Carbon Nanotubes Market Growth Analysis Report - Market Size, Share, Forecast Trends and Outlook (2025-2034)

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Report description:

The carbon nanotubes market attained a value of USD 9.41 Billion in 2024 . The market is expected to grow at a CAGR of 16.50% during the forecast period of 2025-2034. By 2034, the market is expected to reach USD 43.34 Billion .

The rapid rise of electric vehicles (EVs), portable electronics, and renewable energy storage is driving the market for carbon nanotubes for enhancing batteries and supercapacitors. Carbon nanotubes (CNTs) improve conductivity, charge capacity, and cycle life by reinforcing electrodes, driving innovations. In June 2023, CHASM Advanced Materials introduced NTeC-E conductive CNT additives for lithium-ion batteries to offer scalable, cost-efficient, and sustainable solutions This surge is making way for lightweight and durable batteries for green energy transition.

Carbon nanotube recycling is a significant contributor to the market, as it supports environmental sustainability and cost-efficiency. By recovering CNTs from used composites, electronic waste, or even plastic materials, manufacturers are reducing reliance on virgin raw materials and lower production costs. In January 2025, rice researchers revealed breakthrough carbon nanotube recycling method for enabling sustainable, eco-friendly production of advanced nanomaterials for diverse applications. This offers accessibility for large-scale applications in sectors, such as energy storage, electronics, automotive, and construction.

Key Trends and Recent Developments

May 2025

OCSiAl and Molicel formed a long-term partnership to boost ultrahigh-power lithium-ion batteries using single wall carbon nanotubes. This collaboration helped to improve energy density, conductivity, and performance, supporting next-generation battery technologies for high-demand applications via advanced CNT-enhanced electrode materials.

March 2025

AMD partnered with Huntsman Corporation to develop advanced composites enhanced with carbon nanotubes. This collaboration focused on integrating CNT technology into high-performance materials to improve strength, durability, and thermal conductivity for targeting applications in aerospace, automotive, and electronics industries.

December 2024

DENSO signed a Memorandum of Understanding with Finland-based Canatu to explore practical applications of carbon nanotube technology. This collaboration aimed to develop advanced automotive solutions by integrating Canatu's flexible CNT innovations into DENSO's components, enhancing performance, safety, and user experience in next-generation vehicles.

November 2024

Jartoo unveiled the world's first carbon nanotube heated blanket on Kickstarter, combining cutting-edge nanotechnology with cozy comfort. This innovative blanket offers ultra-efficient, even heating, faster warm-up times, and low energy use, making it ideal for eco-conscious consumers seeking advanced warmth solutions in a sleek, modern design.

Advancement in Composite Materials

Wide adoption in polymer and composite manufacturing to enhance mechanical strength, electrical conductivity, and thermal stability is boosting the carbon nanotubes industry. Industries, such as automotive, aerospace, and construction are seeking CNT-reinforced composites for lightweight, high-strength parts. In October 2024, Dow and Carbice collaborated to develop advanced silicone-carbon nanotube thermal interface materials for improving electronics performance and reliability in mobility. This expansion is also promoting material innovation, durability, and sustainability, fuelling market growth in composites.

Electronics Miniaturization and Performance

With the shrink in electronics and the strong demand for flexibility, carbon nanotubes are replacing traditional materials in transistors, interconnects, sensors, and flexible displays. Superior electrical and thermal properties of CNTs are allowing manufacturers to introduce smaller, faster, and more durable components. Companies are developing CNT-based transparent conductive films for supporting next-gen electronics and wearables. In January 2022, Toray Industries introduced a new printing tech for enabling semiconductor circuits on flexible films using high-performance semiconductive carbon nanotube composites.

Rising Focus on Sustainable and Green Technologies

Sustainability concerns in the carbon nanotubes market are leading to higher adoption of lightweight designs and energy-efficient devices. In August 2024, a research team at the Department of Energy and Chemical Engineering developed a breakthrough technology to transform waste plastics into valuable carbon nanotubes for promoting recycling. This trend is enhancing renewable energy devices and improving battery life while aligning with global green initiatives. Companies are also investing in CNT-enabled products to reduce carbon footprints, meeting stricter environmental regulations and consumer demand for eco-friendly products.

Growth of Nanotechnology Research and Development

Advances in nanotechnology research & development across academia and industry is fostering novel applications of carbon nanotubes in electronics, healthcare, and materials science. In May 2025, Luxembourg Institute of Science and Technology's

spin-off STRAYPROTECT created a super-black carbon nanostructure coating for enhancing optical device precision. Government funding and private investments are stimulating innovations in CNT functionalization and integration, expanding commercial opportunities.

Strategic Collaborations and Partnerships

Collaborations between producers, research institutes, and end-users are accelerating product development and commercialization in the carbon nanotubes industry. In November 2024, OCSiAl partnered with Green Energy Origin to manufacture TUBALL BATT nanotube suspensions, boosting lithium-ion battery performance and strengthening Europe's sustainable battery supply chain. These partnerships combine technical expertise, resources, and real-world application insights for creating a faster route from research to market.

Carbon Nanotubes Industry Segmentation

The EMR's report titled "Carbon Nanotubes Market Report and Forecast 2025-2034" offers a detailed analysis of the market based on the following segments:

Market Breakup by Type

- Single Walled
- Multi Walled

Key Insight: Single-walled carbon nanotubes market is gaining traction for offering exceptional electrical, mechanical, and thermal properties. These tubes provide superior conductivity and strength, making them ideal for high-performance applications like semiconductors, sensors, and energy storage devices. Several companies focus heavily on this production for electronics and battery technologies. In May 2025, Zeon and Sino Applied Technology partnered to expand single-walled carbon nanotube conductive paste, advancing lithium battery use in electric vehicles. Advances in flexible electronics and next-generation displays are also driving strong demand and significant investment in this segment globally.

Market Breakup by Method

- Chemical Vapor Deposition
- Catalytic Chemical Vapor Deposition
- High Pressure Carbon Monoxide Reaction
- Others

Key Insight: Chemical vapor deposition is particularly favored in the carbon nanotubes market for its scalability, cost-effectiveness, and ability. Widely used in both industrial and academic settings, this method involves the decomposition of hydrocarbon gases on a catalyst substrate. Companies are utilizing chemical vapor deposition (CVD) for producing multi-walled and single-walled CNTs used in electronics, coatings, and composite materials. In October 2024, OCSiAl launched its first European facility in Serbia using CVD technology to produce single-walled carbon nanotubes. As the demand for nanotubes rises, the segment remains the preferred and most economical production technique.

Market Breakup by Application

- Batteries and Capacitors
- Chemical and Polymers

- Electrical and Electronics
- Automotive
- Energy
- Aerospace and Defense
- Medical
- Others

Key Insight: The carbon nanotubes industry value is expanding with wide usage in lithium-ion batteries and supercapacitors due to their excellent electrical conductivity, high surface area, and mechanical strength. Major EV battery makers incorporate multi-walled CNTs as conductive additives in electrodes. In June 2023, LG Chem revealed plans to build its fourth carbon nanotube manufacturing unit to meet the demand for next-gen materials for EV batteries. The segment further holds dominance in the market, driven by the explosive growth in electric vehicles, grid storage, and portable electronics as well as rising requirements for high-performance, reliable battery technologies.

Market Breakup by Region

- North America
- Europe
- Asia Pacific
- Latin America
- Middle East and Africa

Key Insight: North America leads the carbon nanotubes market due to strong infrastructure, advanced manufacturing capabilities, and significant investments in nanotechnology. In March 2025, the United States government-backed National Nanotechnology Initiative allocated USD 2.16 billion to support over 1,200 active nanotech projects in premier institutions. The region benefits from high demand for lightweight and conductive materials in electric vehicles, aerospace composites, and flexible electronics. Government funding and partnerships between academia and industry also accelerate CNT innovations, reinforcing the regional market growth.

Carbon Nanotubes Market Share

Multi-Walled Carbon Nanotubes to Garner Popularity

The demand for multi-walled carbon nanotubes (MWCNTs) is growing for offering enhanced mechanical strength and durability. Industries are leveraging multi-walled carbon nanotubes to improve material toughness and thermal stability for industrial reinforcement. In June 2022, Bergen Carbon Solutions introduced MWCNTs to its portfolio after to scale production using its CO?-to-nanofiber technology. Affordability and robust properties also ensure steady product demand, especially in sectors focused on structural enhancements and bulk material manufacturing.

CCVD & HiPCO Methods to Gain Traction

Catalytic chemical vapor deposition (CCVD) is gaining traction in the carbon nanotubes industry due to its ability to enhance yield and purity using metal catalysts. This method is highly suitable for producing vertically aligned and patterned CNT arrays. Companies employ CCVD for consistent single-walled carbon nanotubes production tailored to high-performance applications. This method also offers precision and superior material quality, making it increasingly attractive for next-gen nanotechnology applications.

The high pressure carbon monoxide reaction (HiPCO) method is deployed to yield extremely pure carbon nanotubes. HiPCO-produced carbon nanotubes are the most structurally uniform, making them a reference material for electronics, photonics, biomedical and sensing applications. This process is primarily used in research and specialized applications where purity as well as structural control are important, such as nanoelectronics and biomedical fields. Startups and research institutions are also deploying HiPCO for academic-grade materials.

Higher Carbon Nanotubes Application in Chemical and Polymers & Automotive

The carbon nanotubes market is expanding from the chemical and polymers segment due to increasing integration to develop advanced composites with improved strength, thermal resistance, and electrical conductivity. Industries use CNT-reinforced polymers for structural parts, flame retardants, and anti-static coatings. This segment is expanding rapidly in automotive, packaging, and construction, where lightweight yet durable materials are in demand. With widespread application in multiple end-use industries, chemical and polymer integration is gaining traction.

The automotive industry uses carbon nanotubes in body panels, tires, and electronic components to improve strength, reduce weight, and enhance electrical conductivity. Several companies are supplying nanotubes for EMI shielding and anti-static components in vehicles. CNTs are also used in sensors for in-vehicle electronics and smart systems. According to the IEA (International Energy Agency), over 4 million electric cars were sold during the first quarter of 2025. With this rapid growth in electric and connected vehicles, the product demand in automotive applications is further expanding.

Carbon Nanotubes Market Regional Analysis

Surging Carbon Nanotubes Demand in Europe & Asia Pacific

Europe holds significant share in the carbon nanotubes market, driven by robust industrial innovation and sustainability goals. Germany, the United Kingdom, and France are supporting CNT adoption in automotive, renewable energy, and construction sectors. Moreover, the push toward electric mobility and green energy solutions is increasing the demand in battery electrodes and composite reinforcements, solidifying Europe's role in shaping the market advancements.

Asia Pacific carbon nanotubes market share is growing with the expanding electronics, automotive, and energy sectors, particularly in China, Japan, and South Korea. The demand for CNTs in lithium-ion batteries, semiconductors, and structural materials continues to rise. In July 2024, researchers at Peking University's Center for Carbon-Based Electronics unveiled the world's first carbon nanotube-based tensor processor chip, offering a promising solution for energy-efficient applications. Asia Pacific is further expected to grow due to increasing industrialization, government support, and domestic nanotech advancements.

Competitive Landscape

Key players in the carbon nanotubes market are adopting a range of strategic initiatives to strengthen their position and capitalize on growing demand across industries. Technological innovation is urging companies to invest heavily in research & development to enhance properties, such as conductivity, strength, and thermal resistance, making them suitable for applications in electronics, aerospace, energy storage, and automotive sectors. Strategic partnerships and collaborations with research institutions, end-use industries, and material science firms are also common, enabling the development of tailored solutions.

Many firms are also expanding production capacities to meet rising global demand, particularly for multi-walled nanotubes due to their cost-effectiveness and versatility. Geographical expansion is another focus, especially in emerging markets, where industrial applications are rapidly growing. Sustainability is becoming increasingly important, prompting players to explore eco-friendly

production methods and recyclable nanomaterials. Additionally, companies are adopting competitive pricing strategies, forming long-term supply agreements, and entering licensing deals to increase market penetration and ensure steady revenue streams.

Arkema Group

Founded in 2004, Arkema Group is headquartered in Colombes, France, and specializes in advanced materials, including carbon nanotubes through its subsidiary, Graphistrength. Arkema offers CNTs for use in electronics, composites, coatings, and energy storage, with a focus on enhancing material strength, conductivity, and lightweight properties.

Toray Industries, Inc.

Toray Industries, established in 1926 and headquartered in Tokyo, Japan, is a global leader in high-performance materials, offering carbon nanotubes primarily for use in aerospace, automotive, and electronic sectors. Toray's CNT technologies support lightweight, durable, and conductive solutions, contributing significantly to advancements in composite materials.

Carbon Solutions, Inc.

Carbon Solutions, Inc., founded in 1998 and headquartered in Riverside, the United States, is known for its production and functionalization of carbon nanotubes and other nanomaterials. The company supplies high-purity CNTs tailored for academic research and industrial use,_x000D_
particularly in electronics, coatings, sensors, and energy storage technologies.

Cheap Tubes Inc.

Established in 2005, Cheap Tubes Inc. is headquartered in Grafton, the United States and offers a broad range of carbon nanomaterials. The company serves sectors like electronics, biomedical, aerospace, and energy, with a focus on affordability and customized nanotechnology solutions.

Other players in the carbon nanotubes market are Nanocyl SA, Jiangsu Cnano Technology Co., Ltd, and CHASM Advanced Materials Inc., among others.

Key Features of the Carbon Nanotubes Market Report:

- Comprehensive quantitative analysis covering market size, share, and growth forecasts.
- In-depth segmentation by type, method, application, and region for targeted insights.
- Detailed competitive landscape with profiles of leading industry players.
- Examination of emerging trends, technological advancements, and market drivers.
- Analysis of regulatory frameworks and their impact on market dynamics.
- Insightful evaluation of supply chain and distribution channels globally.

Why Choose Expert Market Research?

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Call to Action:

Download our free sample report today to explore the latest carbon nanotubes market trends 2025 , growth opportunities, and competitive strategies. Stay ahead in the evolving nanomaterials industry with Expert Market Research's reliable insights and actionable data. Get your comprehensive market overview now!

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