

Graphene Market by Type (Bulk Graphene and Monolayer Graphene), Source, Application, End-use Industry (Automotive & Transportation, Aerospace & Defense, Electronics, and Construction) and Region - Global Forecast to 2029

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Abstracts

The graphene market is estimated at USD 1.00 billion in 2024 and is projected to reach USD 2.94 billion by 2029, at a CAGR of 24.0% from 2024 to 2029. Bulk Graphene dominated the type segment of graphene market in terms of value in 2023. This is due to the rapidly growing demand for bulk graphene due to its unique combination of extraordinary properties and potential applications across various industries. Bulk Graphene is preferred over monolayer graphene for various reasons, specifically due to production scalability, cost-effectiveness, and application versatility.

“Graphite accounted for the largest share of the overall graphene market, by source, in terms of value.”

Graphite is among the most available forms of carbon in found on the earth. Due to its abundance, graphite is one of the most readily available raw materials for mass production of graphene. Businesses involved in graphite mining have an upper hand as they are masters of the supply of this precious resource since they determine who can access the supply. The synthesis of graphene from graphite is comparatively easier, compared to other sources, through mechanical or chemical exfoliation methods. Graphite can be cleaved into monolayers, or few layers sheets based on simple techniques like sonification or chemical treatments.

“Composite application led the application segment during the forecast period, in terms of value in the graphene segment.”

Composite application is leading the application segment of the graphene market because of some truly persuasive factors that outline the distinctive benefits it offers in terms of material property modification and enrichment across industries.

Graphene enhanced composites possess attractive mechanical, electrical, and thermal properties. Graphene incorporation in materials can enhance these in almost every aspect-for strength, flexibility, conductivity, and durability. This makes graphene composites particularly appealing for industries which require lightweight yet stiff materials, like aerospace and automotive.

“Electronics end-use industry is expected to have the fastest growth rate in terms of value, amongst all the end-use industries in the graphene market.”

Electronics end-use industry is expected to grow faster than all the other end-use industries where graphene is used. The outstanding electrical conductivity, high electron mobility, make it an ideal material for various electronic components. This capability allows for the development of faster and more efficient devices that may be critical in a market focused on performance and speed.

Constant research and development are increasing potential applications of graphene in electronics. Some of the recent innovations, like Graphene field-effect transistors (GFETs), promise to revolutionize semiconductor technology and thus offer superior performance compared to conventional silicon-based devices. While breakthroughs continue, the reception of graphene in new electronic technologies should gain greater momentum.

“During the forecast period, graphene market in Asia Pacific region is projected to have the largest market share, in terms of value amongst all regions.”

In terms of value, Asia Pacific accounted for the largest market share of the graphene market due to increasing demand for graphene across various sectors, especially in electronics and automotive industries.

The electronics sector is one of the growing areas, which graphene plays a vital role in the adoption of graphene in the Asia Pacific region. Graphene's unique properties such as strength to weight ratio, and excellent electrical conductivity are increasingly utilized in the automotive and aerospace sectors.

The competitive environment in Asia Pacific is characterized by numerous players investing heavily in R&D to enhance their product offerings. Companies such as Ningbo Morsh Technology Co., Ltd., First Graphene, and The Sixth Element (Changzhou) Materials Technology Co., Ltd. are expanding their market presence through strategic partnerships and collaborations, which further drives market growth.

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- 60%, Tier 2- 20%, and Tier 3- 20%

By Designation- C Level- 33%, Director Level- 33%, and Others- 34%

By Region- North America- 20%, Europe- 25%, Asia Pacific- 25%, Middle East & Africa (MEA)-20%, South America- 10%.

The report provides a comprehensive analysis of company profiles:

Prominent companies include Graphenea S.A (Spain), First Graphene (Australia), NanoXplore Inc. (Canada), Avanzare Innovacion Tecnologica S.L. (Spain), Global Graphene Group (US), Directa Plus S.P.A (Italy), Haydale Graphene Industries Plc (UK), ACS Material (US), The Sixth Element (Changzhou) Materials Technology Co. Ltd. (China), Xiamen Knano Graphene Technology Co., Ltd. (China), Universal Matter, Inc. (Canada), Petroliam Nasional Berhad (Petronas, Malaysia), Thomas Swan & Co. Ltd. (England), and Danish Graphene ApS (Denmark).

Research Coverage

This research report categorizes the graphene market By Source (Graphite, Graphite Oxide, Reduced Graphite Oxide, and Other Sources), By Type (Bulk Graphene and Monolayer Graphene), By Application (Composite, Energy Harvesting & Storage, Paints, Coatings & Inks, Electronics, and Other Applications), By End-use Industry (Automotive & Transportation, Aerospace & Defense, Electronics, Construction, and Other End-use Industries), and By 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 graphene market, such as drivers, restraints, challenges, and opportunities. A thorough examination of the key industry players has been conducted to provide insights into their business overview,

solutions, and services, key strategies, contracts, partnerships, and agreements. New product and service launches, mergers and acquisitions, and recent developments in the graphene market are all covered. This report includes a competitive analysis of upcoming startups in the graphene 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 graphene 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 (Growing demand in key end-use industries and supportive government policies in major graphite-exporting countries for boosting graphene production), restraints (Difficulty in mass production and lack of energy band-gap in graphene materials), opportunities (Rising demand in energy storage applications due to exceptional properties and rising use in next generation electronics due to exceptional properties), and challenges (Lack of standardization in graphene industry and high production cost) influencing the growth of the graphene market.

Product Development/Innovation: Detailed insights on upcoming technologies, research & development activities, and new product & service launches in the graphene market.

Market Development: Comprehensive information about lucrative markets – the report analyses the graphene market across varied regions.

Market Diversification: Exhaustive information about new products & services, untapped geographies, recent developments, and investments in the graphene market

Competitive Assessment: In-depth assessment of market shares, growth strategies and service offerings of leading players like, include Graphenea S.A

(Spain), First Graphene (Australia), NanoXplore Inc. (Canada), Avanzare Innovacion Tecnologica S.L. (Spain), Global Graphene Group (US), Directa Plus S.P.A (Italy), Haydale Graphene Industries Plc (UK), ACS Material (US), The Sixth Element (Changzhou) Materials Technology Co. Ltd. (China), Xiamen Knano Graphene Technology Co., Ltd. (China), Universal Matter, Inc. (Canada), Petrolia Nasional Berhad (Petronas, Malaysia), Thomas Swan & Co. Ltd. (England), and Danish Graphene ApS (Denmark) among others in the graphene market.

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About

The market for modified starches was estimated to be \$XX million in 2013 and is estimated to reach \$XX million by 2018, growing at a rate of XX% by 2018. Food acquired the largest share of XX% in 2013 and is expected to reach XX% by 2018, growing at a rate of XX% for the period of five years. The non-food segment is expected to show a high growth of XX%. Paper-making forms a major segment in non-food applications of modified starch.

The total addressable market for modified starches is estimated to have stood at a value of \$XX billion in 2013, and is expected to reach \$XX billion by 2018, growing at a CAGR of XX%. The major application markets for modified starches have been taken into consideration for the obtained estimation. Modified starches find wide opportunities in the food and industrial sectors. Therefore, some of the major food and industrial applications have been covered for the analysis. Processed food forms a major addressable market for modified starches with a revenue generation of \$XX billion in 2013.

The six major players in the modified starches market that have been considered for the study include Cargill(U.S.), ADM(U.S.), Ingredion (U.S.), Penford(U.S.), Tate & Lyle (U.K.), and Roquette(France).The rest (large, medium, and small-scale organizations) are categorized as others. Cargill holds the highest share, i.e., XX%. The others segment holds more than half of the global market with a share of XX%.

In terms of volume, corn acquired the largest share—XX%—in 2013 and is expected to slightly lose its holding in the market by 2018, falling to a share of XX%. Cassava is an emerging competition for corn and is expected to grow at a rate of XX% by 2018. The other raw materials include potato, wheat, rice, etc.

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