

Global Major Carbon Materials Maker

posco
MC MATERIALS



‘POSCO MC Materials’

A global carbon materials company
dedicated to building an eco-friendly industry and
creating a sustainable society for the future.

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SUSTAINABLE MANAGEMENT

POSCO MC MATERIALS

In November 2012, POSCO MC Materials, as the Korea's pioneer of premium Needle coke, was established on the strategic collaboration of POSCO Future M's production infrastructure, Mitsubishi Chemical's technology, and Mitsubishi Corporation's marketing network.

We are driving a significant shift for carbon neutrality in the steel and mobility industry by supplying key materials for making graphite electrodes and anodes of lithium-ion batteries. Through providing vital carbon products, we will strengthen the POSCO Group's competitiveness in the eco-friendly industry and promote a sustainable future.

As a 'Global Major Carbon Materials Maker', we will keep developing innovative materials for better future and become a trusted environmental leader.



Top-Quality Needle Coke Provider

Only 4 countries have needle coke
manufacturing technology
(Korea, China, USA, and Japan)

POSCO MC MATERIALS

POSCO's 2050 Carbon Neutrality

We contribute to the eco-friendly industries
(Rechargeable Battery, HyREX) within POSCO Group.

Global Expert of Carbon Materials

We develop advanced technologies for the
expansion of the carbon materials value chain.

Address	2408, Jecheol-ro, Gwangyang-si, Jeollanam-do	Shareholders	POSCO Future M(60%), MMP(40%)
Business	Needle coke, Isotropic coke, Oil products	Capital Stock	141.4 million USD
		Assets	282.5 million USD (2024)

Management Philosophy

POSCO Group's Management Philosophy

Vision



Materials for Tomorrow, Innovation for Excellence

Strategy



To achieve predominant
business leadership
based on future technology

To foster a dynamic
corporate culture to
grow together

To enhance a sustainable ESG management system

Core Values



Safety
Foundation of
a fulfilling
workplace



Ethics
Sound
principle of
community



Trust
Anchor of
communication
and unity



Ingenuity
Source of
enhanced
performance



Audacity
Passion for
growth and
achievement

POSCO MC Materials' Vision



Mission

Creating a sustainable future and
contributing to carbon neutrality with
advanced & innovative materials



Vision

The global carbon materials company
that creates an eco-friendly future

Objectives



- 1 Global leader in fundamental carbon materials
- 2 Contribution to carbon neutrality with eco-friendly steel production materials
- 3 Expansion of the carbon materials value chain

Key Business



- 1 Needle Coke (for GE/Anode for Battery)
- 2 Pitch Coke (Specialty Carbon)
- 3 Future Carbon Materials

HISTORY

2021~NOW

Future Market
Leading Company

- 2024 11. Carbon Materials R&D Center certified as a Safety Management Excellence Lab
- 2023 11. Awarded Excellence in Safety Company at the 22nd Korea Safety Awards
- 08. Won the POSCO Technology Awards (Eco-Friendly Future Materials)
- 04. Corporate research center certified from KOITA * KOITA : Korea Industrial Technology Association
- 01. Renamed to POSCO MC Materials Co., Ltd.
- 2022 08. ISO 9001 and 14001 qualified
- 2021 12. 'Family-Friendly Company' certified
- 05. Founded Carbon Materials R&D Center



2018~2020

Securing Global Growth
Momentum

- 2020 11. 'Global Premium brand of Needle coke' awarded
- 08. 'Outstanding Company in Labor-Management Culture' by Gwangyang-si
- 01. Won the grand awards in the export from Gwangyang Chamber of Commerce
- 2018 12. Won \$100 Million Export Tower at the 55th Trade Day



2016~2017

Production and Quality
Stabilization

- 2017 11. Won a commendation from the 'Minister of Trade, Industry and Energy' in the 'Korean Energy Efficiency Awards'
- 2016 05. Commenced Needle coke sales



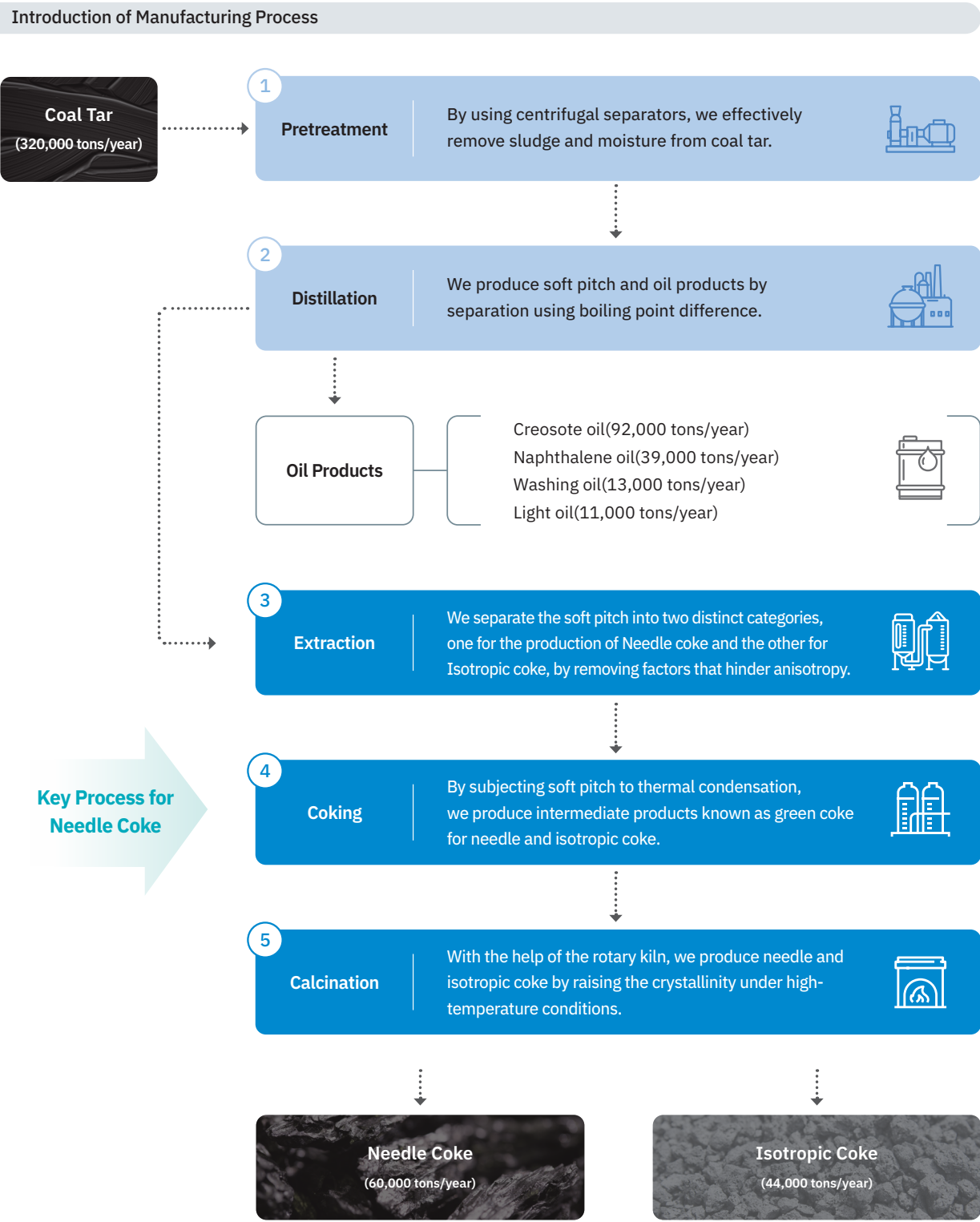
2012~2015

Factory Construction

- 2015 12. Completed construction of Needle coke factory & commenced Needle coke production
- 2013 10. 'Dongtan Industrial Medal' awarded
- 03. 'High-Technology Business Company' certified
- 2012 12. Broke ground on the Needle coke factory
- 11. Established PMC Tech Co., Ltd.



Manufacturing Process



Product Introduction

Needle Coke

Needle coke is produced through the refining/distillation of coal tar generated in the steel industry. It features a thin, elongated needle-like structure with anisotropic molecular arrangement, which grants it excellent electrical conductivity and durability at high temperatures, along with low thermal expansion rates.

Major Uses

✔ Used as electrodes of electric arc furnaces (for melting and refining of iron scrap)

✔ Used as anodes, which is key material of rechargeable batteries, and future carbon materials such as SiC, CNT, graphene

▲ Graphite Electrodes

▲ Anodes of Rechargeable Battery

Needle Coke Quality Index

Needle Coke for Graphite Electrodes

Items		PMN-B	PMN-E	PMN-M
Moisture	(%)	0.1	0.1	0.1
Ash	(%)	0.01	0.01	0.01
VM	(%)	0.3	0.3	0.3
Sulfur	(%)	0.3	0.3	0.3
Nitrogen	(%)	0.6	0.6	0.6
Real Density	(g/cm³)	2.14	2.14	2.14
CTE	(×10 ⁻⁷ /°C)	3.5	4.0	4.0
In-situ Puffing	(%)	3.0	2.4	3.0
Size > 12.7 mm	(%)	25	25	0
Size < 1 mm	(%)	15	15	30

Needle Coke for Anode materials

Items		PMG-B	PMN-Z
Type of Product		Green	Calcined
Moisture	(%)	1~10	0.1
Ash	(%)	0.01	0.01
VM	(%)	4~6	0.3
Sulfur	(%)	0.3~0.4	0.3
Nitrogen	(%)	-	0.6
Real Density	(g/cm³)	-	2.1
CTE	(×10 ⁻⁷ /°C)	-	4.0~5.0
Size > 12.7 mm	(%)	-	0
Size < 1 mm	(%)	-	100

Product Introduction

Isotropic Coke

Product Name : Pitch Coke

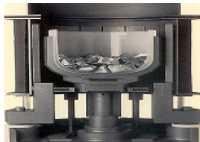
Isotropic coke is produced through a similar process to needle coke. It has an isotropic molecular structure with similar alignment in all directions, giving it characteristics of high density, strength, and excellent heat resistance.

Major Uses

- Used as isotropic graphite blocks for semiconductor silicon manufacturing crucibles and blocks for aluminum refining
- Used as carbon additives and electrode material for HyREX(Hydrogen Reduction Ironmaking)



▲ Isostatic Graphite Block



▲ Silicon Manufacturing Graphite Crucibles



▲ HyREX Electrode Materials

Pitch Coke Quality Index

Items		PMP	PMS-1	PMS-3
Moisture	(%)	0.1	0.1	0.1
Ash	(%)	0.5	0.4	0.4
VM	(%)	0.4	0.4	0.4
Sulfur	(%)	0.4	0.4	0.4
Nitrogen	(%)	1.0	1.0	1.0
Real Density	(g/cm³)	1.98-2.02	2.0	2.0
CTE	(×10 ⁻⁷ /°C)	N/A	N/A	35
HGI	-	N/A	N/A	18
Fixed Carbon	(%)	99.0	99.1	99.1

Oil Products

Various types of oils are produced from coal tar during the distillation process by utilizing differences in boiling points.

Major Uses

- Creosote Oil : Used as the primary raw material for carbon black production which is used in industrial coatings, inks, tires, and etc.
- Naphthalene Oil : Used as a raw material for plasticizers (PA) and water reducers (PNS, SNF) for concrete admixtures.
- Washing Oil : Used as a catalyst for extraction of light oil components (benzene, toluene, xylene) and for machinery cleaning



▲ Carbon Black



▲ Plasticizer (PA)



▲ BTX (Benzene, Toluene, Xylene)

Global Marketing Network

In line with the eco-friendly industry paradigm, POSCO MC Materials solidifies its position in the global market by producing Needle coke, which is essential for the production of graphite electrodes for electric arc furnaces and anode materials for rechargeable batteries, as well as creosote oil for carbon black and other oil products.

Based on the principle of customer and stakeholder satisfaction as our top priority, we make continuous efforts to improve product quality and corporate reliability. Additionally, we will become a key player in the future carbon materials value chain through an enhanced marketing network and technological innovation.



- United States of America

China

India
- United Arab Emirates

Japan

Malaysia
- Europe - Germany, Poland, Italy, Spain

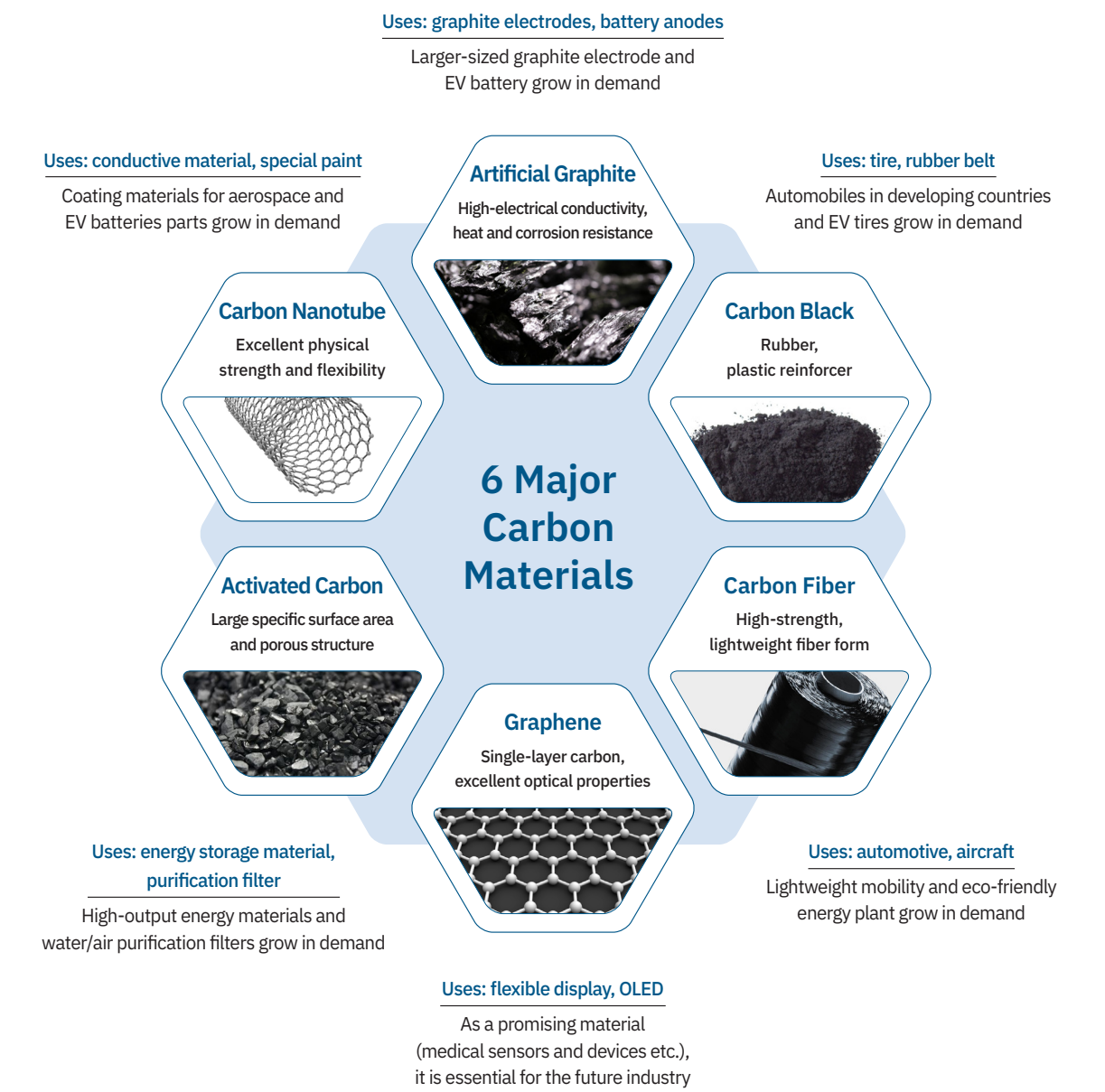
Industry Outlook

Industry Overview

Carbon materials possess exceptional characteristics such as lightweight, high strength, outstanding electrical and thermal conductivity. These enable them to transcend the technical limits of conventional materials like metals and plastics.

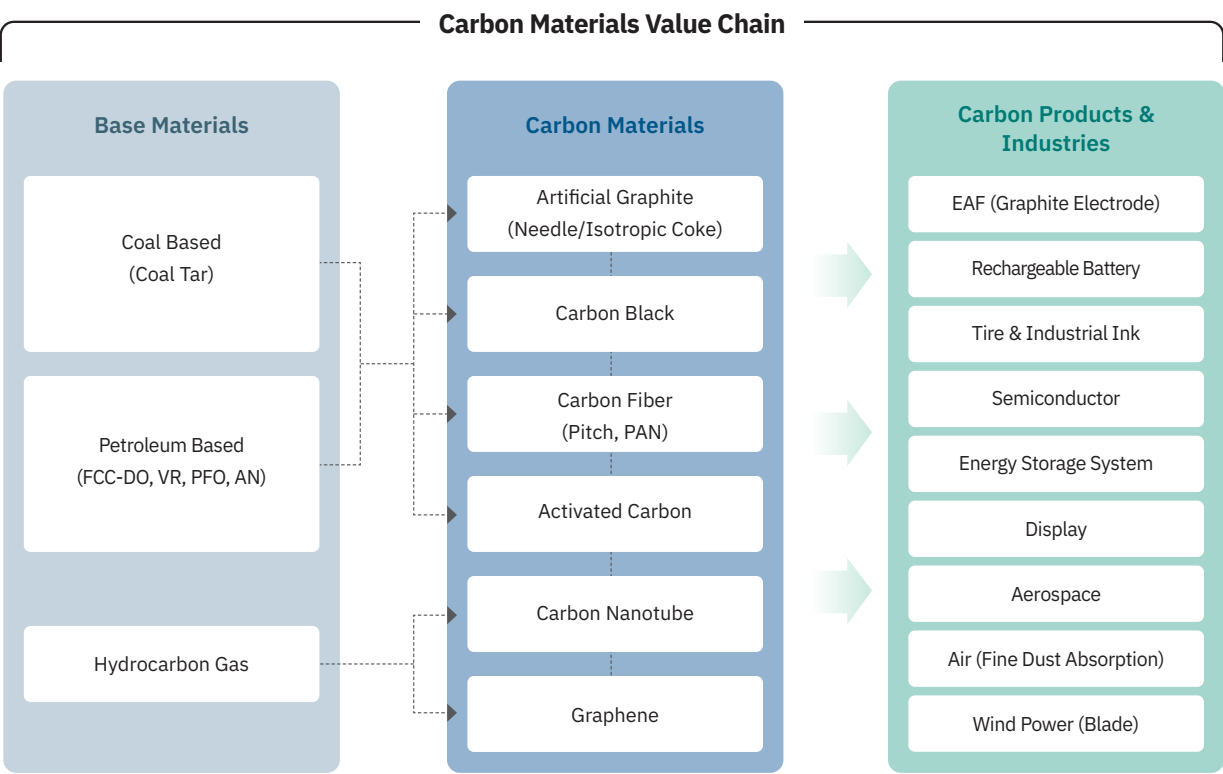
Their unique advantages position them as a key material at the middle of the Fourth Industrial Revolution, such as eco- friendly steel production, mobility industry, aerospace, semiconductor and etc.

Moreover, through synergistic integration with other materials, carbon materials will drive technological innovations across various industries.

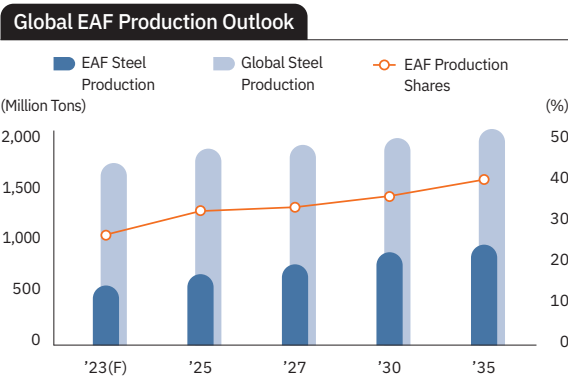
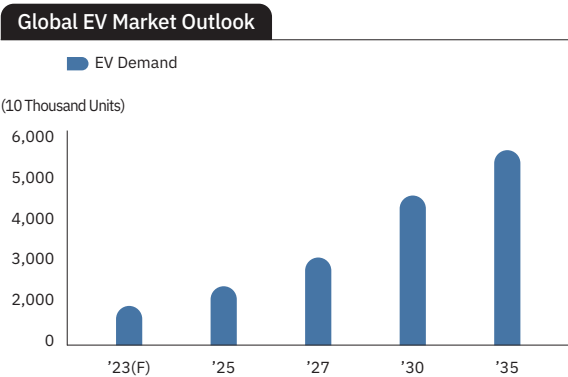


Industry Prospect

The industrial paradigm is changing as major countries are implementing eco-friendly policies in response to global carbon neutrality goals. Carbon materials have limitless growth potential as a key material in advanced strategic sectors such as CNT, graphene, and carbon fiber. They are crucial for the development of eco-friendly industries, including renewable energy storage devices, electric vehicles, and electric arc furnaces, as part of the net-zero transition.



* PFO : Pyrolysis Fuel Oil / VR : Vacuum Residue / FCC-DO : Fluid Catalytic Cracking - Decant Oil / AN : Acrylonitrile / PAN : Polyacrylonitrile



Research & Development

POSCO MC Materials R&D Center providing advanced solutions in graphite electrode & materials for steelmaking process like EAF¹⁾, SAF²⁾ and anode materials required for the eco-friendly energy industry. We are strengthening our capabilities in quality and technology through the ongoing research and development.



Co-Research

- ✓ POSCO Future M “Collaboration in isotropic graphite blocks and activated carbon R&D”
- ✓ POSCO Holdings NEX.T Hub & RIST “Joint research on commercialization of electrode materials”
- ✓ Kumoh Univ. & Chungnam Univ. “Coke & Pitch R&D and Academia-industry partnership”
- ✓ Korean Carbon Society (MOU) “Mutual cooperation in nurturing carbon materials specialists”

R&D Projects

Electrode Materials



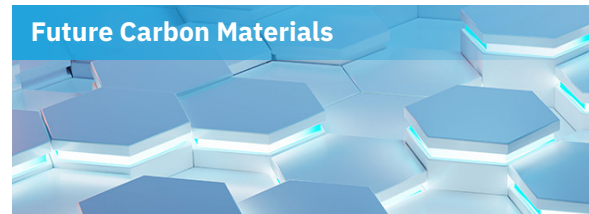
We provide solutions for high-quality graphite electrode materials by controlling the CTE³⁾ and Puffing of Needle coke, and drive the domestic production of the carbon paste electrode for ESF.

Anode Materials for LIB



We enhance the performance and stability of artificial graphite and developing cost-effective and efficient production methods.

Future Carbon Materials



Through collaborations with academic societies, we continuously research and develop various forms of future carbon materials such as carbon nanotubes, graphene, and carbon black.

Eco Materials



We conduct research on eco-friendly materials and the recycling of waste carbon materials suitable for the zero-carbon era.

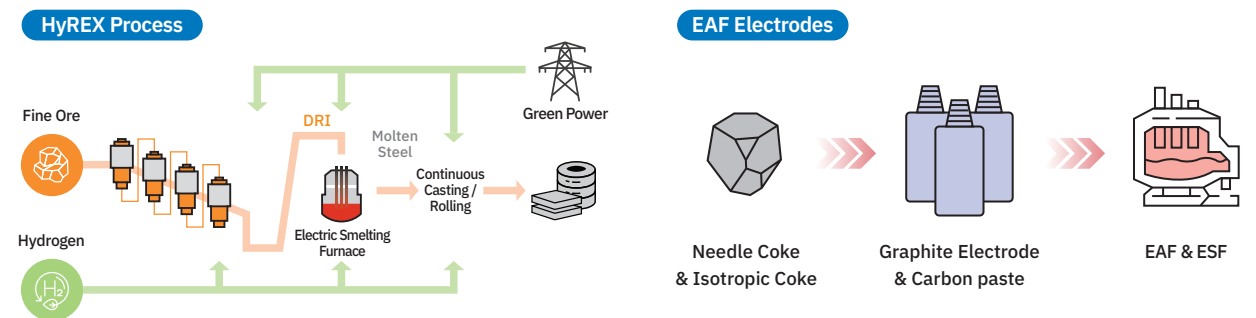
* 1) EAF : Electric Arc Furnace, 2) ESF : Electric Smelting Furnace, 3) CTE : Coefficient of Thermal Expansion

POSCO's Future Value Chain

As a global leader of eco-friendly future materials, POSCO Group is building a greener steel business with hydrogen reduction ironmaking, and a sustainable rechargeable battery materials business to drive the future mobility industry.

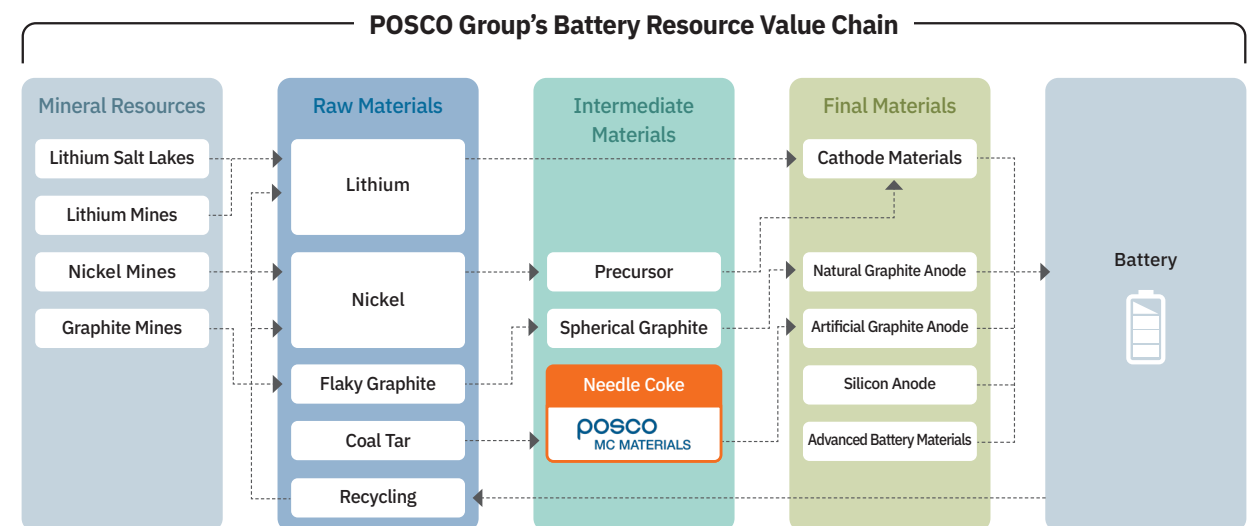
Carbon Neutral HyREX (Hydrogen Reduction Ironmaking)

HyREX is an advanced technology which aims to achieve near-zero emissions by using hydrogen to convert fine iron ore into Direct Reduced Iron (DRI). Since DRI is put into Electric Smelting Furnace (ESF) to produce hot metal, the demand for key materials of ESF, such as graphite electrodes and electrode materials, will increase.



Battery Resource Value Chain

POSCO Group has built a complete rechargeable battery materials value chain supplying the world with raw input as well as final materials. With POSCO Holdings at the Top, aiming to maximize synergy across the group, POSCO Group has integrated mineral resources, raw and final materials businesses.



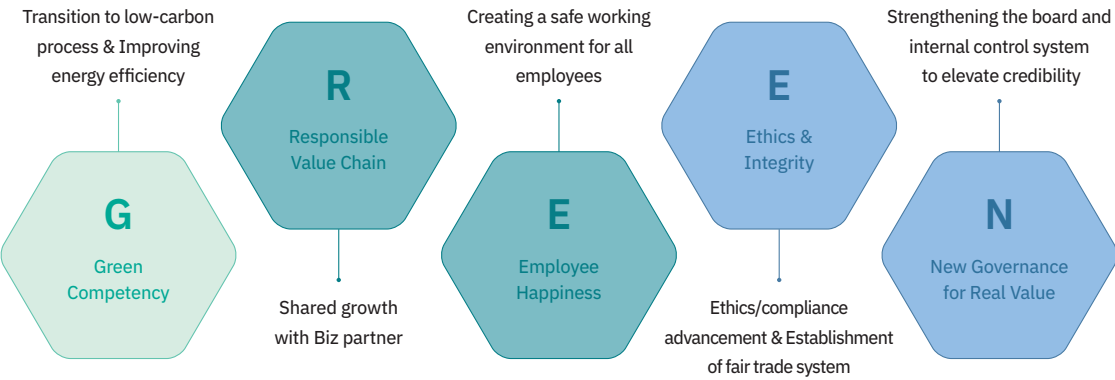
POSCO MC Materials, a member of POSCO Group, is conducting research and development to create synergy between hydrogen reduction ironmaking and the future rechargeable battery material business. We will never stop improving for the best and stable supply of the carbon raw materials.

Sustainable Management

ESG Management

POSCO Group’s ESG management is based on the philosophy of “Corporate Citizenship: Building a Better Future Together.” It takes the lead in environmental leadership for building sustainable communities and achieving real value through the advancement of corporate governance.

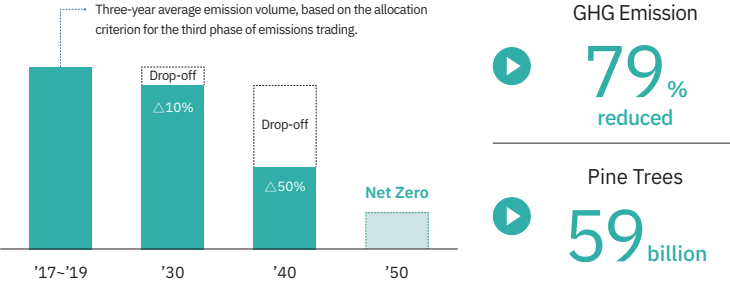
GREEN framework



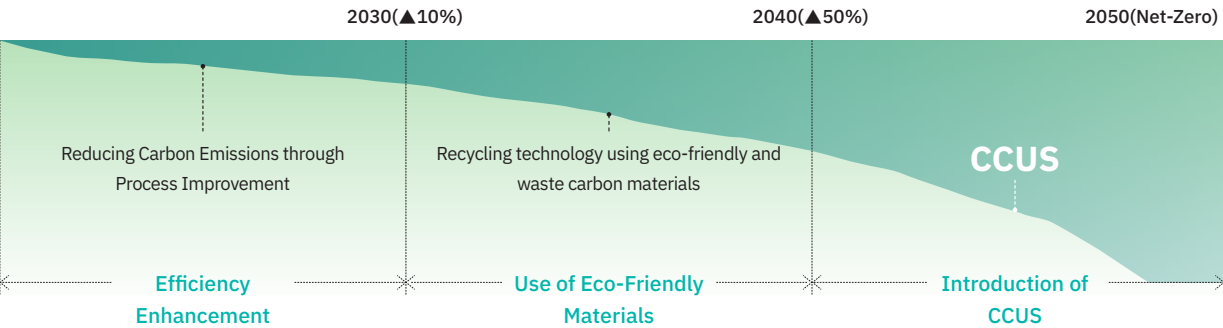
POSCO’s 2050 Carbon Neutrality ENVIRONMENT

Through electric arc furnaces of POSCO’s HyREX, it is possible to reduce greenhouse gas emissions by 79% compared to blast furnace production, which is equivalent to the absorption capacity of 5.9 billion pine trees in a year (approximately 50 million tons/year).

As a key partner in POSCO’s 2050 carbon neutrality vision, POSCO MC Materials contributes to sustainable and eco-friendly industrial development by ensuring the stable supply of Graphite electrodes & materials.



POSCO MC Materials’ Carbon Neutrality Roadmap ENVIRONMENT



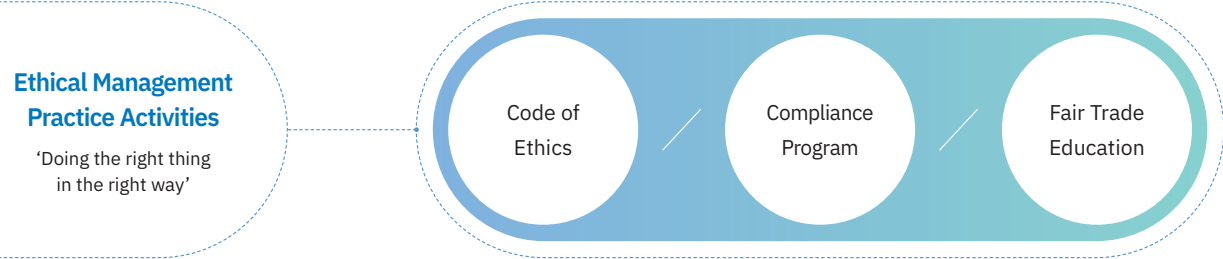
Sustainability SOCIAL

With the goal to take part in addressing social issues and contribute to fostering a more prosperous world and better tomorrow for humanity, POSCO Group has been practicing the management philosophy of Sustainability. By embracing sustainable management practices that prioritize long-term company growth as well as environmental and social responsibility, we aim to foster mutually beneficial relationships with all stakeholders and enhance corporate value while sustaining growth.



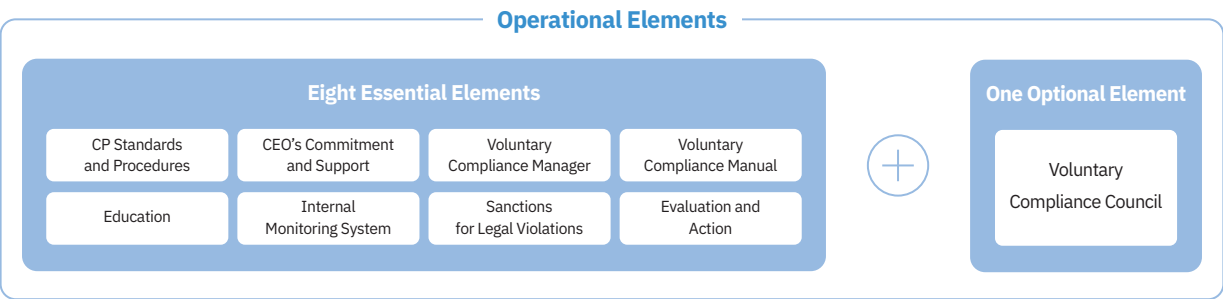
Ethical Management GOVERNANCE

POSCO MC Materials is practicing ethical management activities, with integrity, fairness, and honesty.



Compliance Management GOVERNANCE

POSCO MC Materials complies with the regulations and requirements set forth by the Fair Trade Commission, and operates a compliance program in accordance with the evaluation criteria.



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