

Graphene Nanoplatelets Market - Global Industry Size, Share, Trends, Opportunity, and Forecast, Segmented By Application (Lithium-Ion Batteries, Conductive Inks and Coatings, EMI Shielding, Additives, Others), By End User (Energy & Power, Automotive & Transportation, Building & Construction, Others), By Region and Competition, 2020-2030F

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Report description:

Market Overview

Global Graphene Nanoplatelets Market was valued at USD 93.12 Million in 2024 and is expected to reach USD 180.49 Million by 2030 with a CAGR of 11.86% during the forecast period. The global market for Graphene Nanoplatelets (GNPs) is experiencing robust growth, driven by rising demand across a diverse range of industries including aerospace, automotive, electronics, energy storage, and biomedical applications. GNPs offer exceptional mechanical strength, thermal conductivity, and electrical properties, making them ideal for enhancing the performance of composites, coatings, conductive inks, and batteries. As manufacturers increasingly seek lightweight, high-performance materials, the adoption of GNPs is accelerating, particularly in advanced composite applications and next-generation energy solutions.

Key Market Drivers

Rising Demand of Graphene Nanoplatelets in Energy & Power Sector

Graphene nanoplatelets (GNPs) have emerged as a game-changing material with immense potential to revolutionize various industries, and the energy and power sector is no exception. The remarkable properties of GNPs, including their exceptional electrical conductivity, mechanical strength, and thermal stability, make them an attractive candidate for addressing critical challenges and driving innovation within the energy and power domain. The energy and power sector are undergoing a profound transformation as the world shifts towards more sustainable and efficient energy sources. GNPs are poised to play a pivotal role in this transition by enhancing the performance and efficiency of energy storage devices, such as batteries and supercapacitors. The

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demand for high-performance energy storage solutions is on the rise, driven by the increasing adoption of renewable energy sources and the need for grid stabilization. GNPs, with their large surface area and electrical conductivity, can significantly enhance the charge storage capacity of batteries and supercapacitors. This translates to longer-lasting and faster-charging energy storage systems, addressing key challenges in renewable energy integration and grid management. In the realm of renewable energy, GNPs are also making strides in improving the efficiency of photovoltaic cells. Solar panels coated with graphene nanoplatelets exhibit enhanced light absorption and electron transport properties, leading to improved energy conversion efficiency. GNPs can help maximize the conversion of sunlight into electricity, making solar energy more viable and competitive. This innovation not only boosts the overall efficiency of solar panels but also accelerates the adoption of solar power as a mainstream energy source.

According to the IEO2023 projections, global electric power generation and capacity are expected to expand significantly by 2050, with capacity rising by 50% to 100% and electricity generation increasing by 30% to 76%, depending on the scenario. A substantial portion of this growth is driven by zero-carbon technologies, particularly renewables and nuclear energy, which are projected to contribute up to two-thirds of global electricity generation by mid-century. In line with this transition, battery storage capacity is also set for major expansion, growing from less than 1% of global power capacity in 2022 to between 4% and 9% by 2050. This accelerated shift toward cleaner, more efficient energy systems is expected to fuel the demand for advanced materials like Graphene Nanoplatelets, which enhance energy storage performance and thermal management, thereby supporting overall market growth in the energy and power sector. GNPs offer exceptional electrical conductivity, thermal stability, and mechanical strength, making them highly suitable for enhancing the performance of energy storage systems such as lithium-ion batteries, supercapacitors, and fuel cells. As energy storage becomes critical to the adoption of electric vehicles, renewable energy integration, and smart grid technologies, the role of GNPs in improving charge capacity, energy density, and lifespan of devices is gaining strategic importance. Moreover, their use in thermal interface materials and conductive coatings further supports innovation in energy infrastructure. This growing application spectrum, combined with increasing investment in clean energy technologies, is significantly boosting the demand for GNPs in the energy and power sector worldwide.

Key Market Challenges

Scalability and Production Consistency and Cost-effectiveness

One of the primary challenges in the graphene nanoplatelets market is scalability and production consistency. While significant advancements have been made in synthesizing GNPs, producing them on a large scale while maintaining consistent quality remains a complex task. Traditional methods often yield small quantities, and alternative techniques like chemical vapor deposition can be costly and energy-intensive. Scaling up production to meet industrial demands without compromising quality is a hurdle that requires innovative solutions and substantial investments in research and development.

Moreover, the production of high-quality graphene nanoplatelets can be expensive due to the intricate processes involved. The cost of raw materials, equipment, and energy needed for production contributes to the overall expense. This poses a challenge, especially for industries that require substantial quantities of GNPs, such as electronics and energy storage. For GNPs to become economically viable for a broader range of applications, efforts are required to develop more efficient and affordable production methods.

Key Market Trends

Increasing Commercial-Scale Production

A key trend shaping the Graphene Nanoplatelets (GNPs) market is the transition toward large-scale commercial production, driven by increasing global demand across a range of industries. As GNP applications continue to grow, particularly in energy storage, composites, coatings, and electronics manufacturers are focusing on advanced production technologies to enhance scalability, lower costs, and maintain consistent product quality. Progress in exfoliation methods, chemical vapor deposition, and sustainable synthesis techniques is making high-volume manufacturing more efficient and cost-effective. Leading companies such as XG Sciences in the U.S. and Directa Plus in Italy have expanded their production capacity to supply GNPs for commercial use in lithium-ion batteries, conductive inks, and polymer-reinforced materials. These firms are adopting innovative processing techniques to streamline operations and support consistent, industrial-scale output. This development is playing a vital role in bridging the gap between research and real-world application, making GNPs more viable for large-scale use. As production expands and economies of scale are realized, the cost of GNPs is expected to decline, further boosting adoption and fueling

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market growth.

Key Market Players

- [X] XG Sciences, Inc.
- [A] ACS Material, LLC
- [T] Thomas Swan & Co. Ltd.
- [D] Directa Plus S.p.A
- [H] Haydale Limited
- [A] Applied Graphene Materials plc
- [N] NanoXplore Inc.
- [C] CVD Equipment Corporation
- [S] Strem Chemicals, Inc.
- [G] Global Graphene Group

Report Scope:

In this report, the Global Graphene Nanoplatelets Market has been segmented into the following categories, in addition to the industry trends which have also been detailed below:

- [G] Graphene Nanoplatelets Market, By Application:

- o Lithium-Ion Batteries
- o Conductive Inks and Coatings
- o EMI Shielding
- o Additives
- o Others

- [G] Graphene Nanoplatelets Market, By End User:

- o Energy & Power
- o Automotive & Transportation
- o Building & Construction
- o Others

- [G] Graphene Nanoplatelets Market, By Region:

- o Asia-Pacific
 - [C] China
 - [I] India
 - [A] Australia
 - [J] Japan
 - [S] South Korea
- o Europe
 - [F] France
 - [G] Germany
 - [S] Spain
 - [I] Italy
 - [U] United Kingdom
- o North America
 - [U] United States
 - [M] Mexico
 - [C] Canada
- o South America
 - [B] Brazil
 - [A] Argentina
 - [C] Colombia

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o Middle East & Africa

□ South Africa

□ Saudi Arabia

□ UAE

Competitive Landscape

Company Profiles: Detailed analysis of the major companies present in the Global Graphene Nanoplatelets Market.

Available Customizations:

Global Graphene Nanoplatelets Market report with the given market data, TechSci Research offers customizations according to a company's specific needs. The following customization options are available for the report:

Company Information

-□ Detailed analysis and profiling of additional market players (up to five).

Table of Contents:

1. Product Overview
 - 1.1. Market Definition
 - 1.2. Scope of the Market
 - 1.2.1. Markets Covered
 - 1.2.2. Years Considered for Study
 - 1.2.3. Key Market Segmentations
2. Research Methodology
 - 2.1. Objective of the Study
 - 2.2. Baseline Methodology
 - 2.3. Key Industry Partners
 - 2.4. Major Association and Secondary Sources
 - 2.5. Forecasting Methodology
 - 2.6. Data Triangulation & Validation
 - 2.7. Assumptions and Limitations
3. Executive Summary
 - 3.1. Overview of the Market
 - 3.2. Overview of Key Market Segmentations
 - 3.3. Overview of Key Market Players
 - 3.4. Overview of Key Regions/Countries
 - 3.5. Overview of Market Drivers, Challenges, Trends
4. Impact of COVID-19 on Global Graphene Nanoplatelets Market
5. Global Graphene Nanoplatelets Market Outlook
 - 5.1. Market Size & Forecast
 - 5.1.1. By Value
 - 5.2. Market Share & Forecast
 - 5.2.1. By Application (Lithium-Ion Batteries, Conductive Inks and Coatings, EMI Shielding, Additives, Others)
 - 5.2.2. By End User (Energy & Power, Automotive & Transportation, Building & Construction, Others)
 - 5.2.3. By Region
 - 5.2.4. By Company (2024)
 - 5.3. Market Map
6. Asia Pacific Graphene Nanoplatelets Market Outlook
 - 6.1. Market Size & Forecast
 - 6.1.1. By Value
 - 6.2. Market Share & Forecast

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- 6.2.1. By Application
- 6.2.2. By End User
- 6.2.3. By Country
- 6.3. Asia Pacific: Country Analysis
 - 6.3.1. China Graphene Nanoplatelets Market Outlook
 - 6.3.1.1. Market Size & Forecast
 - 6.3.1.1.1. By Value
 - 6.3.1.2. Market Share & Forecast
 - 6.3.1.2.1. By Application
 - 6.3.1.2.2. By End User
 - 6.3.2. India Graphene Nanoplatelets Market Outlook
 - 6.3.2.1. Market Size & Forecast
 - 6.3.2.1.1. By Value
 - 6.3.2.2. Market Share & Forecast
 - 6.3.2.2.1. By Application
 - 6.3.2.2.2. By End User
 - 6.3.3. Australia Graphene Nanoplatelets Market Outlook
 - 6.3.3.1. Market Size & Forecast
 - 6.3.3.1.1. By Value
 - 6.3.3.2. Market Share & Forecast
 - 6.3.3.2.1. By Application
 - 6.3.3.2.2. By End User
 - 6.3.4. Japan Graphene Nanoplatelets Market Outlook
 - 6.3.4.1. Market Size & Forecast
 - 6.3.4.1.1. By Value
 - 6.3.4.2. Market Share & Forecast
 - 6.3.4.2.1. By Application
 - 6.3.4.2.2. By End User
 - 6.3.5. South Korea Graphene Nanoplatelets Market Outlook
 - 6.3.5.1. Market Size & Forecast
 - 6.3.5.1.1. By Value
 - 6.3.5.2. Market Share & Forecast
 - 6.3.5.2.1. By Application
 - 6.3.5.2.2. By End User
- 7. Europe Graphene Nanoplatelets Market Outlook
 - 7.1. Market Size & Forecast
 - 7.1.1. By Value
 - 7.2. Market Share & Forecast
 - 7.2.1. By Application
 - 7.2.2. By End User
 - 7.2.3. By Country
 - 7.3. Europe: Country Analysis
 - 7.3.1. France Graphene Nanoplatelets Market Outlook
 - 7.3.1.1. Market Size & Forecast
 - 7.3.1.1.1. By Value
 - 7.3.1.2. Market Share & Forecast
 - 7.3.1.2.1. By Application

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- 7.3.1.2.2. By End User
- 7.3.2. Germany Graphene Nanoplatelets Market Outlook
 - 7.3.2.1. Market Size & Forecast
 - 7.3.2.1.1. By Value
 - 7.3.2.2. Market Share & Forecast
 - 7.3.2.2.1. By Application
 - 7.3.2.2.2. By End User
- 7.3.3. Spain Graphene Nanoplatelets Market Outlook
 - 7.3.3.1. Market Size & Forecast
 - 7.3.3.1.1. By Value
 - 7.3.3.2. Market Share & Forecast
 - 7.3.3.2.1. By Application
 - 7.3.3.2.2. By End User
- 7.3.4. Italy Graphene Nanoplatelets Market Outlook
 - 7.3.4.1. Market Size & Forecast
 - 7.3.4.1.1. By Value
 - 7.3.4.2. Market Share & Forecast
 - 7.3.4.2.1. By Application
 - 7.3.4.2.2. By End User
- 7.3.5. United Kingdom Graphene Nanoplatelets Market Outlook
 - 7.3.5.1. Market Size & Forecast
 - 7.3.5.1.1. By Value
 - 7.3.5.2. Market Share & Forecast
 - 7.3.5.2.1. By Application
 - 7.3.5.2.2. By End User
- 8. North America Graphene Nanoplatelets Market Outlook
 - 8.1. Market Size & Forecast
 - 8.1.1. By Value
 - 8.2. Market Share & Forecast
 - 8.2.1. By Application
 - 8.2.2. By End User
 - 8.2.3. By Country
 - 8.3. North America: Country Analysis
 - 8.3.1. United States Graphene Nanoplatelets Market Outlook
 - 8.3.1.1. Market Size & Forecast
 - 8.3.1.1.1. By Value
 - 8.3.1.2. Market Share & Forecast
 - 8.3.1.2.1. By Application
 - 8.3.1.2.2. By End User
 - 8.3.2. Mexico Graphene Nanoplatelets Market Outlook
 - 8.3.2.1. Market Size & Forecast
 - 8.3.2.1.1. By Value
 - 8.3.2.2. Market Share & Forecast
 - 8.3.2.2.1. By Application
 - 8.3.2.2.2. By End User
 - 8.3.3. Canada Graphene Nanoplatelets Market Outlook
 - 8.3.3.1. Market Size & Forecast

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- 8.3.3.1.1. By Value
- 8.3.3.2. Market Share & Forecast
- 8.3.3.2.1. By Application
- 8.3.3.2.2. By End User
- 9. South America Graphene Nanoplatelets Market Outlook
- 9.1. Market Size & Forecast
- 9.1.1. By Value
- 9.2. Market Share & Forecast
- 9.2.1. By Application
- 9.2.2. By End User
- 9.2.3. By Country
- 9.3. South America: Country Analysis
- 9.3.1. Brazil Graphene Nanoplatelets Market Outlook
- 9.3.1.1. Market Size & Forecast
- 9.3.1.1.1. By Value
- 9.3.1.2. Market Share & Forecast
- 9.3.1.2.1. By Application
- 9.3.1.2.2. By End User
- 9.3.2. Argentina Graphene Nanoplatelets Market Outlook
- 9.3.2.1. Market Size & Forecast
- 9.3.2.1.1. By Value
- 9.3.2.2. Market Share & Forecast
- 9.3.2.2.1. By Application
- 9.3.2.2.2. By End User
- 9.3.3. Colombia Graphene Nanoplatelets Market Outlook
- 9.3.3.1. Market Size & Forecast
- 9.3.3.1.1. By Value
- 9.3.3.2. Market Share & Forecast
- 9.3.3.2.1. By Application
- 9.3.3.2.2. By End User
- 10. Middle East and Africa Graphene Nanoplatelets Market Outlook
- 10.1. Market Size & Forecast
- 10.1.1. By Value
- 10.2. Market Share & Forecast
- 10.2.1. By Application
- 10.2.2. By End User
- 10.2.3. By Country
- 10.3. MEA: Country Analysis
- 10.3.1. South Africa Graphene Nanoplatelets Market Outlook
- 10.3.1.1. Market Size & Forecast
- 10.3.1.1.1. By Value
- 10.3.1.2. Market Share & Forecast
- 10.3.1.2.1. By Application
- 10.3.1.2.2. By End User
- 10.3.2. Saudi Arabia Graphene Nanoplatelets Market Outlook
- 10.3.2.1.1. By Value
- 10.3.2.2. Market Share & Forecast

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- 10.3.2.2.1. By Application
- 10.3.2.2.2. By End User
- 10.3.3. UAE Graphene Nanoplatelets Market Outlook
 - 10.3.3.1. Market Size & Forecast
 - 10.3.3.1.1. By Value
 - 10.3.3.2. Market Share & Forecast
 - 10.3.3.2.1. By Application
 - 10.3.3.2.2. By End User
- 11. Market Dynamics
 - 11.1. Drivers
 - 11.2. Challenges
- 12. Market Trends & Developments
 - 12.1. Recent Developments
 - 12.2. Product Launches
 - 12.3. Mergers & Acquisitions
- 13. Global Graphene Nanoplatelets Market: SWOT Analysis
- 14. Porter's Five Forces Analysis
 - 14.1. Competition in the Industry
 - 14.2. Potential of New Entrants
 - 14.3. Power of Suppliers
 - 14.4. Power of Customers
 - 14.5. Threat of Substitute Product
- 15. Competitive Landscape
 - 15.1. XG Sciences, Inc.
 - 15.1.1. Business Overview
 - 15.1.2. Company Snapshot
 - 15.1.3. Products & Services
 - 15.1.4. Financials (As Reported)
 - 15.1.5. Recent Developments
 - 15.2. ACS Material, LLC
 - 15.3. Thomas Swan & Co. Ltd.
 - 15.4. Directa Plus S.p.A.
 - 15.5. Haydale Limited
 - 15.6. Applied Graphene Materials plc
 - 15.7. NanoXplore Inc.
 - 15.8. CVD Equipment Corporation
 - 15.9. Strem Chemicals, Inc.
 - 15.10. Global Graphene Group
- 16. Strategic Recommendations
- 17. About Us & Disclaimer

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