

The Global Market for Graphene Oxide and Graphene Nanoplatelets to 2027

https://marketpublishers.com/r/G0668FA1774EN.html

Date: June 2018

Pages: 575

Price: US\$ 1,061.00 (Single User License)

ID: G0668FA1774EN

Abstracts

Commercial graphene can be broadly divided into 'Large Area' epitaxial graphene and Flake or 'Bulk' Graphene, and is manufactured in 2 formats:

Films format (CVD graphene).

Bulk powder/flake format (Graphene oxide and graphene nanoplatelets).

This new report from covers the market for graphene oxide and graphene nanoplatelets, which are produced in volume scale is (kilograms, tons, etc.) and represent the majority of the "graphene market" at present. Main markets for graphene oxide and graphene nanoplatelets are:

Catalysts.

Fuel cells.

Li-ion batteries.

Conductive inks

Solar cells

Supercapacitors.

OLED Lighting.



	Composites.	
	Packaging.	
	Plastics.	
	Gas & water separation.	
	Water filtration.	
	Coatings.	
Report contents include:		
	Size in value and tons for the graphene oxide and graphene nanoplatelets market, and growth rate during the forecast period, 2017-2026.	
	End-user industries for graphene oxide and graphene nanoplatelets and growth during the forecast period.	
	Market drivers, trends and challenges, by end user markets.	
	The regional markets for graphene oxide and graphene nanoplatelets .	
	Market outlook for 2018.	
	In-depth market assessment of opportunities for graphene oxide and graphene nanoplatelets .	
	Production capacities by company.	
	In-depth company profiles, including products, capacities, and commercial activities.	
	Detailed forecasts for key growth areas, opportunities and user demand.	

Over 180 company profiles.







Contents

1 RESEARCH SCOPE AND METHODOLOGY

- 1.1 Report scope
- 1.2 Research methodology
- 1.3 Assumptions and limitations
- 1.4 Primary research.
- 1.5 Secondary research
- 1.6 Market opportunity analysis.
- 1.7 Market challenges rating system.

2 EXECUTIVE SUMMARY.

- 2.1 Two-dimensional (2D) materials
- 2.2 Graphene
 - 2.2.1 The market in 2016
 - 2.2.2 The market in 2017
 - 2.2.3 The market in 2018
 - 2.2.4 The market to 2027-Applications and markets with greatest potential returns
 - 2.2.5 Production
 - 2.2.6 Products.
 - 2.2.7 Graphene investments 2016-2018.
- 2.3 Market outlook for 2018
 - 2.3.1 Global funding and initiatives.
 - 2.3.2 Products and applications.
 - 2.3.3 Production
 - 2.3.4 Market drivers and trends.
 - 2.3.5 Market and technical challenges.
- 2.4 Key players
 - 2.4.1 Competitive landscape
 - 2.4.2 Asia-Pacific
 - 2.4.2.1 China
 - 2.4.2.2 South Korea
 - 2.4.2.3 Taiwan
 - 2.4.2.4 Malaysia
 - 2.4.2.5 Japan
 - 2.4.2.6 Australia.
 - 2.4.3 North America



- 2.4.4 Europe.
 - 2.4.4.1 European Union funding
 - 2.4.4.2 UK
 - 2.4.4.3 Spain
 - 2.4.4.4 Italy

3 OVERVIEW OF GRAPHENE

- 3.1 History.
- 3.2 Forms of graphene.
- 3.3 Properties

4 GRAPHENE SYNTHESIS

- 4.1 Graphene oxide flakes and graphene nanoplatelets
- 4.2 Production methods
 - 4.2.1 Production directly from natural graphite ore
 - 4.2.2 Alternative starting materials
 - 4.2.3 Quality
- 4.3 Synthesis and production by types of graphene
 - 4.3.1 Graphene nanoplatelets (GNPs)
 - 4.3.2 Graphene nanoribbons
 - 4.3.3 Large-area graphene films
 - 4.3.4 Graphene oxide (GO)
- 4.4 Pros and cons of graphene production methods
- 4.5 Recent synthesis methods.
- 4.6 Synthesis methods by company

5 GRAPHENE MARKET STRUCTURE AND ROUTES TO COMMERCIALIZATION

6 END USER MARKET SEGMENT ANALYSIS

- 6.1 Market dynamics
- 6.2 Market growth accelerators and inhibitors.
- 6.3 Graphene production volumes 2010-2027.
- 6.4 Commercial production capacities
 - 6.4.1 Graphene oxide.
 - 6.4.2 Graphene nanoplatelets
 - 6.4.3 Planned graphene capacities 2018 onwards



6.5 Graphene pricing

- 6.5.1 Pristine Graphene Flakes pricing.
- 6.5.2 Few-Layer Graphene pricing
- 6.5.3 Graphene Nanoplatelets pricing
- 6.5.4 Reduced Graphene Oxide pricing
- 6.5.5 Graphene Quantum Dots pricing
- 6.5.6 Graphene Oxide Nanosheets pricing.
- 6.5.7 Multilayer Graphene (MLG) pricing.
- 6.5.8 Mass production of lower grade graphene materials.
- 6.5.9 High grade graphene difficult to mass produce.
- 6.5.10 Bulk supply.
- 6.5.11 Commoditisation.

7 GRAPHENE MARKET ANALYSIS.

- 7.1 Graphene market supply chain
- 7.2 Porters Five Forces Analysis
 - 7.2.1 Threat of New Entrants
 - 7.2.2 Threat of Substitutes.
 - 7.2.3 Bargaining Power of Buyers.
 - 7.2.4 Bargaining Power of Suppliers
 - 7.2.5 Intensity of Competitive Rivalry.

8 3D PRINTING.

- 8.1 MARKET DRIVERS AND TRENDS
- 8.2 PROPERTIES AND APPLICATIONS
- 8.3 GLOBAL MARKET SIZE AND OPPORTUNITY
- 8.4 MARKET CHALLENGES
- 8.5 PRODUCT DEVELOPERS

9 ADHESIVES

- 9.1 MARKET DRIVERS AND TRENDS
- 9.2 PROPERTIES AND APPLICATIONS
- 9.3 GLOBAL MARKET SIZE AND OPPORTUNITY
- 9.4 MARKET CHALLENGES
- 9.5 PRODUCT DEVELOPERS



10 AEROSPACE.

- 10.1 MARKET DRIVERS AND TRENDS.
- 10.2 PROPERTIES AND APPLICATIONS.
 - 10.2.1 Composites
 - 10.2.2 Coatings
- 10.3 GLOBAL MARKET SIZE AND OPPORUNTIY.
- 10.4 MARKET CHALLENGES.
- 10.5 PRODUCT DEVELOPERS.

11 AUTOMOTIVE

- 11.1 MARKET DRIVER AND TRENDS.
- 11.2 PROPERTIES AND APPLICATIONS.
 - 11.2.1 Composites
 - 11.2.2 Thermally conductive additives
 - 11.2.3 Tires.
- 11.3 GLOBAL MARKET SIZE AND OPPORTUNITY.
- 11.4 MARKET CHALLENGES.
- 11.5 PRODUCT DEVELOPERS.

12 COATINGS

- 12.1 MARKET DRIVERS AND TRENDS.
- 12.2 PROPERTIES AND APPLICATIONS.
 - 12.2.1 Anti-corrosion coatings
 - 12.2.1.1 Marine
 - 12.2.2 Anti-microbial
 - 12.2.3 Anti-icing
 - 12.2.4 Barrier coatings
 - 12.2.5 Heat protection
 - 12.2.6 Anti-fouling
 - 12.2.7 Wear and abrasion resistance.
 - 12.2.8 Smart windows
- 12.3 GLOBAL MARKET SIZE AND OPPORTUNITY.
 - 12.3.1 Thermal barrier coatings
 - 12.3.2 Barrier coatings
 - 12.3.3 Anti-microbial coatings
 - 12.3.4 De-icing or anti-icing coatings



- 12.3.5 Abrasion and wear resistant coatings.
- 12.3.6 Anti-corrosion coatings
- 12.4 MARKET CHALLENGES.
- 12.5 PRODUCT DEVELOPERS.

13 COMPOSITES

- 13.1 MARKET DRIVERS AND TRENDS.
- 13.2 PROPERTIES AND APPLICATIONS.
 - 13.2.1 Polymer composites.
 - 13.2.2 Barrier packaging
 - 13.2.3 Electrostatic discharge (ESD) and electromagnetic interference (EMI) shielding
 - 13.2.4 Wind turbines
 - 13.2.5 Ballistic protection.
- 13.3 GLOBAL MARKET SIZE AND OPPORTUNITY.
- 13.4 MARKET CHALLENGES.
- 13.5 PRODUCT DEVELOPERS.

14 CONDUCTIVE INKS

- 14.1 MARKET DRIVERS AND TRENDS.
- 14.2 PROPERTIES AND APPLICATIONS.
 - 14.2.1 RFID
 - 14.2.2 Smart labels
 - 14.2.3 Smart clothing
 - 14.2.4 Printable sensors
 - 14.2.5 Printed batteries.
 - 14.2.6 Printable antennas
- 14.3 GLOBAL MARKET SIZE AND OPPORTUNITY.
- 14.4 MARKET CHALLENGES.
- 14.5 PRODUCT DEVELOPERS.

15 ENERGY STORAGE, CONVERSION AND EXPLORATION.

- 15.1 BATTERIES
 - 15.1.1 MARKET DRIVERS AND TRENDS.
 - 15.1.2 PROPERTIES AND APPLICATIONS.
 - 15.1.2.1 Lithium-ion batteries (LIB).
 - 15.1.2.2 Lithium-air batteries



- 15.1.2.3 Lithium-sulfur batteries (Li-S)
- 15.1.2.4 Sodium-ion batteries.
- 15.1.2.5 Flexible and stretchable batteries
- 15.1.3 GLOBAL MARKET SIZE AND OPPORTUNITY.
- 15.1.4 MARKET CHALLENGES.
- 15.1.5 PRODUCT DEVELOPERS.
- 15.2 SUPERCAPACITORS
 - 15.2.1 MARKET DRIVERS AND TRENDS.
 - 15.2.2 PROPERTIES AND APPLICATIONS.
 - 15.2.2.1 Flexible and stretchable supercapacitors
 - 15.2.3 GLOBAL MARKET SIZE AND OPPORTUNITY.
 - 15.2.4 MARKET CHALLENGES.
- 15.2.5 PRODUCT DEVELOPERS.
- 15.3 PHOTOVOLTAICS
 - 15.3.1 MARKET DRIVERS AND TRENDS.
 - 15.3.2 PROPERTIES AND APPLICATIONS.
 - 15.3.2.1 ITO replacement
 - 15.3.2.2 Graphene-silicon (Gr-Si) Schottky junction solar cells
 - 15.3.2.3 Halide perovskites/graphene hybrids
 - 15.3.2.4 Solar energy harvesting textiles
 - 15.3.3 GLOBAL MARKET SIZE AND OPPORTUNITY.
 - 15.3.4 MARKET CHALLENGES.
 - 15.3.5 PRODUCT DEVELOPERS.
- 15.4 FUEL CELLS.
 - 15.4.1 MARKET DRIVERS AND TRENDS.
 - 15.4.2 PROPERTIES AND APPLICATIONS.
 - 15.4.2.1 Electrocatalyst supports.
 - 15.4.3 GLOBAL MARKET SIZE AND OPPORTUNITY.
 - 15.4.4 MARKET CHALLENGES.
 - 15.4.5 PRODUCT DEVELOPERS.
- 15.5 LED LIGHTING AND UVC
 - 15.5.1 MARKET DRIVERS AND TRENDS.
 - 15.5.2 PROPERTIES AND APPLICATIONS.
 - 15.5.2.1 Flexible OLED lighting.
 - 15.5.3 GLOBAL MARKET SIZE AND OPPORTUNITY.
 - 15.5.4 MARKET CHALLENGES.
 - 15.5.5 PRODUCT DEVELOPERS.
- 15.6 OIL AND GAS
- 15.6.1 MARKET DRIVERS AND TRENDS.



15.6.2 PROPERTIES AND APPLICATIONS.

- 15.6.2.1 Sensing and reservoir management.
- 15.6.2.2 Coatings.
- 15.6.2.3 Drilling fluids
- 15.6.2.4 Sorbent materials
- 15.6.2.5 Catalysts
- 15.6.2.6 Separation
- 15.6.3 GLOBAL MARKET SIZE AND OPPORTUNITY.
- 15.6.4 MARKET CHALLENGES.
- 15.6.5 PRODUCT DEVELOPERS.

16 FILTRATION

- 16.1 MARKET DRIVERS AND TRENDS.
- 16.2 PROPERTIES AND APPLICATIONS.
 - 16.2.1 Graphene membranes
 - 16.2.2 Water filtration
 - 16.2.3 Gas separation
 - 16.2.4 Photocatalytic absorbents
 - 16.2.5 Air filtration
- 16.3 GLOBAL MARKET SIZE AND OPPORTUNITY.
- 16.4 MARKET CHALLENGES.
- 16.5 PRODUCT DEVELOPERS.

17 LIFE SCIENCES AND MEDICAL.

- 17.1 MARKET DRIVERS AND TRENDS.
- 17.2 PROPERTIES AND APPLICATIONS.
 - 17.2.1 Cancer therapy
 - 17.2.1.1 Graphene oxide for therapy and drug delivery
 - 17.2.1.2 Graphene nanosheets.
 - 17.2.1.3 Gene delivery.
 - 17.2.1.4 Photodynamic Therapy
 - 17.2.2 Medical implants and devices
 - 17.2.3 Wound dressings
 - 17.2.4 Biosensors
 - 17.2.4.1 FRET biosensors for DNA detection.
 - 17.2.5 Medical imaging
 - 17.2.6 Tissue engineering



- 17.2.7 Dental.
- 17.2.8 Electrophysiology
- 17.2.9 Wearable and mobile health monitoring
 - 17.2.9.1 Graphene devices
 - 17.2.9.2 Patch-type skin sensors.
 - 17.2.9.3 Skin temperature monitoring
 - 17.2.9.4 Hydration sensors
 - 17.2.9.5 Wearable sweat sensors
 - 17.2.9.6 Smart footwear
- 17.3 GLOBAL MARKET SIZE AND OPPORTUNITY.
- 17.4 MARKET CHALLENGES.
- 17.5 PRODUCT DEVELOPERS.

18 LUBRICANTS

- 18.1 MARKET DRIVERS AND TRENDS.
- 18.2 PROPERTIES AND APPLICATIONS.
- 18.3 GLOBAL MARKET SIZE AND OPPORTUNITY.
- 18.4 MARKET CHALLENGES.
- 18.5 PRODUCT DEVELOPERS.

19 RUBBER AND TIRES

- 19.1 APPLICATIONS
- 19.2 GLOBAL MARKET SIZE AND OPPORTUNITY.
- 19.3 MARKET CHALLENGES.
- 19.4 PRODUCT DEVELOPERS.

20 SENSORS

- 20.1 MARKET DRIVERS AND TRENDS.
- 20.2 PROPERTIES AND APPLICATIONS.
 - 20.2.1 Infrared (IR) sensors
 - 20.2.2 Electrochemical and gas sensors
 - 20.2.2.1 Graphene foam.
 - 20.2.3 Pressure sensors
 - 20.2.4 Biosensors
 - 20.2.5 Optical sensors
 - 20.2.6 Humidity sensors



- 20.2.7 Strain sensors
- 20.2.8 Acoustic sensors
- 20.2.9 Wireless sensors
- 20.2.10 Surface enhanced Raman scattering
- 20.3 GLOBAL MARKET SIZE AND OPPORTUNITY.
- 20.4 MARKET CHALLENGES.
- 20.5 PRODUCT DEVELOPERS.

21 TEXTILES AND APPAREL.

- 21.1 MARKET DRIVERS AND TRENDS.
- 21.2 PROPERTIES AND APPLICATONS
 - 21.2.1 Conductive coatings.
 - 21.2.2 Conductive yarns
- 21.3 GLOBAL MARKET SIZE AND OPPORTUNITY.
- 21.4 MARKET CHALLENGES.
- 21.5 PRODUCT DEVELOPERS.

22 OTHER MARKETS

- 22.1 CEMENT ADDITIVES.
 - 22.1.1 GLOBAL MARKET SIZE AND OPPORTUNITY.
 - 22.1.2 PRODUCT DEVELOPERS.



List Of Tables

LIST OF TABLES

- Table 1: Addressable markets for graphene (revenues), relevant applications, graphene technology fit and competition from other materials
- Table 2: Demand for graphene (tons), 2010-2027
- Table 3: Consumer products incorporating graphene.
- Table 4: Graphene investments and financial agreements 2017
- Table 5: Market opportunity assessment matrix for graphene applications
- Table 6: Graphene target markets-Applications and potential addressable market size
- Table 7: Main graphene producers by country and annual production capacities.
- Table 8: Graphene industrial collaborations, licence agreements and target markets
- Table 9: Properties of graphene.
- Table 10: Graphene oxide flakes/graphene nanoplatelets-Markets, applications and current global market
- Table 11: Main production methods for graphene.
- Table 12: Graphene synthesis methods, by company.
- Table 13: Graphene market structure
- Table 14: Global production of graphene, 2010-2027 in tons/year. Base year for projections is 2015
- Table 15: Graphene oxide production capacity in tons by country/year, 2010-2018.
- Table 16: Graphene oxide production capacity in tons by region, 2010-2018
- Table 17: Graphene nanoplatelets capacity in tons by country/year, 2010-2018
- Table 18: Graphene nanoplatelets capacity in tons by region, 2010-2018
- Table 19: Planned graphene production capacities
- Table 20: Types of graphene and prices
- Table 21: Pristine graphene flakes pricing by producer.
- Table 22: Few-layer graphene pricing by producer
- Table 23: Graphene nanoplatelets pricing by producer
- Table 24: Reduced graphene oxide pricing, by producer.
- Table 25: Graphene quantum dots pricing by producer.
- Table 26: Graphene oxide nanosheets pricing by producer
- Table 27: Multi-layer graphene pricing by producer
- Table 28: Market drivers for use of graphene in 3D printing
- Table 29: Graphene properties relevant to application in 3D printing
- Table 30: Market size for graphene in 3D printing
- Table 31: Market opportunity assessment for graphene in 3D printing
- Table 32: Demand for graphene in 3-D printing (tons), 2018-2027



- Table 33: Market challenges rating for nanotechnology and nanomaterials in the 3D printing market
- Table 34: Market drivers for use of graphene in adhesives.
- Table 35: Graphene properties relevant to application in adhesives
- Table 36: Applications and benefits of graphene in adhesives.
- Table 37: Market size for graphene in adhesives
- Table 38: Market opportunity assessment for graphene in adhesives.
- Table 39: Demand for graphene in adhesives (tons), 2018-2027
- Table 40: Market challenges rating for graphene in the adhesives market
- Table 41: Market drivers for use of graphene in aerospace
- Table 42: Applications and benefits of graphene in aerospace
- Table 43: Market size for graphene in aerospace
- Table 44: Market opportunity assessment for graphene in aerospace
- Table 45: Demand for graphene in aerospace (tons), 2018-2027
- Table 46: Market challenges rating for graphene in the aerospace market.
- Table 47: Market drivers for use of graphene in the automotive sector
- Table 48: Applications and benefits of graphene in the automotive industry
- Table 49: Market size for graphene in the automotive industry
- Table 50: Market opportunity assessment for graphene in the automotive industry.
- Table 51: Demand for graphene in automotive (tons), 2018-2027.
- Table 52: Market challenges rating for graphene in the automotive sector.
- Table 53: Properties of nanocoatings
- Table 54: Graphene properties relevant to application in coatings
- Table 55: Markets for nanocoatings
- Table 56: Market opportunity assessment for graphene in the coatings market
- Table 57: Demand for graphene in coatings (tons), 2018-2027
- Table 58: Market challenges rating for graphene in the coatings market
- Table 59: Market drivers for use of graphene in composites
- Table 60: Graphene properties relevant to application in polymer composites.
- Table 61: Applications and benefits of graphene in composites
- Table 62: Market size for graphene in composites.
- Table 63: Market opportunity assessment for graphene in the composites market
- Table 64: Demand for graphene in composites (tons), 2018-2027
- Table 65: Market challenges rating for graphene in the composites market
- Table 66: Market drivers for use of graphene in conductive inks.
- Table 67: Comparative properties of conductive inks
- Table 68: Printable electronics products
- Table 69: Opportunities for advanced materials in printed electronics
- Table 70: Applications in flexible and stretchable batteries, by nanomaterials type and



benefits thereof

- Table 71: Market opportunity assessment for graphene in conductive inks
- Table 72: Conductive inks in the flexible and stretchable electronics market 2017-2027 revenue forecast (million \$), by ink types
- Table 73: Demand for graphene in conductive ink (tons), 2018-2027.
- Table 74: Market impediments for graphene in conductive inks
- Table 75: Market drivers for use of graphene in batteries.
- Table 76: Wearable energy and energy harvesting devices and stage of development
- Table 77: Applications in flexible and stretchable batteries, by materials type and benefits thereof
- Table 78: Market size for graphene in batteries
- Table 79: Potential addressable market for thin film, flexible and printed batteries
- Table 80: Market opportunity assessment for graphene in batteries
- Table 81: Demand for graphene in batteries (tons), 2018-2027
- Table 82: Market challenges for graphene in energy
- Table 83: Market challenges rating for graphene in the batteries market.
- Table 84: Market drivers for use of graphene in supercapacitors
- Table 85: Comparative properties of graphene supercapacitors and lithium-ion batteries
- Table 86: Applications and benefits of graphene in supercapacitors
- Table 87: Applications in flexible and stretchable supercapacitors, by nanomaterials type and benefits thereof
- Table 88: Market size for graphene in supercapacitors
- Table 89: Market opportunity assessment for graphene in supercapacitors
- Table 90: Demand for graphene in supercapacitors (tons), 2018-2027.
- Table 91: Market challenges rating for graphene in the supercapacitors market
- Table 92: Market drivers for use of graphene in photovoltaics
- Table 93: Market size for graphene in photovoltaics.
- Table 94: Market size for graphene in photovoltaics.
- Table 95: Potential addressable market for photovoltaics
- Table 96: Demand for graphene in photovoltaics (tons), 2018-2027
- Table 97: Market challenges rating for graphene in the solar market
- Table 98: Market drivers for use of graphene in fuel cells and hydrogen storage
- Table 99: Applications and benefits of graphene in fuel cells and hydrogen storage
- Table 100: Market size for graphene in fuel cells and hydrogen storage
- Table 101: Market opportunity assessment for graphene in fuel cells and hydrogen storage
- Table 102: Demand for graphene in fuel cells (tons), 2018-2027
- Table 103: Market challenges rating for graphene in the fuel cells market
- Table 104: Market drivers for use of graphene in LED lighting and UVC



- Table 105: Applications of graphene in lighting
- Table 106: Market size for graphene in LED lighting and UVC.
- Table 107: Investment opportunity assessment for graphene in the lighting market
- Table 108: Demand for graphene in lighting (tons), 2018-2027
- Table 109: Market impediments for graphene in lighting
- Table 110: Market drivers for graphene in oil and gas
- Table 111: Applications of graphene in the oil and gas market
- Table 112: Application markets, competing materials, graphene advantages and current market size in oil and gas
- Table 113: Market summary and revenues for graphene in the oil and gas market.
- Table 114: Potential addressable market for graphene in the oil and gas market
- Table 115: Demand for graphene in oil and gas (tons), 2018-2027
- Table 116: Market challenges rating for graphene in the oil and gas market.
- Table 117: Market drivers for use of graphene in filtration
- Table 118: Applications and benefits of graphene in filtration and separation
- Table 119: Market size for graphene in filtration
- Table 120: Potential addressable market for graphene in the filtration market.
- Table 121: Market opportunity assessment for graphene in the filtration and separation market.
- Table 122: Demand for graphene in filtration (tons), 2018-2027.
- Table 123: Market challenges rating for graphene in the filtration and separation market
- Table 124: Market drivers for use of graphene in the life sciences and medical market
- Table 125: Graphene properties relevant to application in biomedicine and healthcare
- Table 126: Applications and benefits of graphene in life sciences and medical
- Table 127: Applications in flexible and stretchable health monitors, by advanced materials type and benefits thereof
- Table 128: Market size for graphene in biomedical and healthcare
- Table 129: Market opportunity assessment for graphene in biomedical & healthcare markets
- Table 130: Potential addressable market for graphene in biomedical & healthcare markets.
- Table 131: Demand for graphene in life sciences and medical (tons), 2018-2027.
- Table 132: Market challenges in graphene in biomedicine and healthcare.
- Table 133: Market challenges rating for graphene in the biomedical and healthcare market.
- Table 134: Market drivers for use of graphene in lubricants
- Table 135: Applications of graphene in the lubricants market
- Table 136: Applications of carbon nanomaterials in lubricants.
- Table 137: Market size for graphene in lubricants



- Table 138: Potential addressable market for graphene in the lubricants market.
- Table 139: Market opportunity assessment for graphene in lubricants
- Table 140: Demand for graphene in lubricants (tons), 2018-2027.
- Table 141: Market challenges rating for graphene in the lubricants market
- Table 142: Applications of graphene in rubber and tires
- Table 143: Market summary and revenues for graphene in the rubber and tires market
- Table 144: Potential addressable market for graphene in the rubber and tires market
- Table 145: Investment opportunity assessment for graphene in the rubber and tires market
- Table 146: Demand for graphene in rubber and tires (tons), 2018-2027
- Table 147: Market challenges for graphene in rubber and tires
- Table 148: Market drivers for use of graphene in sensors
- Table 149: Applications and benefits of graphene in sensors
- Table 150: Graphene properties relevant to application in sensors
- Table 151: Comparison of ELISA (enzyme-linked immunosorbent assay) and graphene biosensor
- Table 152: Market size for graphene in sensors
- Table 153: Market opportunity assessment for graphene in the sensors market
- Table 154: Demand for graphene in sensors (tons), 2018-2027.
- Table 155: Market challenges rating for graphene in the sensors market
- Table 156: Types of smart textiles.
- Table 157: Smart textile products
- Table 158: Market drivers for use of graphene in smart textiles and apparel.
- Table 159: Nanocoatings applied in the textiles industry-type of coating, nanomaterials utilized, benefits and applications
- Table 160: Desirable functional properties for the textiles industry afforded by the use of nanomaterials
- Table 161: Applications and benefits of graphene in textiles and apparel
- Table 162: Global smart clothing, interactive fabrics and apparel market.
- Table 163: Potential addressable market for graphene in the smart textiles market.
- Table 164: Market opportunity assessment for graphene in smart textiles and apparel.
- Table 165: Demand for graphene in textiles (tons), 2018-2027
- Table 166: Market impediments for graphene in textiles
- Table 167: Market challenges for graphene in textiles and apparel
- Table 168: Potential addressable market for graphene in the cement market
- Table 169: Demand for graphene in cement (tons), 2018-2027
- Table 170: Graphene producers and types produced.
- Table 171: Graphene producers target market matrix.
- Table 172: Graphene industrial collaborations, licence agreements and target markets



Table 173: Graphene product developers and end users target market matrix



List Of Figures

LIST OF FIGURES

Figure 1: Global graphene market snapshot.

Figure 2: Demand for graphene oxide and graphene nanoplatelets by market 2017 and 2027

Figure 3: Global graphene oxide and graphene nanoplatelets market volume, by End-User Industry, 2017 and 2027

Figure 4: Global graphene oxide and graphene nanoplatelets market volume, by Region, 2016 and 2026

Figure 5: Demand for graphene, 2010-2027.

Figure 6: Vittoria bike tires incorporating graphene

Figure 7: Demand for graphene, by market, 2027.

Figure 8: Global government funding for graphene in millions USD to 2017.

Figure 9: Global consumption of graphene 2016, by region

Figure 10: Global Graphene Market Opportunity Matrix, by Region.

Figure 11: Global Graphene Market Opportunity Matrix, by Country 2017.

Figure 12: Global Graphene Market Opportunity Matrix, by Country 2027.

Figure 13: Demand for graphene in China, by market, 2017.

Figure 14: Demand for graphene in China, by market, 2027.

Figure 15: Demand for graphene in Asia-Pacific, by market, 2017

Figure 16: Demand for graphene in Asia-Pacific, by market, 2027

Figure 17: 15-inch single-layer graphene sheet being prepared in the Chongqing

Institute of Green and Intelligent Technology, Chinese Academy of Sciences

Figure 18: Demand for graphene in North America, by market, 2017.

Figure 19: Demand for graphene in North America, by market, 2027.

Figure 20: Demand for graphene in Europe, by market, 2017.

Figure 21: Demand for graphene in Europe, by market, 2027.

Figure 22: Graphene layer structure schematic

Figure 23: Graphite and graphene

Figure 24: Graphene and its descendants: top right: graphene; top left: graphite = stacked graphene; bottom right: nanotube=rolled graphene; bottom left:

fullerene=wrapped graphene.

Figure 25: Fabrication methods of graphene.

Figure 26: Graphene synthesis methods

Figure 27: TEM micrographs of: A) HR-CNFs; B) GANF® HR-CNF, it can be observed its high graphitic structure; C) Unraveled ribbon from the HR-CNF; D) Detail of the ribbon; E) Scheme of the structure of the HR-CNFs; F) Large single graphene oxide



sheets derived from GANF

- Figure 28: Graphene nanoribbons grown on germanium.
- Figure 29: Schematic illustration of the main graphene production techniques
- Figure 30: Graphene synthesis-CVD technique
- Figure 31: (a) Graphene powder production line in The Sixth Element Materials
- Technology Co. Ltd. (b) Graphene film production line of Wuxi Graphene Films Co. Ltd.
- Figure 32: Illustrative procedure of the Scotch-tape based micromechanical cleavage of HOPG.
- Figure 33: Roll-to-roll graphene production process.
- Figure 34: Schematic of roll-to-roll manufacturing process
- Figure 35: Microwave irradiation of graphite to produce single-layer graphene
- Figure 36: Schematic of typical commercialization route for graphene producer
- Figure 37: Graphene market dynamics
- Figure 38: Accelerators and Inhibitors: Five Year Analysis (2023).
- Figure 39: Accelerators and Inhibitors: Ten Year Analysis (2028).
- Figure 40: Global market for graphene 2010-2027 in tons/year
- Figure 41: Graphene oxide production capacity in tons by region, 2010-2018.
- Figure 42: Graphene nanoplatelets capacity in tons by region, 2010-2018.
- Figure 43: Global Graphene Market Supply Chain Analysis
- Figure 44: Global Graphene Market: Porter's Five Forces Analysis.
- Figure 45: 3D Printed tweezers incorporating Carbon Nanotube Filament
- Figure 46: Demand for graphene in 3-D printing (tons), 2018-2027.
- Figure 47: Graphene Adhesives
- Figure 48: Potential addressable market for graphene in adhesives
- Figure 49: Demand for graphene in adhesives (tons), 2018-2027.
- Figure 50: Graphene aircraft
- Figure 51: Potential addressable market for graphene in aerospace
- Figure 52: Potential addressable market for graphene-enabled applications in aerospace.
- Figure 53: Demand for graphene in aerospace (tons), 2018-2027
- Figure 54: Graphene enhanced aircraft cargio container
- Figure 55: Graphene-based automotive components
- Figure 56: Antistatic graphene tire.
- Figure 57: Potential addressable market for graphene in the automotive sector.
- Figure 58: Potential addressable market for graphene in the automotive sector.
- Figure 59: Demand for graphene in automotive(tons), 2018-2027.
- Figure 60: Supercar incorporating graphene
- Figure 61: Graphene tire
- Figure 62: Heat transfer coating developed at MIT



Figure 63: Water permeation through a brick without (left) and with (right) "graphene paint" coating

Figure 64: Four layers of graphene oxide coatings on polycarbonate.

Figure 65: Global Paints and Coatings Market, share by end user market

Figure 66: Graphene based anti-corrosion steel coatings

Figure 67: Potential addressable market for graphene in the coatings market.

Figure 68: Potential addressable market for graphene in the coatings market.

Figure 69: Demand for graphene in coatings (tons), 2018-2027.

Figure 70: Potential addressable market for graphene in composites.

Figure 71: Potential addressable market for graphene in the composites market

Figure 72: Demand for graphene in composites (tons), 2018-2027

Figure 73: BGT Materials graphene ink product

Figure 74: Printed graphene conductive ink

Figure 75: Flexible RFID tag

Figure 76: Textiles covered in conductive graphene ink

Figure 77: Enfucell Printed Battery

Figure 78: Graphene printed antenna.

Figure 79: Printed antennas for aircraft

Figure 80: Vorbeck Materials conductive ink products

Figure 81: Potential addressable market for graphene in the conductive ink market

Figure 82: Conductive inks in the flexible and stretchable electronics market 2017-2027 revenue forecast (million \$), by ink types

Figure 83: Demand for graphene in conductive ink (tons), 2018-2027

Figure 84: The SkelStart Engine Start Module 2.0 based on the graphene-based

SkelCap ultracapacitors

Figure 85: Energy harvesting textile.

Figure 86: LG Chem Heaxagonal battery.

Figure 87: Printed 1.5V battery.

Figure 88: H600 concept car

Figure 89: Anion concept car.

Figure 90: Potential addressable market for graphene in the thin film, flexible and printed batteries market.

Figure 91: Demand for graphene in batteries (tons), 2018-2027.

Figure 92: Skeleton Technologies ultracapacitor.

Figure 93: Zapgo supercapacitor phone charger.

Figure 94: Stretchable graphene supercapacitor.

Figure 95: Potential addressable market for graphene in supercapacitors

Figure 96: Demand for graphene in supercapacitors (tons), 2018-2027

Figure 97: Solar cell with nanowires and graphene electrode



Figure 98: Schematic illustration of the fabrication concept for textile-based dyesensitized solar cells (DSSCs) made by sewing textile electrodes onto cloth or paper

Figure 99: Potential addressable market for graphene in photovoltaics.

Figure 100: Demand for graphene in photovoltaics (tons), 2018-2027

Figure 101: Potential addressable market for graphene in fuel cells

Figure 102: Demand for graphene in fuel cells (tons), 2018-2027.

Figure 103: LG OLED flexible lighting panel

Figure 104: Flexible OLED incorporated into automotive headlight

Figure 105: Potential addressable market for graphene in lighting

Figure 106: Demand for graphene in lighting (tons), 2018-2027.

Figure 107: Schematic of boron doped graphene for application in gas sensors

Figure 108: Directa Plus Grafysorber

Figure 109: Nanometer-scale pores in single-layer freestanding graphene membrane can effectively filter NaCl salt from water.

Figure 110: Potential addressable market for graphene in lighting

Figure 111: Demand for graphene in oil and gas (tons), 2018-2027.

Figure 112: Degradation of organic dye molecules by graphene hybrid composite photocatalysts

Figure 113: Graphene anti-smog mask

Figure 114: Potential addressable market for graphene in the filtration market

Figure 115: Demand for graphene in filtration (tons), 2018-2027

Figure 116: Graphene filtration membrane

Figure 117: Graphene Frontiers' Six[™] chemical sensors consists of a field effect transistor (FET) with a graphene channel. Receptor molecules, such as DNA, are attached directly to the graphene channel

Figure 118: Graphene-Oxide based chip prototypes for biopsy-free early cancer diagnosis.

Figure 119: Connected human body

Figure 120: Flexible, lightweight temperature sensor

Figure 121: Graphene-based E-skin patch

Figure 122: Smart e-skin system comprising health-monitoring sensors, displays, and ultra flexible PLEDs

Figure 123: Graphene medical patch

Figure 124: TempTraQ wearable wireless thermometer

Figure 125: Mimo baby monitor

Figure 126: Nanowire skin hydration patch.

Figure 127: Wearable sweat sensor.

Figure 128: GraphWear wearable sweat sensor.

Figure 129: Global medical and healthcare smart textiles and wearables market,



2015-2027, billions \$

Figure 130: Global medical and healthcare smart textiles and wearables market,

2015-2027, billions \$

Figure 131: Potential addressable market for graphene-enabled applications in the

biomedical and healthcare market

Figure 132: Demand for graphene in life sciences and medical (tons), 2018-2027

Figure 133: Demand for graphene in lubricants (tons), 2018-2027

Figure 134: Demand for graphene in rubber and tires (tons), 2018-2027.

Figure 135: GFET sensors

Figure 136: First generation point of care diagnostics.

Figure 137: Graphene Field Effect Transistor Schematic.

Figure 138: Potential addressable market for graphene in the sensors market

Figure 139: Demand for graphene in sensors (tons), 2018-2027

Figure 140: Conductive yarns

Figure 141: Global smart clothing, interactive fabrics and apparel market 2013-2027 revenue forecast (million \$).

Figure 142 Global smart clothing, interactive fabrics and apparel sales by market segment, 2016

Figure 143: Global market revenues for nanotech-enabled smart clothing and apparel

2014-2021, in US\$, conservative estimate

Figure 144: Global market revenues for nanotech-enabled smart clothing and apparel

2014-2021, in US\$, optimistic estimate

Figure 145: Demand for graphene in textiles (tons), 2018-2027.

Figure 146: Demand for graphene in cement (tons), 2018-2027.

Figure 147: Graphene added to cement



I would like to order

Product name: The Global Market for Graphene Oxide and Graphene Nanoplatelets to 2027

Product link: https://marketpublishers.com/r/G0668FA1774EN.html

Price: US\$ 1,061.00 (Single User License / Electronic Delivery)

If you want to order Corporate License or Hard Copy, please, contact our Customer

Service:

info@marketpublishers.com

Payment

To pay by Credit Card (Visa, MasterCard, American Express, PayPal), please, click button on product page https://marketpublishers.com/r/G0668FA1774EN.html

To pay by Wire Transfer, please, fill in your contact details in the form below:

First name:	
Last name:	
Email:	
Company:	
Address:	
City:	
Zip code:	
Country:	
Tel:	
Fax:	
Your message:	
	**All fields are required
	Custumer signature

Please, note that by ordering from marketpublishers.com you are agreeing to our Terms & Conditions at https://marketpublishers.com/docs/terms.html

To place an order via fax simply print this form, fill in the information below and fax the completed form to +44 20 7900 3970