ltd.
- Graphite India Limited
- Mitsubishi Chemical Holdings Corporation
- Nippon Steel Chemical & Material Co., Ltd.
- Phillips 66 Company
- Sojitz Corporation
- Sumitomo Corporation

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(Please note that this is only a partial list of the key players, and the complete list is provided in the report.)

Latest News:

-□ In December 2023, Mott Corporation announced a new eight-figure agreement with South Korean refinery S-OIL. Mott and its Korean partner DL E&C are teaming up to provide critical filtration technology for S-OIL's groundbreaking Shaheen project in Ulsan, South Korea.

-□ In November 2023, Nippon Steel Corporation announced its indirect acquisition of 20% interest in Elk Valley Resources (EVR JV), which is the steelmaking coal business partnership sold by Teck Resources Limited (Teck),

Key Questions Answered in This Report

1. What was the size of the global needle coke market in 2023?
2. What is the expected growth rate of the global needle coke market during 2024-2032?
3. What are the key factors driving the global needle coke market?
4. What has been the impact of COVID-19 on the global needle coke market?
5. What is the breakup of the global needle coke market based on the type?
6. What is the breakup of the global needle coke market based on the grade?
7. What is the breakup of the global needle coke market based on the application?
8. What are the key regions in the global needle coke market?
9. Who are the key players/companies in the global needle coke market?

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