

# The Global Market for Carbon Nanomaterials: Carbon Nanotubes, Graphene, 2D Materials and Nanodiamonds

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## Abstracts

This is a golden era for nanostructured carbon materials research. Graphitic carbon materials such as carbon nanotubes (CNTs) and graphene are the strongest, lightest and most conductive fibres known to man, with a performance-per-weight greater than any other material. In direct competition in a number of markets, they are complementary in others.

Once the most promising of all nanomaterials, CNTs face stiff competition in conductive applications from graphene and other 2D materials and in mechanically enhanced composites from nanocellulose. However, after considerable research efforts, numerous multi-walled carbon nanotubes (MWNTs)-enhanced products are commercially available. Super-aligned CNT arrays, films and yarns have found applications in consumer electronics, batteries, polymer composites, aerospace, sensors, heaters, filters and biomedicine.

Large-scale industrial production of single-walled carbon nanotubes (SWNTs) has been initiated, promising new market opportunities in transparent conductive films, transistors, sensors and memory devices. SWNTs are regarded as one of the most promising candidates to be utilized as building blocks in next generation electronics.

Two-dimensional(2D) materials are currently one of the most active areas of nanomaterials research, and offer a huge opportunity for both fundamental studies and practical applications, including superfast, low-power, flexible and wearable electronics, sensors, photonics and electrochemical energy storage devices that will have an immense impact on our society.

Graphene is a ground-breaking two-dimensional (2D) material that possesses extraordinary electrical and mechanical properties that promise a new generation of innovative devices. New methods of scalable synthesis of high-quality graphene, clean delamination transfer and device integration have resulted in the commercialization of state-of-the-art electronics such as graphene touchscreens in smartphones and flexible RF devices on plastics.

Beyond graphene, emerging elementary 2D materials such as transition metal dichalcogenides, group V systems including phosphorene, and related isoelectronic structures will potentially allow for flexible electronics and field-effect transistors that exhibit ambipolar transport behaviour with either a direct band-gap or greater gate modulation.

Nanodiamonds (NDs), also called detonation diamonds (DND) or ultradispersed diamonds (UDD), are relatively easy and inexpensive to produce, and have moved towards large-scale commercialization due to their excellent mechanical, thermal properties and chemical stability.

This 1000 page report on the carbon nanotubes, graphene and 2D materials and nanodiamonds market is by far the most comprehensive and authoritative report produced.

Production volumes, estimated to 2027

Commercialization timelines and technology trends

Carbon nanotubes and graphene products, now and planned

Comparative analysis of carbon nanotubes and graphene

Assessment of carbon nanomaterials market including production volumes, competitive landscape, commercial prospects, applications, demand by market and region, commercialization timelines, prices and producer profiles.

Assessment of end user markets for carbon nanomaterials including market drivers and trends, applications, market opportunity, market challenges and application and product developer profiles.

Unique assessment tools for the carbon nanomaterials market, end user

applications, economic impact, addressable markets and market challenges to provide the complete picture of where the real opportunities in carbon nanomaterials are.

Company profiles of carbon nanotubes, graphene, 2D materials and nanodiamonds producers and product developers, including products, target markets and contact details

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