Global advanced materials company

LG Chem
Contents

Introduction of LG Chem

/ Introduction of LG Group
/ Introduction of LG Chem
/ Business of LG Chem
1947
Established as Lucky Chemical Industrial Co. (now LG Chem)

1958
Established as Goldstar Co. (now LG Electronics)

1987
Completed ‘Lucky Gold Star Tower’

1995
Established as a New Corporate Identity (Lucky Goldstar → LG)

1996
Established as LG Telecom (now LG U+)}

2003
Established as LG Corp.

2017
LG Group’s 70th Anniversary
Total of **70**

250,000 (person)

USD **137.2** Billion

*As of 2019*
LG Way

No. 1 LG

Introduction of LG Chem

VISION

Behavioral Mode

Management Principles

Customer – Value Creation

People – Oriented Management

Jeong-Do Management
We connect science to life for a better future
LG Chem’s Innovative Sustainability

Deliver advanced, innovative and sustainable solutions for our environment and society

**Vision**
- Leading Sustainable Innovation for Customer
- Managing the Impacts of Climate Change
- Making a Positive Contribution to Society

**Strategy items**
- Circular Economy
- Environment Protection
- Responsible Products
- Climate Action
- Renewable Energy
- Water Management
- Responsible Supply Chain
- Human Rights / Diversity
- Safety / Wellness

5 Core tasks
2019 : The First Korean Chemical Company To Enter

GLOBAL TOP 10

* By Chemical & Engineering News Published by ACS(American Chemical Society)
## Brand value of chemical Companies

### “Global No.4”

*By Brand Finance Group in the UK*

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### Top 10 Most Valuable Brands

<table>
<thead>
<tr>
<th>Rank</th>
<th>Brand</th>
<th>Change</th>
<th>2020</th>
<th>2019</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>BASF</td>
<td>▲</td>
<td>$7,878m</td>
<td>$8,253m</td>
<td>-4.5%</td>
</tr>
<tr>
<td>2</td>
<td>Dow</td>
<td>▲</td>
<td>$4,843m</td>
<td>$6,819m</td>
<td>-29.0%</td>
</tr>
<tr>
<td>3</td>
<td>Samsung</td>
<td>▲</td>
<td>$4,344m</td>
<td>$3,964m</td>
<td>+9.3%</td>
</tr>
<tr>
<td>4</td>
<td>LG Chem</td>
<td>▲</td>
<td>$3,500m</td>
<td>$3,338m</td>
<td>+4.9%</td>
</tr>
<tr>
<td>5</td>
<td>Linde</td>
<td>▲</td>
<td>$2,861m</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>6</td>
<td>Lyondellbasell</td>
<td>▲</td>
<td>$2,637m</td>
<td>$3,073m</td>
<td>-14.2%</td>
</tr>
<tr>
<td>7</td>
<td>AsahiKASEI</td>
<td>▲ 3</td>
<td>$2,368m</td>
<td>$2,246m</td>
<td>+5.4%</td>
</tr>
<tr>
<td>8</td>
<td>Mitsubishi Chemical</td>
<td>▲</td>
<td>$2,287m</td>
<td>$2,535m</td>
<td>-9.8%</td>
</tr>
<tr>
<td>9</td>
<td>Dupont</td>
<td>▼ 4</td>
<td>$2,200m</td>
<td>$3,261m</td>
<td>-32.5%</td>
</tr>
<tr>
<td>10</td>
<td>Air Liquide</td>
<td>▼ 3</td>
<td>$1,982m</td>
<td>$2,594m</td>
<td>-23.6%</td>
</tr>
</tbody>
</table>

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Introduction of LG Chem

LG Chem | History

1947  Established as Lucky Chemical Industrial Corporation
1969  Listed on Korea Stock Exchange
1974  Renamed company to Lucky Corporation
1976  Completed the Yeosu PVC Resin Plant
1979  Opened the Daedeok Central R&D Center

1980’s Earlier

1995  Renamed to LG Chem, Ltd.
      Completed construction of Tianjin PVC plant in China
1998  Completed construction Cheongju plant for rechargeable batteries

1990’s

2001  Spun-off the company (LGC, LG Chem, LG Household & Healthcare)
2003  Acquired Hyundai Petrochemicals
2004  Completed construction of Ochang Techno Park
      Established LG Chem (China) Investment Co., Ltd
2005  Established a polarizer back-end subsidiary in Poland
2007  Merged with LG Petrochemicals Co., Ltd
2009  Spun-off Industrial Materials Business (LG Hausys)

2000’s

2010  Started construction of automotive battery plant in Michigan, USA
2015  Established LG Chem Nanjing New Energy Solution Co., Ltd in China
2016  Acquired Dongbu Farm Hannong (Farm Hannong)
2017  Merged with LG Life Sciences Co., Ltd
      Established LG Chem Wroclaw Energy Sp. z o.o. in Poland
2019  Launched Osan Tech Center in China
LG Chem | Financial Results

Sales in 2019
USD 24.5 Billion

Operating profit in 2019
USD 0.8 Billion
Introduction of LG Chem

LG Chem | Domestic Sites

Headquarter/R&D Campus Magok (Est.1987/Est.2018)
Paju Plant (Est.2011) LCD Glass

R&D Campus Gwacheon (Est.2015)
Daesan Complex (Est.2005) NCC, SSBR, PVC

Leadership Center / Tech Center (Est.1991/Est.2019)
Ochang Plant (Est.2005) Rechargeable Batteries, Polarizer, Stripper

R&D Campus Daejeon (Est.1979)
Cheongju Complex (Est.1980) OLED Material, Photoresist, Cathode Material, RO membrane

Osong Plant (Est.2009)
Gimcheon Plant (Est.2008) SAP

Bio Similar, Vaccine

Iksan Plant (3) (Est.1991/Est.1995/Est.2011)
Ulsan Plant (Est.1974) Plasticizers

EP, ABS / Pharmaceutical / Battery Materials

Naju Plant (Est.1984)
Onsan (Est.1979) Fine Chemical

Octanol, Butanol, Plasticizers

Yeosu Complex (Est.1976)
NCC, PVC, ABS, SAP, PE, AA
Introduction of LG Chem

**Overseas Sites**

- **Manufacturing Subsidiaries (25)**
  - Beijing
  - Tianjin (3)
  - Shanghai
  - Guangzhou (2)
  - Nanjing (3)
  - Nantong
  - Chongqing
  - WuXi (2)
  - Ho Chi Minh
  - Haiphong (3)
  - Jakarta
  - Bangkok
  - Kuala Lumpur
  - Tokyo

- **Sales Subsidiaries (14)**
  - Atlanta
  - Torrance
  - Beijing (3)
  - Chongqing
  - Evance
  - Malaysia
  - Singapore
  - Wroclaw (2)
  - Bangkok
  - Jakarta
  - Kuala Lumpur
  - Amman

- **Regional Branch Offices (5)**
  - Moscow
  - Frankfurt
  - Istanbul
  - Sao Paulo
  - Sydney

- **R&D Center (1)**
  - Seoul

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**Asia**

- **Beijing** (Est.2004) • Polarizer
- **Tianjin** (Est.2004) • EP
- **Guangzhou** (Est.2002) • EP
- **Chongqing** (Est.2015) • EP
- **Ningbo** (Est.1996) • ABS, SBR, EP
- **Nanjing** (Est.2003) • Mobile Battery, Polarizer
- **Huizhou** (Est.2003) • ABS
- **Wuxi** (Est.2017) • ESS Battery Pack
- **Quzhou** (Est.2018) • Precursor
- **Taipei** (Est.2004) • Polarizer

**Australia**

- **Sydney**
- **Bangkok**
- **Jakarta**
- **Kuala Lumpur**

**America**

- **Atlanta**
- **Torrance**
- **Troy**
- **Evansville** (Est.2018) • Sealant
- **San Paulo**
- **Mexico City**

**Europe**

- **Wroclaw** (Est.2005) • EP
- **Moscow**
- **Frankfurt**
- **Istanbul**
LG Chem | Business Area

- **Petrochemicals**
  - NCC
  - PolyOlefins
  - PVC/Plasticizers
  - ABS
  - Acrylates/SAP
  - Rubber/Special Polymers

- **Energy Solution**
  - IT&New Application Battery
  - Automotive Battery
  - ESS Battery

- **Advanced Materials**
  - Automotive Material
  - IT Materials
  - Industrial Materials

- **Life Sciences**
  - Primary Care
  - Specialty Care
  - Aesthetic
01
Petrochemicals Company
Petrochemicals Company

Establishment (Year)
1976

Sales (\$)
13.3 Billion * As of 2019

Workforce (Person)
Domestic 5,484 / Overseas 2,271

Business Area
Petrochemical Products

2019
Launched Osan Tech Center

2015
Launched Hwanam Tech Center in Nanjig, China

2010
Acquired Dow Polycarbonate business
Established Manufacturing Subsidiary in China
(Rubber / Special Polymers)

2007
Merged with LG Petrochemicals Co., Ltd.

2003
Acquired PVC Business of Hyundai Petrochemicals Co., Ltd.

1995 – 1998
Established Manufacturing Subsidiary in China / India / Vietnam (PVC, ABS)

1976
Completed Yeocheon PVC resin factory
Entry into the petrochemical business
### Production Capacity (As of 2019)

<table>
<thead>
<tr>
<th>Product</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethylene</td>
<td>2,400</td>
</tr>
<tr>
<td>Propylene</td>
<td>1,430</td>
</tr>
<tr>
<td>BD</td>
<td>330</td>
</tr>
<tr>
<td>BTX</td>
<td>816</td>
</tr>
<tr>
<td>SM</td>
<td>710</td>
</tr>
<tr>
<td>EG</td>
<td>180</td>
</tr>
<tr>
<td>Phenol</td>
<td>710</td>
</tr>
<tr>
<td>BPA</td>
<td>495</td>
</tr>
<tr>
<td>HDPE</td>
<td>550</td>
</tr>
<tr>
<td>LDPE/EVA</td>
<td>465</td>
</tr>
<tr>
<td>POE</td>
<td>300</td>
</tr>
<tr>
<td>PP</td>
<td>385</td>
</tr>
<tr>
<td>PVC</td>
<td>1,245</td>
</tr>
<tr>
<td>VCM</td>
<td>1,390</td>
</tr>
<tr>
<td>CA/EDC</td>
<td>997</td>
</tr>
<tr>
<td>Plasticizer</td>
<td>380</td>
</tr>
<tr>
<td>Oxo- Alcohol</td>
<td>299</td>
</tr>
<tr>
<td>Acrylic Acid</td>
<td>631</td>
</tr>
<tr>
<td>SAP</td>
<td>480</td>
</tr>
<tr>
<td>ABS</td>
<td>2,040</td>
</tr>
<tr>
<td>PS</td>
<td>142</td>
</tr>
<tr>
<td>EPS</td>
<td>136</td>
</tr>
<tr>
<td>Specialty Resin</td>
<td>508</td>
</tr>
<tr>
<td>Synthetic Rubber</td>
<td>515</td>
</tr>
</tbody>
</table>
Naphtha Cracking Center (NCC)

LG Chem’s naphtha cracking center (NCC) processes produce basic materials for the petrochemical industry, including ethylene and propylene. The raw materials produced from the BPA processes are used in polycarbonate (PC) resins and epoxy materials.
Polyolefins (PO)

LG Chem’s polyolefin (PO) processes produce synthetic resins, such as polyethylene (PE) and polypropylene (PP), used in containers and packaging materials, which are recognized in the global market for their outstanding quality.

Applications

Medical Appliances
Korean Floor Heating System
Packing Materials
Cable Insulator
Solar Film
Interior & Exterior Decoration of a Car

LD / LLD/ HD / POE / EVA
PVC / Plasticizers

LG Chem’s polyvinyl chloride (PVC) processes produce synthetic resins used for chassis and pipes, while plasticizers produce raw materials that add flexibility to the PVC. LG Chem’s CNT processes produce Carbon Nanotubes which have superior electrical, thermal, and mechanical properties.

Applications

- Sash
- Flooring
- Pipe
- Artificial Leather
- Cable Sheath
- Cathode Material
Acrylonitrile Butadiene Styrene (ABS)

LG Chem’s acrylonitrile butadiene styrene (ABS) processes produce high-performance materials, used in automobiles, home appliances, and IT devices, that have excellent heat resistance, impact resistance, and processability.

Applications

- Interior & Exterior Decoration of a Car
- Toy
- Home Application Housing
- Kitchen Container
- Products Container
- Building Insulation Material
Acrylates / SAP

LG Chem’s acrylate processes produce raw materials used for paint, adhesives, and SAP. SAP effectively absorbs fluids in diapers and items for sanitary purposes.

Applications

Plasticizer/ SAP Resin
Diapers
Paint
Adhesives
Cleaning agent for Semiconductors
Acrylic Fibers
LG Chem’s synthetic rubber processes produce raw materials used in tires and golf balls, and the specialty polymer processes produce special adhesives that are versatile.
Energy Solution Company
Energy Solution Company

Establishment (Year)
1995

Sales ($)
7.2 Billion * As of 2019

Workforce (Person)
Domestic 6,571 / Overseas 13,753

Business Area
IT & New Application/
Advanced Automotive/ESS Battery

2018
Developed the world’s first L-shaped battery

2016
Supplied lithium-ion batteries for NASA spacesuits

2015
Signed an agreement with AES to supply first-ever 1GWh ESS battery

2013
Developed the world’s first hexagonal pouch battery for smart watches

2010
Supplied the world’s first lithium-ion batteries for PHEV

2009
Supplied the world’s first lithium-ion batteries for HEV

1995
Started the development of lithium-ion batteries
IT & New Application Battery

LG Chem’s IT & New Application Battery Division was the first to mass-produce Lithium-ion Batteries domestically, and is now leading the global market through superior technology and productivity.

Cylindrical, Prismatic, Polymer

IT & New Applications

<table>
<thead>
<tr>
<th>Mobile Device</th>
<th>Power Tool</th>
<th>Electric Bicycle</th>
<th>Smart Mobility</th>
</tr>
</thead>
</table>

Major Customers

- LG Electronics
- BOSCH
- Apple
- Dell
- VinFast
- Asus
- Lenovo
- StonyBlack&Decker

01 Petrochemicals Company
02 Energy Solution Company
03 Advanced Materials Company
04 Life Sciences Company
LG Chem produces world-renowned EV batteries, and has a product portfolio that encompasses all products related to car batteries from cells to modules, BMS, packs, and technical support.

**Automotive Solution**

<table>
<thead>
<tr>
<th>Cell</th>
<th>Battery Management System (BMS)</th>
<th>Module / Pack / Rack</th>
</tr>
</thead>
</table>

**Major Customers**

01 Petrochemicals Company
02 Energy Solution Company
03 Advanced Materials Company
04 Life Sciences Company
ESS Battery

With superior lithium ion battery technology and global production capacity, LG Chem supplies battery systems for ESS batteries in many different fields including electrical grid, household, commercial, and UPS (uninterruptible power supply).

ESS Battery Solution

<table>
<thead>
<tr>
<th>Cell</th>
<th>Battery Management System (BMS)</th>
<th>Module / Pack / Rack</th>
<th>Container</th>
</tr>
</thead>
</table>

**Major Customers**

- KoOCo
- SMA
- SoftBank
- AES
- Nextera Energy
- Siemens
- Edison International
- Duke Energy
- ABB
Advanced Materials Company
Advanced Materials Company

Establishment (Year)
2019

Sales ($) 
4.2 Billion * As of 2019

Workforce (Person)
Domestic 3,924 / Overseas 2,934

Business Area
Automotive Materials / IT Materials / Industrial Materials

2019
Launched the Advanced Materials Company

2018
Established Chinese joint venture for manufacturing Precursor and cathode material

2016
Acquired GS E&M, a renowned cathode manufacturer

2006
Commercialized Battery Materials (Cathode, Electrolyte)

2003
Established IT&E Manufacturing Subsidiary in Nanjing, China

2000 - 2004
Commercialized LCD, OLED, Process materials

2000
Developed PDP phosphor for the first time in Korea and started production of polarizers
LG Chem is striving to provide the number one product in the automotive industry through stronger and lighter materials.

**Applications**

Exterior & Interior Decoration of a Car / Engine Parts

**Major Customers**

- GM
- HYUNDAI MOTOR GROUP
- Volkswagen
- Chrysler
- Mercedes-Benz
- RENAULT
- NISSAN
- MITSUBISHI
- Ford
IT Materials

LG Chem produces unique solutions for IT devices with products such as OLED materials, display materials, and various high-functional films and semiconductors.

OLED Materials / Display Materials / Advanced Functional Film

Applications

- OLED Display Materials
- Semiconductor Materials
- Rollable TV

Major Customers

- LG Display
- BOE
- Innolux
- AUO
- Samsung
- Samsung Display
Industrial Materials

LG Chem produces one of the key materials for secondary batteries, namely the material for positive electrodes, and concentrates on the development of high-capacity cathode material for mobile battery, electric vehicle, and energy storage battery markets as well.

Applications

Mobile Battery  Automotive Battery  ESS Battery

Major Customers

LG Chem  HITACHI
04

Life Sciences Company
Life Sciences Company

Establishment (Year)
1984

Sales ($)
0.5 Billion *As of 2019

Workforce (Person)
Domestic 1,665 / Overseas 136

Business Area
Pharmaceuticals, Vaccines, Aesthetic

2019
Established Life Sciences Innovation Center in Boston, USA

2012
Developed 1st Korean diabetes medicine, ‘Zemiglo’

2003
1st Korean NCE approved by US FDA(Factive)

1996
1st Korean hepatitis B vaccine ‘Euvox’ approved by WHO PQ

1991
Developed World’s first 4th generation Cephalosporin

1984
Start of pharmaceutical business
(Established Pharmaceuticals business division)

1961
Acquire of manufacturing license pharmaceuticals products
LG Chem has developed Korea’s first diabetes medicine, Zemiglo, and arthritis medicine, Synovian, increasing its competitiveness in Korea as well as overseas, and has expanded its efforts to develop new drugs and to cooperate with other companies through partnership in the fields of diabetes and cardiovascular, musculoskeletal, and autoimmune diseases.

**Representative Products**

- **Diabetes** (Zemiglo, Zemimet SR)
- **Cardiovascular Disease** (Rovatitan)
- **Musculoskeletal Disease** (Hyruan One)
- **Autoimmune Disease** (Ezept)
LG Chem is the first company in Korea that has successfully developed a drug for growth hormones and is also concentrating on the R&D of drugs for special diseases. Throughout the hepatitis B and pentavalent combination (5-in-1) vaccine that has been approved by the World Health Organization (WHO), LG Chem has been strengthening competitiveness in the global market.
Aesthetic

YVOIRE, the first hyaluronic acid filler developed by LG Chem with authentic in-house technology in Korea, is expanding its market shares with the recognition of superior product quality.

Representative Products

- Hyaluronic Filler (Y-SOLUTION)
- Hyaluronic Filler (YVOIRE)
- Hyaluronic Filler (伊婉 in China)
Farm Hannong, LG Chem's affiliate company, is the top domestic agricultural company holding the first place in the agricultural chemicals and the second place in the fertilizer & seed in market shares, and aims to be the leading green company in the international market through agriculture and ICT industry technologies.
A Company That Enriches Human Life
Thank you