

**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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**Report description:**

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

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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

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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), Petroliam Nasional Berhad (Petronas, Malaysia), Thomas Swan & Co. Ltd. (England), and Danish Graphene ApS (Denmark) among others in the graphene market.

## **Table of Contents:**

1	INTRODUCTION	26
1.1	STUDY OBJECTIVES	26
1.2	MARKET DEFINITION	26
1.3	STUDY SCOPE	27
1.3.1	MARKETS COVERED AND REGIONAL SCOPE	27
1.3.2	INCLUSIONS AND EXCLUSIONS	28
1.3.3	YEARS CONSIDERED	28
1.4	CURRENCY CONSIDERED	29
1.5	UNIT CONSIDERED	29
1.6	STAKEHOLDERS	29
1.7	SUMMARY OF CHANGES	29
2	RESEARCH METHODOLOGY	30
2.1	RESEARCH DATA	30

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2.1.1	SECONDARY DATA	31
2.1.1.1	Key data from secondary sources	31
2.1.2	PRIMARY DATA	31
2.1.2.1	Key data from primary sources	32
2.1.2.2	Key primary participants	32
2.1.2.3	Breakdown of primary interviews	33
2.1.2.4	Key industry insights	33
2.2	MARKET SIZE ESTIMATION	34
2.2.1	BOTTOM-UP APPROACH	34
2.2.2	TOP-DOWN APPROACH	35
2.3	BASE NUMBER CALCULATION	35
2.3.1	APPROACH 1: SUPPLY-SIDE ANALYSIS	35
2.3.2	APPROACH 2: DEMAND-SIDE ANALYSIS	36
2.4	MARKET FORECAST APPROACH	36
2.4.1	SUPPLY SIDE	36
2.4.2	DEMAND SIDE	36
2.5	DATA TRIANGULATION	37
2.6	FACTOR ANALYSIS	38
2.7	RESEARCH ASSUMPTIONS	38
2.8	RESEARCH LIMITATIONS AND RISK ASSESSMENT	39
3	EXECUTIVE SUMMARY	40
?		
4	PREMIUM INSIGHTS	44
4.1	ATTRACTIVE OPPORTUNITIES FOR PLAYERS IN GRAPHENE MARKET	44
4.2	GRAPHENE MARKET, BY TYPE AND REGION	45
4.3	GRAPHENE MARKET, BY SOURCE	45
4.4	GRAPHENE MARKET, BY END-USE INDUSTRY	46
4.5	GRAPHENE MARKET, BY APPLICATION	46
4.6	GRAPHENE MARKET, BY COUNTRY	47
5	MARKET OVERVIEW	48
5.1	INTRODUCTION	48
5.2	MARKET DYNAMICS	48
5.2.1	DRIVERS	49
5.2.1.1	Growing demand in key end-use industries	49
5.2.1.2	Supportive government policies in major graphite-exporting countries for boosting graphene production and improving revenue streams	49
5.2.2	RESTRAINTS	50
5.2.2.1	Difficulty in mass production	50
5.2.2.2	Lack of energy bandgap in graphene materials	50
5.2.3	OPPORTUNITIES	50
5.2.3.1	Rising demand in energy storage applications due to exceptional properties	50
5.2.3.2	Rising use in next-generation electronics (flexible electronics, wearables, and smart textiles) due to high conductivity and flexibility	51
5.2.4	CHALLENGES	51
5.2.4.1	Lack of standardization in graphene industry	51
5.2.4.2	High production cost	51
5.3	PORTER'S FIVE FORCES ANALYSIS	52

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5.3.1	THREAT OF NEW ENTRANTS	53
5.3.2	THREAT OF SUBSTITUTES	53
5.3.3	BARGAINING POWER OF SUPPLIERS	53
5.3.4	BARGAINING POWER OF BUYERS	53
5.3.5	INTENSITY OF COMPETITIVE RIVALRY	54
5.4	KEY STAKEHOLDERS AND BUYING CRITERIA	54
5.4.1	KEY STAKEHOLDERS IN BUYING PROCESS	54
5.4.2	BUYING CRITERIA	55
5.5	MACROECONOMICS INDICATORS	56
5.5.1	INTRODUCTION	56
5.5.2	GDP TRENDS AND FORECAST	56
5.5.3	TRENDS IN GLOBAL ELECTRONICS INDUSTRY	58
5.5.4	TRENDS IN GLOBAL AUTOMOTIVE & TRANSPORTATION INDUSTRY	58
	?	
5.6	SUPPLY CHAIN ANALYSIS	60
5.6.1	RAW MATERIAL ANALYSIS	60
5.6.2	FINAL PRODUCT ANALYSIS	61
5.7	VALUE CHAIN ANALYSIS	61
5.8	ECOSYSTEM ANALYSIS	62
5.9	PRICING ANALYSIS	64
5.9.1	AVERAGE SELLING PRICE TREND OF KEY PLAYERS, BY END-USE INDUSTRY	64
5.9.2	AVERAGE SELLING PRICE TREND, BY TYPE	65
5.9.3	AVERAGE SELLING PRICE TREND, BY SOURCE	65
5.9.4	AVERAGE SELLING PRICE TREND, BY REGION	66
5.10	TRADE ANALYSIS	66
5.10.1	IMPORT SCENARIO (HS CODE 380190)	66
5.10.2	EXPORT SCENARIO (HS CODE 380190)	68
5.11	TECHNOLOGY ANALYSIS	69
5.11.1	KEY TECHNOLOGIES	69
5.11.1.1	Chemical vapor deposition (CVD)	69
5.11.1.2	Exfoliation	70
5.11.2	COMPLEMENTARY TECHNOLOGIES	71
5.11.2.1	Thermal decomposition	71
5.12	IMPACT OF AI/GEN AI ON GRAPHENE MARKET	72
5.12.1	TOP USE CASES AND MARKET POTENTIAL	72
5.12.2	BEST PRACTICES IN GRAPHENE PROCESSING	72
5.12.3	CASE STUDIES OF AI IMPLEMENTATION IN GRAPHENE MARKET	73
5.12.4	INTERCONNECTED ADJACENT ECOSYSTEM AND IMPACT ON MARKET PLAYERS	73
5.12.5	CLIENTS' READINESS TO ADOPT GENERATIVE AI IN GRAPHENE MARKET	73
5.13	PATENT ANALYSIS	74
5.13.1	INTRODUCTION	74
5.13.2	METHODOLOGY	74
5.13.3	DOCUMENT TYPE	74
5.13.4	INSIGHTS	76
5.13.5	LEGAL STATUS OF PATENTS	76
5.13.6	JURISDICTION ANALYSIS	76
5.13.7	TOP APPLICANTS	77

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- 5.13.8 LIST OF PATENTS BY UNIV ZHEJIANG 78
- 5.13.9 LIST OF PATENTS BY INSTITUTE OF NANOTEK INSTRUMENTS, INC. 78
- 5.13.10 LIST OF PATENTS BY UNIV SOUTH CHINA TECH 79
- 5.14 REGULATORY LANDSCAPE 79
  - 5.14.1 REGULATORY BODIES, GOVERNMENT AGENCIES, AND OTHER ORGANIZATIONS 80
- 5.15 KEY CONFERENCES AND EVENTS, 2024-2026 81
  - ?
- 5.16 CASE STUDY ANALYSIS 83
  - 5.16.1 FIRST GRAPHENE DESIGNED PUREGRAPH MB-EVA BITUMEN 83
  - 5.16.2 AVANZARE INNOVACION TECNOLOGICA S.L. AND TECHNIALIA PARTNERED TO CREATE DESIGN STRATEGIES FOR GRAPHENE PRODUCTION 83
  - 5.16.3 GLOBAL GRAPHENE GROUP PARTNERED WITH TAIWAN-BASED MANUFACTURER TO DEVELOP GRAPHENE-BASED MATERIALS FOR SEMICONDUCTOR INDUSTRY 84
- 5.17 TRENDS/DISRUPTIONS IMPACTING CUSTOMER BUSINESS 84
- 5.18 INVESTMENT AND FUNDING SCENARIO 85
- 6 GRAPHENE MARKET, BY TYPE 86
  - 6.1 INTRODUCTION 87
  - 6.2 BULK GRAPHENE 89
    - 6.2.1 INCREASING DEMAND FOR BULK GRAPHENE IN ELECTRONICS AND AUTOMOTIVE & TRANSPORTATION INDUSTRIES TO FUEL MARKET GROWTH 89
  - 6.3 MONOLAYER GRAPHENE 92
    - 6.3.1 RISING DEMAND FOR MONOLAYER GRAPHENE IN PRODUCTION OF HIGH-PERFORMANCE COMPOSITES AND NEXT-GENERATION ELECTRONICS TO PROPEL MARKET 92
- 7 GRAPHENE MARKET, BY SOURCE 94
  - 7.1 INTRODUCTION 95
  - 7.2 GRAPHITE 97
    - 7.2.1 LAYERED STRUCTURE AND HIGH CARBON CONTENT TO DRIVE DEMAND 97
  - 7.3 GRAPHITE OXIDE 98
    - 7.3.1 ELECTRICAL CONDUCTIVITY TO FUEL DEMAND IN ELECTRONIC INDUSTRY 98
  - 7.4 REDUCED GRAPHITE OXIDE 100
    - 7.4.1 CONSTANT R&D AND INNOVATIONS TO FUEL MARKET GROWTH 100
  - 7.5 OTHER SOURCES 102
- 8 GRAPHENE MARKET, BY APPLICATION 104
  - 8.1 INTRODUCTION 105
  - 8.2 COMPOSITES 107
    - 8.2.1 RISING DEMAND FOR LIGHTWEIGHT COMPONENTS ACROSS VARIOUS INDUSTRIES TO FUEL MARKET GROWTH 107
  - 8.3 ENERGY HARVESTING & STORAGE 109
    - 8.3.1 INNOVATIONS IN ENERGY HARVESTING TO FUEL DEMAND 109
  - 8.4 PAINTS, COATINGS & INKS 111
    - 8.4.1 RAPID URBANIZATION AND INCREASING INDUSTRIAL APPLICATIONS TO DRIVE MARKET 111
  - 8.5 ELECTRONICS 112
    - 8.5.1 INCREASING DEMAND FOR CONSUMER AND NEXT-GENERATION ELECTRONICS TO DRIVE MARKET 112
  - 8.6 OTHER APPLICATIONS 114
- 9 GRAPHENE MARKET, BY END-USE INDUSTRY 117
  - 9.1 INTRODUCTION 118
    - 9.2 AUTOMOTIVE & TRANSPORTATION 120

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9.2.1	RAPID DIGITIZATION AND ELECTRIFICATION OF VEHICLES TO DRIVE MARKET	120
9.3	AEROSPACE & DEFENSE	122
9.3.1	SIGNIFICANT INVESTMENTS IN RESEARCH AND DEVELOPMENT FOR INTEGRATING GRAPHENE INTO AIRCRAFT TECHNOLOGIES TO PROPEL MARKET	122
9.4	ELECTRONICS	124
9.4.1	DEMAND FOR GRAPHENE BASED PRODUCTS IN ELECTRONICS INDUSTRY TO DRIVE THE MARKET	124
9.5	CONSTRUCTION	126
9.5.1	RAPID URBANIZATION AND INDUSTRIALIZATION TO FUEL DEMAND	126
9.6	OTHER END-USE INDUSTRIES	128
10	GRAPHENE MARKET, BY REGION	130
10.1	INTRODUCTION	131
10.2	ASIA PACIFIC	133
10.2.1	CHINA	140
10.2.1.1	Robust manufacturing base and presence of established players to drive market	140
10.2.2	JAPAN	142
10.2.2.1	Growing research and development activities to drive market	142
10.2.3	INDIA	143
10.2.3.1	Rising demand from innovation centers and universities to drive market	143
10.2.4	SOUTH KOREA	145
10.2.4.1	Expanding electronics industry to propel market	145
10.2.5	REST OF ASIA PACIFIC	147
10.3	NORTH AMERICA	149
10.3.1	US	156
10.3.1.1	Presence of large number of graphene manufacturers to drive market	156
10.3.2	CANADA	157
10.3.2.1	Technological advancements to propel market	157
10.4	EUROPE	159
10.4.1	GERMANY	166
10.4.1.1	Robust automotive manufacturing base to drive market	166
10.4.2	FRANCE	168
10.4.2.1	Rising use of environmentally friendly manufacturing technologies to drive market	168
10.4.3	UK	170
10.4.3.1	High demand from research institutions and universities to fuel market growth	170
?		
10.4.4	ITALY	171
10.4.4.1	Growing investments and projects related to use of green technologies to propel market	171
10.4.5	SPAIN	173
10.4.5.1	Development of innovative technologies to drive demand	173
10.4.6	REST OF EUROPE	175
10.5	LATIN AMERICA	176
10.5.1	BRAZIL	182
10.5.1.1	Surging demand for graphite to propel market	182
10.5.2	ARGENTINA	184
10.5.2.1	Rising demand for lithium batteries to drive market	184
10.5.3	MEXICO	186
10.5.3.1	Growing graphene applications to drive market	186

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10.5.4	REST OF LATIN AMERICA	187
10.6	MIDDLE EAST & AFRICA	189
10.6.1	GCC COUNTRIES	195
10.6.1.1	Saudi Arabia	195
10.6.1.1.1	Commitment to technological developments to propel market	195
10.6.1.2	UAE	197
10.6.1.2.1	Supportive regulatory frameworks related to clean technologies and sustainable practices to boost market growth	197
10.6.1.3	Rest of GCC countries	199
10.6.2	SOUTH AFRICA	201
10.6.2.1	High raw material availability to drive market	201
10.6.3	REST OF MIDDLE EAST & AFRICA	203
11	COMPETITIVE LANDSCAPE	205
11.1	OVERVIEW	205
11.2	KEY PLAYER STRATEGIES/RIGHT TO WIN	205
11.3	REVENUE ANALYSIS	207
11.4	MARKET SHARE ANALYSIS	208
11.5	BRAND/PRODUCT COMPARISON	210
11.5.1	FIRST GRAPHENE (PUREGRAPH)	212
11.5.2	NANOXPLORE INC. (GRAPHENEBLACK)	212
11.5.3	DIRECTA PLUS S.P.A. (G+ GRAPHENE PLUS)	212
11.5.4	UNIVERSAL MATTER, INC. (GENEABLE)	212
11.6	COMPANY EVALUATION MATRIX: KEY PLAYERS, 2023	212
11.6.1	STARS	212
11.6.2	EMERGING LEADERS	212
11.6.3	PERVASIVE PLAYERS	212
11.6.4	PARTICIPANTS	213
11.6.5	COMPANY FOOTPRINT: KEY PLAYERS, 2023	214
11.6.5.1	Company footprint	214
11.6.5.2	Type footprint	215
11.6.5.3	Source footprint	216
11.6.5.4	Application footprint	217
11.6.5.5	End-use industry footprint	218
11.6.5.6	Region footprint	219
11.7	COMPANY EVALUATION MATRIX: STARTUPS/SMES, 2023	220
11.7.1	PROGRESSIVE COMPANIES	220
11.7.2	RESPONSIVE COMPANIES	220
11.7.3	DYNAMIC COMPANIES	220
11.7.4	STARTING BLOCKS	220
11.7.5	COMPETITIVE BENCHMARKING: STARTUPS/SMES, 2023	222
11.7.5.1	Detailed list of key startups/SMEs	222
11.7.5.2	Competitive benchmarking of key startups/SMEs	223
11.8	COMPANY VALUATION AND FINANCIAL METRICS	224
11.9	COMPETITIVE SCENARIO	225
11.9.1	PRODUCT LAUNCHES	225
11.9.2	DEALS	226
11.9.3	EXPANSIONS	230

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12	COMPANY PROFILES	231
12.1	KEY PLAYERS	231
12.1.1	GRAPHENEA S.A.	231
12.1.1.1	Business overview	231
12.1.1.2	Products/Solutions/Services offered	231
12.1.1.3	MnM view	233
12.1.1.3.1	Key strengths/Right to win	233
12.1.1.3.2	Strategic choices	233
12.1.1.3.3	Weaknesses/Competitive threats	233
12.1.2	FIRST GRAPHENE	234
12.1.2.1	Business overview	234
12.1.2.2	Products/Solutions/Services offered	236
12.1.2.3	Recent developments	237
12.1.2.3.1	Product launches	237
12.1.2.4	MnM view	238
12.1.2.4.1	Key strengths/Right to win	238
12.1.2.4.2	Strategic choices	238
12.1.2.4.3	Weaknesses/Competitive threats	238
12.1.3	NANOXPLORE INC.	239
12.1.3.1	Business overview	239
12.1.3.2	Products/Solutions/Services offered	240
12.1.3.3	Recent developments	241
12.1.3.3.1	Deals	241
12.1.3.3.2	Expansions	242
12.1.3.4	MnM view	242
12.1.3.4.1	Key strengths/Right to win	242
12.1.3.4.2	Strategic choices	242
12.1.3.4.3	Weaknesses/Competitive threats	242
12.1.4	AVANZARE INNOVACION TECNOLOGICA S.L.	243
12.1.4.1	Business overview	243
12.1.4.2	Products/Solutions/Services offered	243
12.1.4.3	Recent developments	245
12.1.4.3.1	Deals	245
12.1.4.3.2	Expansions	245
12.1.4.4	MnM view	246
12.1.4.4.1	Key strengths/Right to win	246
12.1.4.4.2	Strategic choices	246
12.1.4.4.3	Weaknesses/Competitive threats	246
12.1.5	GLOBAL GRAPHENE GROUP	247
12.1.5.1	Business overview	247
12.1.5.2	Products/Solutions/Services offered	247
12.1.5.3	Recent developments	249
12.1.5.3.1	Deals	249
12.1.5.4	MnM view	250
12.1.5.4.1	Key strengths/Right to win	250
12.1.5.4.2	Strategic choices	250
12.1.5.4.3	Weaknesses/Competitive threats	250

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12.1.6 DIRECTA PLUS S.P.A. 251  
12.1.6.1 Business overview 251  
12.1.6.2 Products/Solutions/Services offered 253  
12.1.6.3 Recent developments 255  
12.1.6.3.1 Product launches 255  
12.1.6.3.2 Deals 255  
12.1.6.4 MnM view 256  
12.1.6.4.1 Key strengths/Right to win 256  
12.1.6.4.2 Strategic choices 256  
12.1.6.4.3 Weaknesses/Competitive threats 256  
12.1.7 HAYDALE GRAPHENE INDUSTRIES PLC 257  
12.1.7.1 Business overview 257  
12.1.7.2 Products/Solutions/Services offered 258  
12.1.7.3 Recent developments 259  
12.1.7.3.1 Deals 259  
?  
12.1.7.4 MnM view 260  
12.1.7.4.1 Key strengths/Right to win 260  
12.1.7.4.2 Strategic choices 260  
12.1.7.4.3 Weaknesses/Competitive threats 260  
12.1.8 ACS MATERIAL 261  
12.1.8.1 Business overview 261  
12.1.8.2 Products/Solutions/Services offered 261  
12.1.8.3 Recent developments 264  
12.1.8.3.1 Product launches 264  
12.1.8.4 MnM view 265  
12.1.8.4.1 Key strengths/Right to win 265  
12.1.8.4.2 Strategic choices 265  
12.1.8.4.3 Weaknesses/Competitive threats 265  
12.1.9 THE SIXTH ELEMENT (CHANGZHOU) MATERIALS TECHNOLOGY CO. LTD. 266  
12.1.9.1 Business overview 266  
12.1.9.2 Products/Solutions/Services offered 266  
12.1.9.3 Recent developments 267  
12.1.9.3.1 Expansions 267  
12.1.9.4 MnM view 268  
12.1.9.4.1 Key strengths/Right to win 268  
12.1.9.4.2 Strategic choices 268  
12.1.9.4.3 Weaknesses/Competitive threats 268  
12.1.10 XIAMEN KNANO GRAPHENE TECHNOLOGY CO., LTD. 269  
12.1.10.1 Business overview 269  
12.1.10.2 Products/Solutions/Services offered 269  
12.1.10.3 MnM view 270  
12.1.10.3.1 Key strengths/Right to win 270  
12.1.10.3.2 Strategic choices 270  
12.1.10.3.3 Weaknesses/Competitive threats 270  
12.1.11 UNIVERSAL MATTER, INC. 271  
12.1.11.1 Business overview 271

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- 12.1.11.2 Products/Solutions/Services offered 271
- 12.1.11.3 Recent developments 272
- 12.1.11.3.1 Deals 272
- 12.1.11.4 MnM view 273
- 12.1.11.4.1 Key strengths/Right to win 273
- 12.1.11.4.2 Strategic choices 273
- 12.1.11.4.3 Weaknesses/Competitive threats 273
- 12.1.12 NINGBO MORSH TECHNOLOGY CO., LTD. 274
- 12.1.12.1 Business overview 274
- 12.1.12.2 Products/Solutions/Services offered 274
- ?
- 12.1.12.3 MnM view 275
- 12.1.12.3.1 Key strengths/Right to win 275
- 12.1.12.3.2 Strategic choices 275
- 12.1.12.3.3 Weaknesses/Competitive threats 275
- 12.1.13 THOMAS SWAN & CO. LTD. 276
- 12.1.13.1 Business overview 276
- 12.1.13.2 Products/Solutions/Services offered 276
- 12.1.13.3 Recent developments 277
- 12.1.13.3.1 Deals 277
- 12.1.13.4 MnM view 277
- 12.1.13.4.1 Key strengths/Right to win 277
- 12.1.13.4.2 Strategic choices 277
- 12.1.13.4.3 Weaknesses/Competitive threats 277
- 12.1.14 DANISH GRAPHENE APS 278
- 12.1.14.1 Business overview 278
- 12.1.14.2 Products/Solutions/Services offered 278
- 12.1.14.3 Recent developments 279
- 12.1.14.3.1 Expansions 279
- 12.1.14.3.2 Others 279
- 12.1.14.4 MnM view 280
- 12.1.14.4.1 Key strengths/Right to win 280
- 12.1.14.4.2 Strategic choices 280
- 12.1.14.4.3 Weaknesses/Competitive threats 280
- 12.2 OTHER PLAYERS 281
- 12.2.1 NANOTECH ENERGY 281
- 12.2.2 GROLLTEX INC 281
- 12.2.3 OTTO CHEMIE PVT. LTD. 282
- 12.2.4 LHP NANOTECH LLP 283
- 12.2.5 CEYLON GRAPHENE TECHNOLOGIES (PVT) LTD. 284
- 12.2.6 ALFA CHEMISTRY 285
- 12.2.7 CARBON RIVERS 285
- 12.2.8 TALGA GROUP 286
- 12.2.9 MATEXCEL 287
- 12.2.10 GRAPHITE CENTRAL 288
- 13 APPENDIX 289
- 13.1 DISCUSSION GUIDE 289

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13.2 KNOWLEDGESTORE: MARKETSANDMARKETS' SUBSCRIPTION PORTAL 292

13.3 CUSTOMIZATION OPTIONS 294

13.4 RELATED REPORTS 294

13.5 AUTHOR DETAILS 295

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