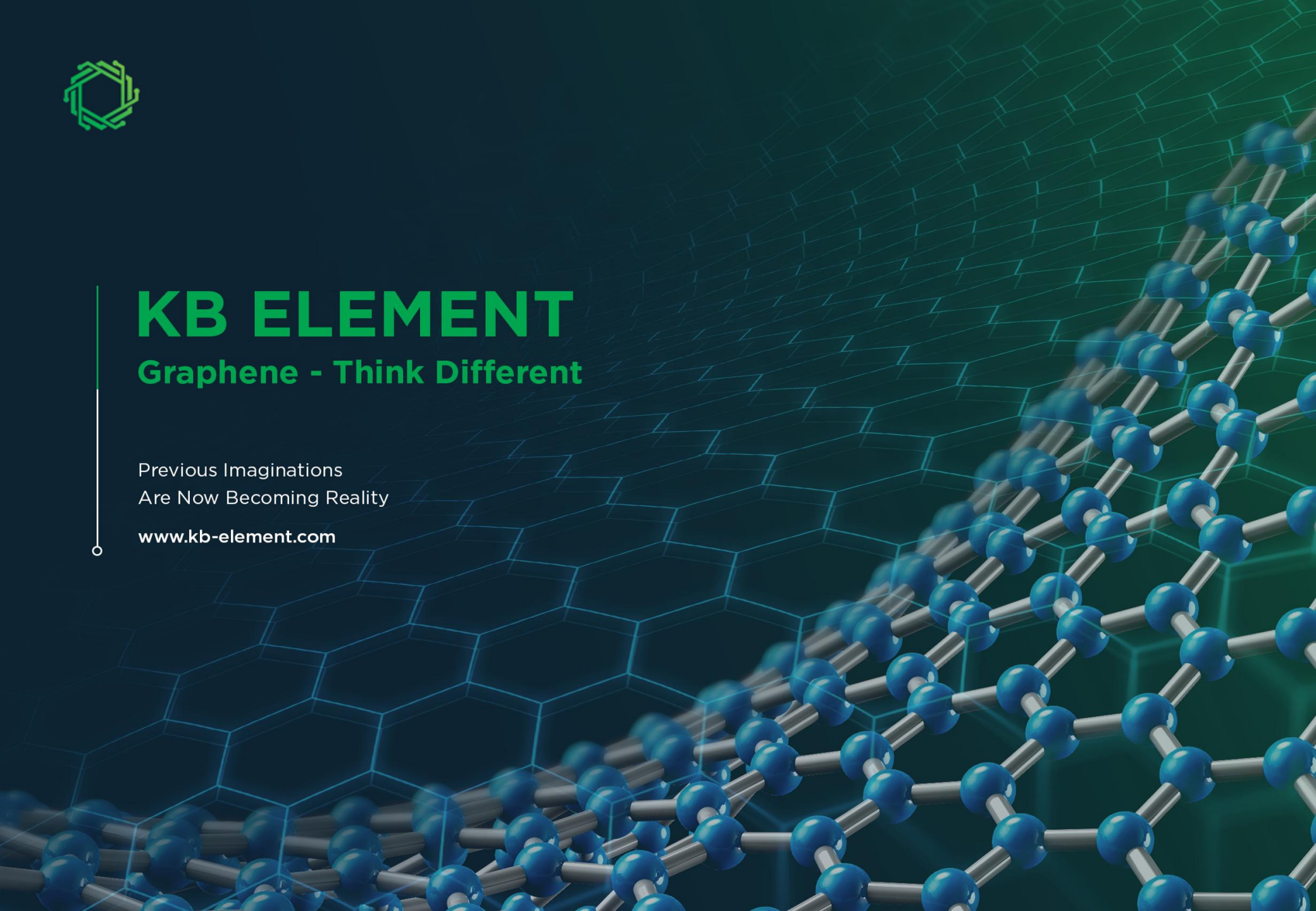
KB ELEMENT

Graphene - Think Different

Previous Imaginations
Are Now Becoming Reality

www.kb-element.com



Chapter 00

Corporate Overview and History

The new material industry in Korea
Technology to Make the Future
Small and Medium Businesses

KB ELEMENT

Corporate name	KB ELEMENT Co.,Ltd.
CEO	Kyoung-Jeong Bae
Foundation date	Sept. 1, 2016
Employees	25
Business	• Manufacturing of Non-oxidized graphene • Development of Graphene • Convergence Materials and Products
Main Product	• Non-oxidized graphene, Graphene Dispersion Intermediate • New material for non-oxidized • graphene fusion

2025	• Selected for the Global Small Giants 1,000+ Project • Selected as a promising investment company under INVEST Gyeonggi G-NEXT
2024	• Selected as a flagship project for K-Carbon – Fuel Cell Sector • Designated as a Climate Tech Company by Gyeonggi Technopark • Participated in overseas exhibitions supported by the Korea Carbon Industry Promotion Agency
2023	• Awarded the Prime Minister's Prize – New Material Technology • Awarded the Minister of Trade, Industry, and Energy Prize – Root Industry • Selected as a military service exemption company in the root industry sector
2022	• Received the Entrepreneurship Award • Won the Ministry of SMEs and Startups Technology Innovation Award • Completed construction of Paju Sinchon Industrial Complex plant
2021	• Certified as an INNOBIZ company • Selected as one of the "Small Giants 100" by the Ministry of SMEs and Startups • Selected as a KOTRA Global Jump 300 company • Selected as a K-Global Accelerator by KISED • Received the Suwon City Technology Innovation Award
2020	• Registered as a supplier to Samsung Display and LG Display • Designated as a "Specialized Root Technology Company" by the Ministry of SMEs and Startups • Selected for government R&D project (localization of graphene thermal dissipation materials)
2018	• Registered as a head office factory • Selected for IBK Changgong 1st batch • Verified as a materials and components specialized company • Certified as a Gyeonggi Export Frontier Company
2017	• Verified as a venture company by the Korea Technology Finance Corporation • Developed graphene-hybrid technology • Acquired ISO 9001 & ISO 14001 certifications • Established an in-house research institute • Selected for government R&D project (Graphene-Hybrid)
2016	Company founded

Chapter 00

Certification

Certificate No: KEFCR-3134Q

KEF-CR

CERTIFICATE OF APPROVAL

KB-ELEMENT CO., LTD.

#11. Sinchon 1-ro, Paju-si, Gyeonggi-do, Korea

Korea Employers' Federation Certification Register certifies that the Quality Management System of the above supplier has been assessed and found to be in accordance with the requirements of the quality standard and the scope of supply detailed below.

Quality Standards

KS Q ISO 9001 : 2015 / ISO 9001 : 2015

Scope of Supply

The Manufacture of Non-oxide Graphene, Heat-dissipating Potting agent, Antistatic solution, Conductive paste and Heat-dissipating Pad using non-oxide graphene

Term of Validity

From June 07, 2024 to June 06, 2027

Date of Issue : June 07, 2024

Kim dong won

President

KAB-QC-25

■ KEF-CR is received recognition (KAB-QC-25) as a Quality management system certification body by Korea Accreditation Board(KAB).
■ KEF-CR is certification body that accredited by member(KAB) of the international accreditation forum multilateral recognition arrangement for quality management system.

Korea Employers' Federation Certification Register

#602 Pyeongdong Business Center 184-1, Pyeongdongsandan-ro, (Woljeon-dong) Gwangsan-gu, Gwangju-Metropolitan City Korea
Tel : 82-62-381-9001 FAX : 82-62-381-9003 www.kefcr.com

KOREA EMPLOYERS' FEDERATION CERTIFICATION REGISTER

[ISO 9001]

High Quality

Certificate No: KEFCR-2686E

KEF-CR

CERTIFICATE OF APPROVAL

KB-ELEMENT CO., LTD.

#11. Sinchon 1-ro, Paju-si, Gyeonggi-do, Korea

Korea Employers' Federation Certification Register certifies that the Environmental Management System of the above supplier has been assessed and found to be in accordance with the requirements of the quality standard and the scope of supply detailed below.

Quality Standards

KS I ISO 14001 : 2015 / ISO 14001 : 2015

Scope of Supply

The Manufacture of Non-oxide Graphene, Heat-dissipating Potting agent, Antistatic solution, Conductive paste and Heat-dissipating Pad using non-oxide graphene

Term of Validity

From June 07, 2024 to June 06, 2027

Date of Issue : June 07, 2024

Kim dong won

President

KAB-EC-29

■ KEF-CR is received recognition (KAB-EC-29) as a environmental management system certification body by Korea Accreditation Board(KAB).
■ KEF-CR is certification body that accredited by member(KAB) of the international accreditation forum multilateral recognition arrangement for environmental management system.

Korea Employers' Federation Certification Register

#602 Pyeongdong Business Center 184-1, Pyeongdongsandan-ro, (Woljeon-dong) Gwangsan-gu, Gwangju-Metropolitan City Korea
Tel : 82-62-381-9001 FAX : 82-62-381-9003 www.kefcr.com

KOREA EMPLOYERS' FEDERATION CERTIFICATION REGISTER

[ISO 14001]

Eco Friendly

CPG

Certification Partner Global

CERTIFICATE OF REGISTRATION

THIS IS TO CERTIFY THAT
THE OCCUPATIONAL HEALTH & SAFETY MANAGEMENT SYSTEM OF

KB-ELEMENT CO., LTD.
551-88-00506

11 Sinchon 1-ro, Paju-si, Gyeonggi-do, Republic of Korea

Has been assessed and registered as complying with the requirements of the International Standard shown above for the following Goods and Services. Further clarifications regarding the scope of this certificate and the applicability of the requirements of:

ISO 45001:2018

may be obtained by consulting the certificate issuer

Production of heat dissipation pads using non-oxidized graphene, non-oxidized graphene coatings, non-oxidized and CNT fusion products, CNT fusion polymer resins, CNT coatings, LCD/OOLED glass touch pads

Registration Number: OHS/4/R82/3603
Registration Date: 25-Oct-2024
Expiry Date: 25-Oct-2027

Tony Wilde
Group Chairman

Certification Partner Global
An Australian Owned Company
License # 1150/2011 CC (previously known as ISC Global),
Level 14, Boulevard Plaza, Tower 1, Downtown Dubai, Dubai, UAE

JAS-ANZ

www.jasanz.org/register

The Status and Validity of this Certificate maybe verified in real time by scanning the adjacent QR Code.
This certificate is valid until the Expiry Date shown on the condition that audits are conducted each year and paid for as per the Certification Agreement. Should this condition not be met, cancellation procedures will be initiated, and the cancellation status will be revealed when the QR Code is scanned. This Certificate remains the property of the Certificate Issuer and must be returned upon request. It must not be altered in any way. Intentional misuse of this certificate will result in cancellation without prior notification.

[ISO 45001]

Safety & Health

Certificate 2025-416

Certificate of

「Global Leading Company 1,000+」

KB ELEMENT

The above-mentioned company is designated as a member of 「Global Leading Company 1,000+」, which is innovative SME with global growth potential.

Status : Level 1

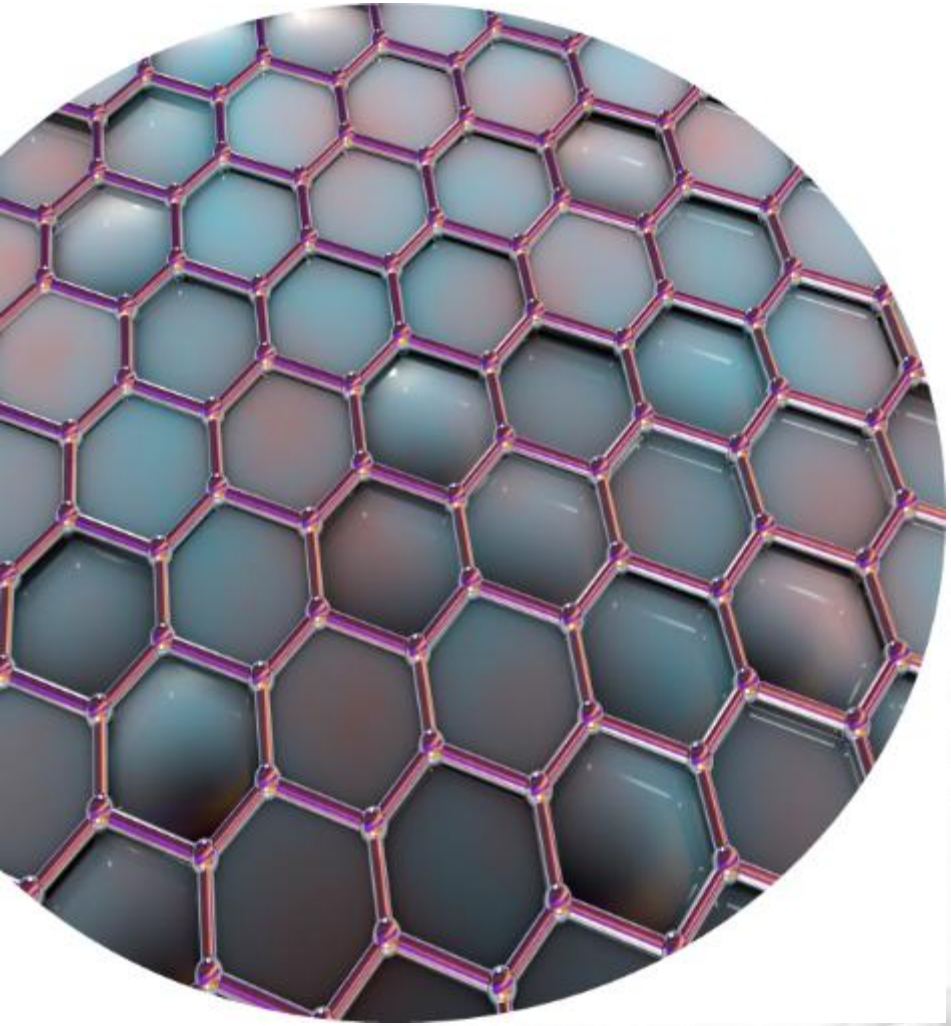
Valid Period : April 14, 2025 ~ December 31, 2026

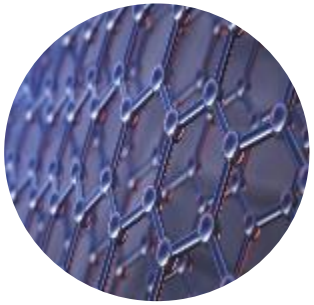
April 14, 2025

Ministry of SMEs and Startups

Minister of SMEs and Startups

[Global Leading Company]





Chapter 1.

Core Technologies – Non-oxidized Graphene Manufacturing Source Technology

1. Introduction to Graphene
2. Non-oxidized Graphene Core Technology
3. Key infrastructure

1. Introduction to Graphene | Dream nano-material, Graphene

GRAPHENE

- "Dream nano-material" attracting global attention for its unique physical and chemical properties across various industries
- One-atom-thick carbon sheet arranged in a hexagonal honeycomb lattice

Electrical conductivity:	Electrical conductivity:	Mechanical strength:	Thermal conductivity:	**Thickness:**	Outstanding	Excellent physical and chemical stability
100× copper	100× silicon	200× steel	2× diamond	**only 0.37 nm**	elasticity	

Graphene, a new material in the future that is in the spotlight in various industries due to its unique physical and chemical properties

Electric car

- Automobile exterior material
- Automobile heat dissipation
- Automobile shielding
- Building materials.LED lighting

Mobile

- Ultrafast semiconductors
- Touch panel
- Flexible display
- Next Generation Electronic Materials

Energy

- Secondary batteries / fuel cells
- Solar / ESS
- Super Capacitor
- Power plants (nuclear, hydropower, solar, wind power)

Space aviation defense industry

- Aeronautical exterior material, parts
- Defense material components
- carbon fiber
- Packaging and Vacuum Insulation

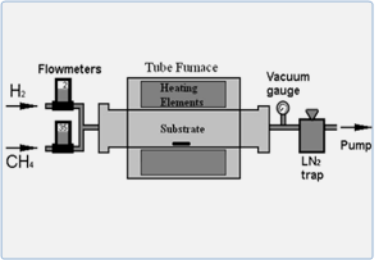
Chapter 01

1. Introduction to Graphene

Differences in the way graphene is produce

Growth (CVD) Graphene and Peeling Graphene

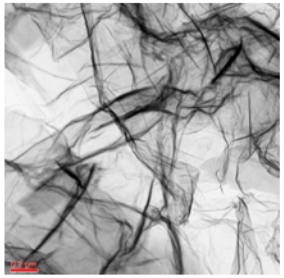
CVD Graphene



High-End Quality (Bottom-Up)

High-quality continuous barrier film made by depositing carbon gas
Transparent, highly conductive, but high production costs

Powder Graphene



Industrial Scale (Top-Down)

Flake powder made by physical/chemical exfoliation of graphite.
Mass production is possible and price competitiveness is excellent.

CVD Graphene
[Manufacturing method] Gas Reaction Deposition (Bottom-Up, Chemical)
[Form] Large Area Continuous Film (Film)
[Scale of production] Limiting substrate size (small, high quality)
[Process Applicability] Need transfer process, tricky
[Cost structure] High facility investment and process costs

Powder Graphene
[Manufacturing method] Graphite (Top-down, Physical/Chemical)
[Form] Flakes, powders and solutions
[Scale of production] Can mass-produce ton units
[Process Applicability] Easy to mix, coat, and inject
[Cost structure] Relatively low cost (price competitive)

- **CVD Graphene application (High-End)**

  - Semiconductor devices (transistors, memory)
  - Transparent electrodes (touchscreen, OLED)
  - Ultra-precise sensor (bio/gas detection)

- **Powder Graphene application (Industrial)**

  - Composite material (reinforced plastic, metal)
  - Functional coating
    (heat dissipation, chape, antistatic)
  - Energy (Battery Conductor)

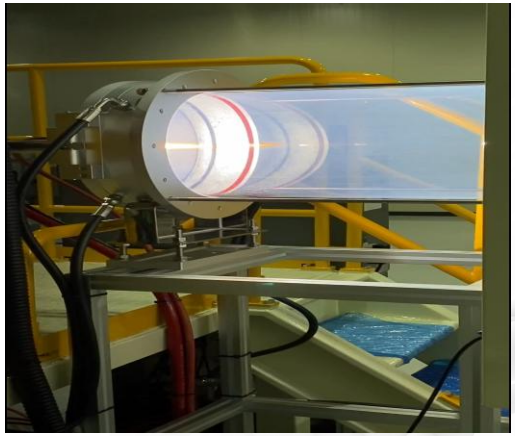
Chapter 01

2. Non-Oxidized Graphene Technology

Securing the world's only manufacturing technology for "non-oxidized graphene" sources based on atmospheric pressure plasma processes (Published worldwide patents)

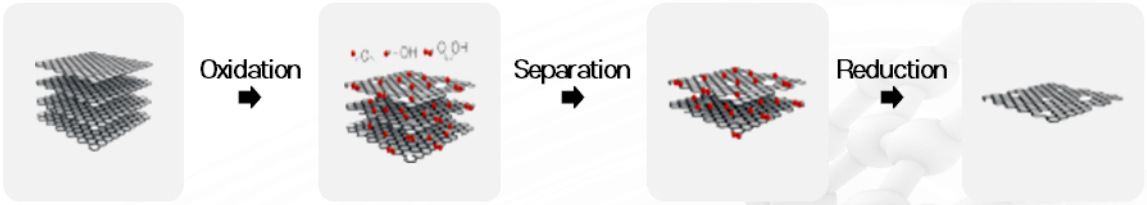
- **Existing chemical processes (Oxidation and reduction methods)**

- **KBE's non-oxidization process (Plasma method)**



- Manufacturing technology differentiation

Existing chemical processes, more than 30 processes (Strong acid use – air pollution, heavy metal wastewater generation, high manufacturing costs)



Atmospheric Plasma Exfoliation –
An eco-friendly process with zero wastewater

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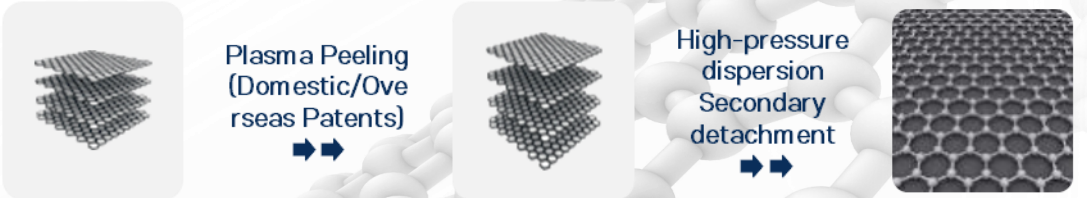


Competitiveness 1	Competitiveness 2	Competitiveness 3	Competitiveness 4
Original technology patent	Process Simplification	Price Competitiveness	Eco-Friendly Manufacturing
Atmospheric pressure plasma process technology	Simplifying the manufacturing process (30 -> 5Step)	1/10 of conventional cost	5× higher quality

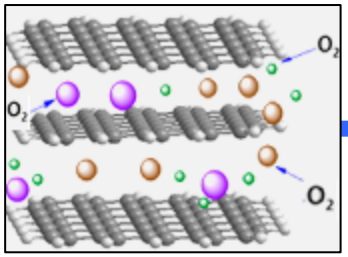
Chapter 02

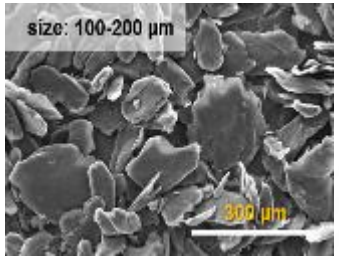
2. Core competitiveness

Establishment of a mass production system for non-oxidized graphene and composite materials
→ Enter various key industries with high growth potential and attractions

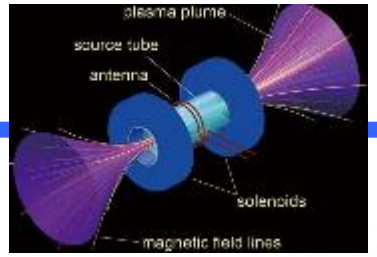
■ **Strengths: Graphene quality, condition change factor, low manufacturing cost, eco-friendly process**

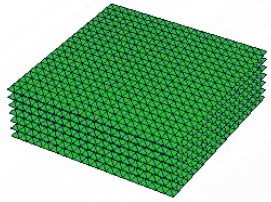
Graphite Treatment (KBE's domestic patent)



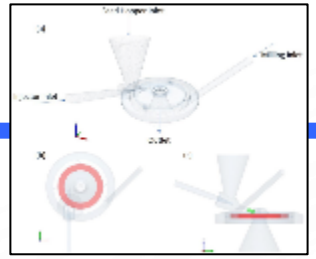


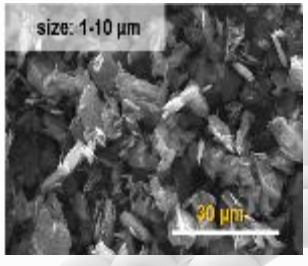
Plasma Intercalation (Patents around the world)



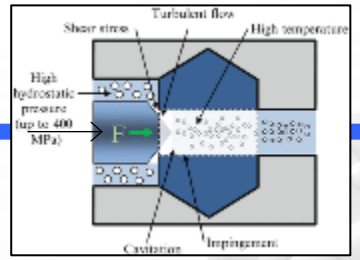


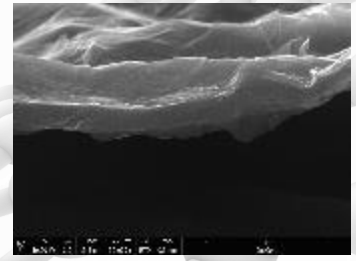
N2 Gas supersonic speed (2'nd Dispersion)



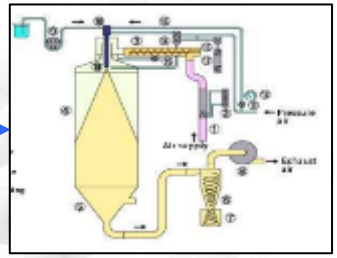


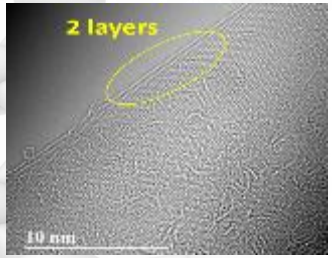
High Pressure & supersonic speed fluid (3'rd Dispersion)





Spray Dry / Freeze Dry (Graphene Flake)





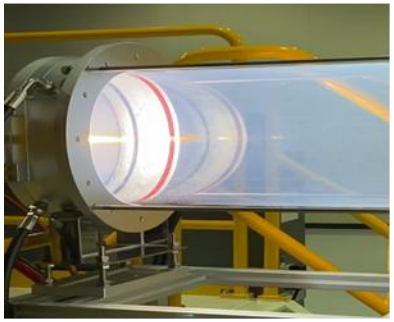
* Proprietary atmospheric plasma facility developed in-house
- International patents registered in Korea, USA, Japan, China, UK, Saudi Arabia, and more

Chapter 02

3. Key infrastructure

Production Systems and R&D Manpower for Core Products

- Production of major products CAPA
  (Based on production of finished products)



Graphene material (Graphene Nano Flakes)

47 KG
Possible daily production quantity

16,800KG
CapA with annual production capacity

21,000KG
Maximum annual production capacity

Graphene dispersion solution(Graphene Ink)

4,700KG
Possible daily production quantity

1,680,000 KG
CapA with annual production capacity

2,100,000 KG
Maximum annual production capacity

Up to 4.2 billion annually

Up to 210 billion annually

Securing CAPA for production of up to 2,100 tonnes per year

- Core personel

Current Status of Research and Development Personnel

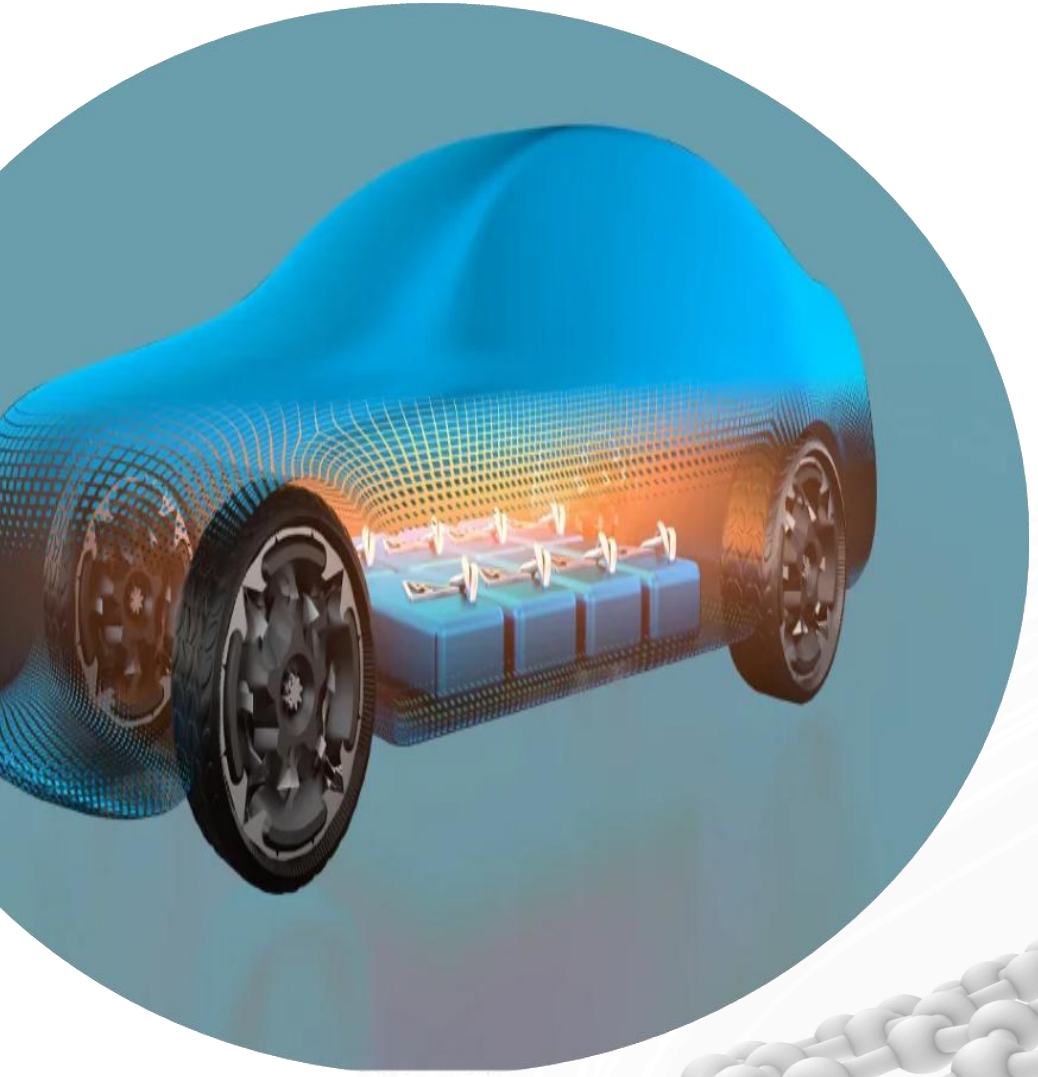
Securing key R&D personnel

9 persons

Status of patent holdings (61 cases)

Securing intellectual property rights for graphene and composite materials

Current situation	Registration	Application
Domestic patent	29	24
Overseas patent	4	4
TOTAL	33	28



Chapter 2.

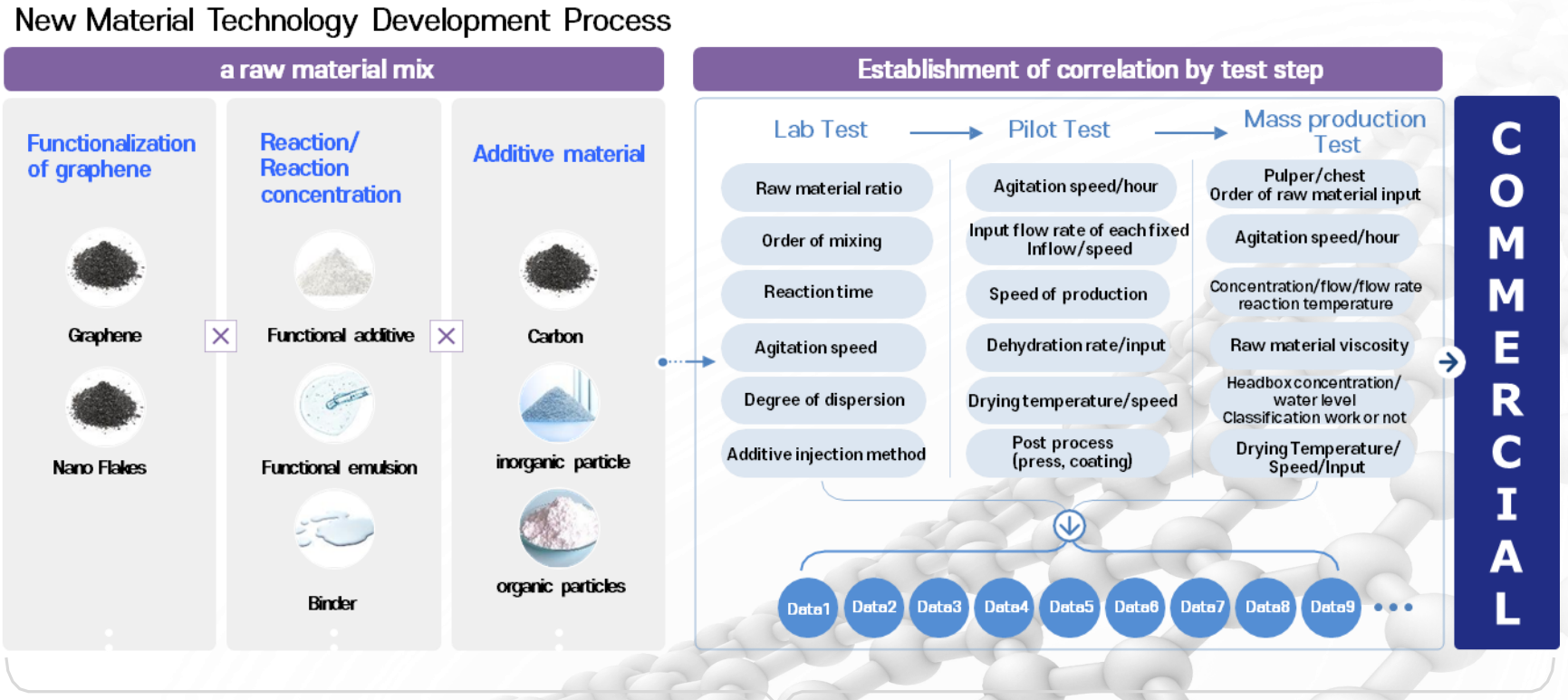
Business Area - Construction of Graphene and Applied Materials product line-up

1. Core technology
2. Securing Industry-Specific Propulsion Solutions
3. Creating a New Material Market
4. Vision

Chapter 02

1. KB Element Core Technology Massive Recipe Data-base

Thousands of experiments over 10 years to build product development Know-How
→ Get your own big data



Build vast amounts of data-base, including samples, research reports, test data, and development reports produced during product development

Chapter 02

2. Securing Industry-Specific Propulsion Solutions

Characteristics of Material Business
– Preoccupation and standardization of the relevant market upon initial reference acquisition

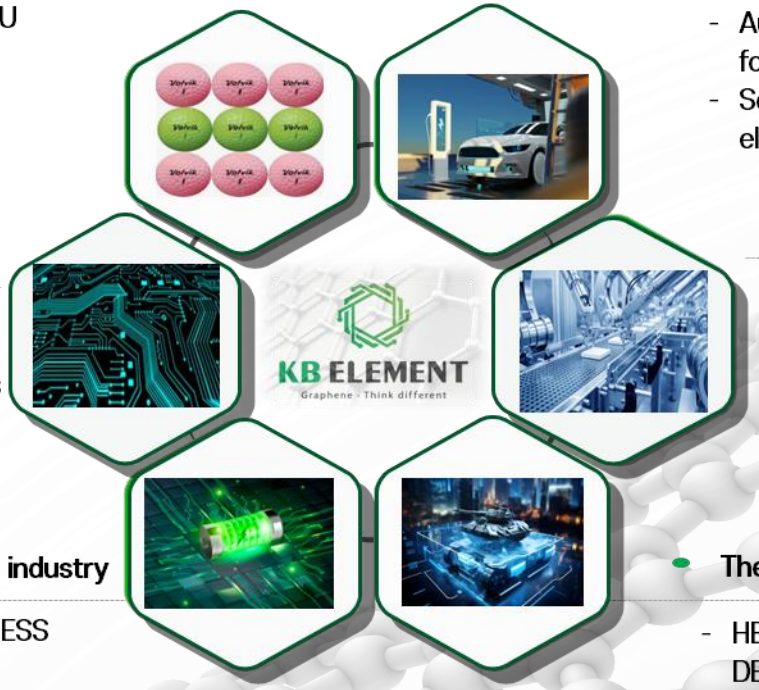
■ Business Cases with KBE Graphene by Industry Group

- **Sports & Leisure**
  - PA6, Clothing/Shoes with TPU
  - A golf ball with a rubber

- **Automotive & Mobility**
  - Automobile interior fiber / urethane foam
  - Sound absorption / light weight / electromagnetic shielding material

- **Industrial materials**
  - Tray ESD / Anti-Dirt Coating
  - Epoxy shielding ink
  - Conductive ink composite

- **Electrical & Electronic**
  - ESD protection for semiconductor processing
  - Mobile Heat Dissipation Films and Materials



- **The secondary battery/energy industry**
  - Heat dissipation material for ESS
  - Air filter for purification
  - Conductive material for secondary batteries

- **The defense/defense industry**
  - HEAT RADIATION MATERIAL FOR EMP DEFENSE MODULE
  - Durable materials such as military mattresses
  - bulletproof fiber, etc

Chapter 02

4. Vision

100-Year Material Enterprise Leap

KB ELEMENT

Graphene · Think different

Previous Imaginations
Are Now Becoming Reality

www.kb-element.com