

For a Green and Clean World, Promise of the Future, Responsible Care

KRCC is an organization established for Responsible Care (RC), by institutions involved in petrochemicals, fine chemicals, fertilizers, and chlor-alkali, as well as the American Chamber of Commerce in Korea, the European Union Chamber of Commerce in Korea, and other chemical institutions. RC incorporates activities to improve the environment, safety, and health in the chemical industry.

Environment



Active and preemptive responses

Safety



Sustainable development

Health



Affluent and abundant human life

Responsible Care

Commitment of the
Chemical Industry to
Sustainable Development

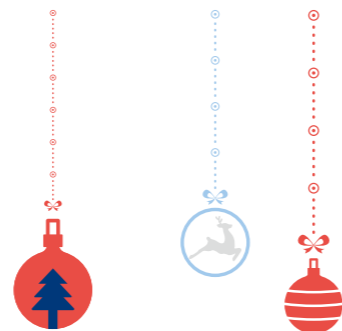
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Issue No



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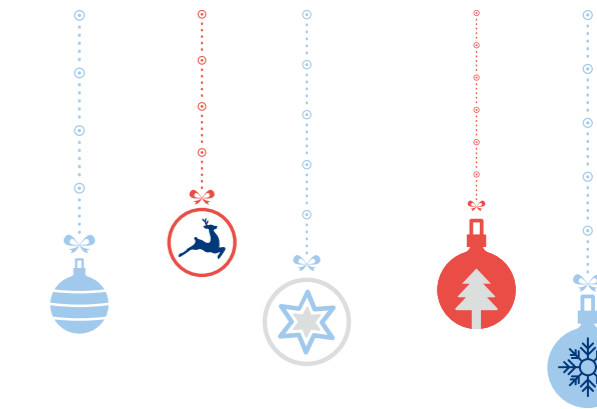


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Serial number: 49
Publisher: Sim Hong-seop
Published by: Maekyung Buyers Guide Corp.
Date of issue: December 9, 2022
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E-mail: rcmaster@krcc.or.kr
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Responsible Care® is a voluntary program in the chemical industry that continuously promotes protection of the environment through safety and health improvement activities by pledging participants' commitment. It implements the program through management policies to protect the environment, safety, and human health throughout the entire lifecycle of chemicals from the development of chemical products to their manufacture, sale, distribution, use, and disposal.

To pass on abundance
for humankind
A better world for
future generations

The KRCC will strengthen
its activities and roles for
sustainable development with
one mind and one heart

Responsible Care
means international
voluntary activities
for the chemical industry

promote improvement
of the environment
and the safety and health
of the people

**Responsible
Care**
Responsible Care Issue
Vol.49

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Industrial Carbon Neutral Implementation Plan and Future Tasks

South Korea joined the international community's declaration of carbon neutrality by declaring 2050 Carbon Neutrality in October 2020. After, it announced the Carbon Neutral Promotion Strategy in December 2020, established the Carbon Neutrality Committee in May 2021; enacted the world's 14th Carbon Neutral Basic Law in Sept. 2021; and announced the upward plan for 2030 National Greenhouse Gas Reduction Target (NDC) and 2050 Carbon Neutrality Scenario — embarking on the journey toward carbon neutrality.

Dr. Emma Jeong
Korea Institute of Industrial Technology Carbon Neutrality Office

1. Status of Carbon Neutrality in Korea

The 2030 domestic GHG emission target is 436.6 million tons, a 40% reduction compared to 2018 (727.6 million tons), which requires an annual average reduction of 4.17%. This is a very challenging target compared to major countries*.

* Annual average reduction rates in major countries(tons):

(EU)1.98, (USA)2.81, (UK)2.81, (Japan) 3.56

Carbon neutrality is a challenging task that will completely transform South Korea's industrial development path, where manufacturing comprises a high proportion, but it is irrevocable and required throughout the industrial environment as part of the new economic order. Accordingly, failure to secure carbon-neutrality competitiveness could lead to Korea falling behind in the global supply chain. Amid this sense of potential crisis, the government announced specific policy directions and strategies, such as its 'Carbon Neutral Industry, Energy R&D Strategy' and 'Industry, Energy Carbon Neutral Transformation Vision and Strategy' – with the goal of transforming energy and industrial structures for carbon neutrality.

2. Characteristics of the Chemical Industry and Current Status of GHG Emissions

The domestic petrochemical industry has the world's 4th-largest production capacity based on ethylene production, and is a national key industry with a global market share of over 5%, with energy-intensive and raw material-intensive characteristics. The production process of petrochemical products is divided into three categories: crude oil; gas; and coal – according to the raw material. South Korea adopts a process of decomposing naphtha produced from crude oil, producing ethylene, propylene, and aromatics (BTX) products. The upstream process of the petrochemical industry involves classifying and refining raw materials to produce basic oil, consuming a huge amount of energy in processes such as pyrolysis, cooling, and compression. It also recovers by-product gases (methane, etc.) from naphtha pyrolysis and burns them as fuel in a pyrolysis furnace, emitting a large amount of GHG (direct emissions). The greenhouse gas emission ratio of the basic oil and intermediate raw material production stage comprises more than 89% of the total, which has a significant effect on the overall greenhouse gas emissions by the petrochemical industry.

In addition, greenhouse gases are emitted as fossil fuels are used (such as coal, oil, and gas) for heating in other processes that operate incinerators, boilers, and gas turbines. As of 2018, greenhouse gas emissions from the domestic petrochemical industry amounted to 46.9 million tons (excluding indirect emissions), accounting for 18% of total industrial sector emissions (260.5 million tons). This means that the petrochemical industry is a major industry that emits a large amount of GHG

in Korea. Also, the structure of the petrochemical industry is that GHG emissions inevitably increase as production increases. The problem lies in the fact that the domestic petrochemical industry will expand its production scale to respond to the ever-increasing demand in the global chemical market. In addition, domestic refiners are also increasing their entry into the petrochemical upstream sector, which is more profitable than the oil refining business, so the domestic chemical production capacity is expected to continue to increase. In fact, in October 2022, Hyundai Chemical completed the first heavy oil-based petrochemical facility in Korea, and in November 2022, GS Caltex completed the olefin production facility (MFC, Mixed Feed Cracker), with continued facility expansion in progress. This has required multilateral efforts to achieve the greenhouse gas reduction target while maintaining the growth of the petrochemical industry.

3. Plans to Implement Carbon Neutrality in the Chemical Industry

The petrochemical industry's 2030 emission target is 37.4 million tons, meaning 9.5 million tons more (20.2%) will have to be reduced compared with 2018. Since the domestic naphtha-based petrochemical industry uses oil not only as a raw material but also as a fuel, it is necessary to establish an innovative GHG-reduction strategy that reduces dependence on oil itself. GHG-reduction strategies in the petrochemical industry can be divided into four areas: raw material substitution; fuel substitution; resource circulation; and process improvement. However, due to the nature of the industry, which uses petroleum as its main raw material, the GHG-reduction effect in raw material substitution is the greatest and is a key means to achieving carbon neutrality. Raw material substitution is a strategy to minimize GHG emissions by replacing naphtha, the existing fossil fuel, with bio naphtha or hydrogen, which emit zero GHG. This can be divided into biomass-derived raw materials and material development technology, and the technology that produces methane by combining by-product gas emitted from the petrochemical process with hydrogen for production. Biomass-derived raw materials and material technologies have a relatively short preparation period for commercialization as they use oil extracted from biomass without significantly altering the existing naphtha process. However, aside from technical maturity and applicability, a bigger challenge exists: the stability of raw material supply and demand.

Fuel substitution is a strategy to replace existing fossil fuels (oil, coal) and by-product gas with electricity, and the heating furnace itself with an electric heating furnace to produce the heat energy required for the heating furnace in the naphtha cracking

center. However, the R&D of electric heating furnaces remains at the basic level, so the industry expects its commercialization and phased facility-conversion to happen after 2040. Resource recycling is a strategy to physically and chemically recycle waste plastic to replace naphtha, so it is described as a kind of raw material substitution method using waste plastic pyrolysis oil instead of naphtha. Major companies such as GS Caltex, SK Geocentric, and Hyundai Oil Bank are scrambling to carry out demonstration projects for waste plastic pyrolysis oil, and the government has recently announced the measures to vitalize the plastic pyrolysis oil industry through 'Measures to Revitalize the Circular Economy for Regulatory Improvement and Support'. Also, with the amendment of the Waste Management Act, the 'Use of Raw Materials for Petroleum and Petrochemical Products' was added to the recyclable types of waste plastic pyrolysis oil, laying the groundwork for pyrolysis oil to be used in naphtha production. The Petroleum Business Act is also planned to be revised based on the results of the ongoing regulatory sandbox demonstration. In addition, pyrolysis oil manufacturing facilities will be classified as recycling facilities, rather than incineration facilities, under the Waste Management Act; and incentives will be expanded by reducing waste charges for chemical recycling, and streamlining facility installation and installation inspection standards. As for process improvement, GHG will be reduced by enhancing overall energy efficiency and adopting process optimization technology in the upstream production process, which is evaluated as having a high possibility of commercialization in the short term compared to other technologies. The GHG reduction measures of the petrochemical industry proposed in the 2030 NDC increase are 1) Fuel conversion: converting heavy oil to 100% eco-friendly fuel, 2) Raw-material conversion: converting the existing naphtha by using bio raw materials, 3) Others: recycling 18.6% of the 5 million tons of waste plastic produced as raw materials.



4. Government Support Policy

Last October, based on the Framework Act on Carbon Neutrality and Green Growth (implemented in March 2022), the Carbon Neutral Green Growth Committee, the ‘control tower’ of the current government’s carbon neutrality and green growth policies, was officially launched; and the “Carbon Neutral Green Growth Promotion Strategy,” and “Carbon Neutral Green Growth Technology Innovation Strategy” were announced. The government especially announced the “Strategy for Carbon Neutral Green Growth Technology Innovation”, a list (plan) of 100 Korean carbon-neutral core technologies with the goal of establishing a mission-oriented, carbon-neutral technology innovation system led by the private sector. The petrochemical industry includes 15 core technologies, the largest in a single industry — such as electric heating furnace system technology; bio-PEF production and application technology; waste plastic pyrolysis technology; and petrochemical process smart platform technology. Also, to strengthen the role of the private sector throughout the carbon-neutral R&D cycle, a private consultative body will be operated by the field to collect opinions on R&D planning and investment. A grand consortium for related companies to conduct research together will be introduced to develop technology, thereby increasing the effectiveness of technology R&D. As the first step and starting point, the Carbon Neutral Industry Core Technology Development Project (plan) was finalized by the Ministry of Trade, Industry & Energy. The petrochemical industry has received a total of KRW 185.8 billion in the budget — KRW 134.4 billion to invest in by-product gas methane conversion technology to convert methane gas formed in the naphtha pyrolysis process into high value-added chemical products instead of the heat source of cracking process, and to convert the fossil fuel-based naphtha pyrolysis process into electricity (direct heating or Plasma). Meanwhile, for electric furnace decomposition technology, the government will consider follow-up support such as demonstrations through a business feasibility review depending on

Carbon Neutrality



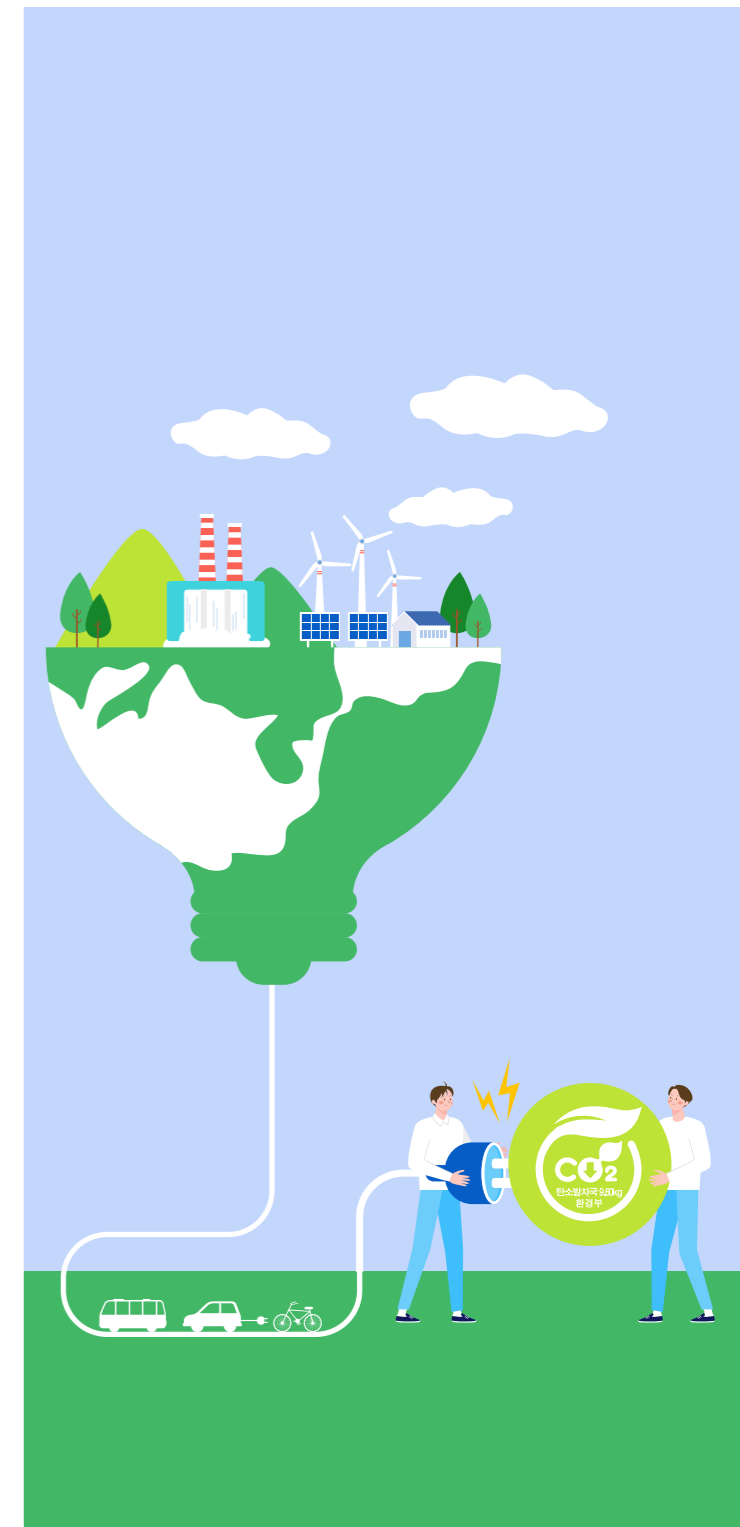
the level of technology secured. In addition, by designating carbon-neutral technology as a new growth and source technology, the government will support tax credits for R&D and facility investment, while including petroleum-based plastic alternative biochemical raw material production and electric heating naphtha decomposition technologies in the petrochemical industrial process technology.

5. Future Tasks

For the commercialization of carbon-neutral core technologies in the petrochemical industry, R&D cooperation between the public and private sectors is of paramount importance. Since the GHG reduction technologies mentioned above are innovative, high-cost technologies compared to existing fossil fuel technologies, they require large-scale costs and a long time to commercialize. Thus, relying only on the private sector to develop such technologies will impede carbon neutrality in the petrochemical industry. To implement an effective GHG-reduction strategy, institutional improvement and tax support measures must be expanded. The amendment of the Petroleum Business Law under review should be confirmed promptly, and the scope of new growth and original technologies should be expanded to include various petrochemical technologies. Tax support benefits ought to be expanded for large corporations leading technology development and investment for carbon neutrality.

In addition, the government’s role is also important to mediate conflicts with various stakeholders (residents, incinerators, waste recycling companies, etc.). It is hoped that specific, feasible policies that can resolve the industry’s onsite difficulties are included in the chemical industry development strategy to be announced by the Ministry of Trade, Industry and Energy in the future. 🌱

<Reference>
‘Strategy for Carbon Neutrality in the Petrochemical Industry and Policy Responses’ Cho Yong-won, Lee Sang-won, Kim Kyung-moon, Korea Institute for Industrial Economics and Trade (2021).



2022 RCLG

Main Contents

The International Council of Chemical Associations (ICCA) RC Leadership Group (RCLG) meeting in the second half of 2022 was held both online and offline in Paris, France, on September 7 to 8, 2022. About 60 representatives from 30 member countries attended the meeting. Under ICCA, there are leadership groups in five areas: energy; climate change; chemical policy; health; responsible care; communication; and plastics. Each leadership group holds meetings twice per year to discuss major issues and response plans by area. At this RC Leadership Group meeting, the representatives discussed the development of RC self-assessment tools and the status of RC by country. The following are the main agenda items and future plans discussed at the meeting:



1 ICCA Self-Assessment Tool Working Group Update

- o (Purpose) Development of ICCA Responsible Care’s Own Tool for Chemical Companies Around the World
- o (Background) The European Chemical Industry Council (Cefic) developed a self-assessment tool to evaluate a firm’s management program and track its progress to drive continuous improvement.
 - RCLG aims to engage more SMEs in RC initiatives and similarly utilize the program in other countries and organizations by leveraging Cefic’s feedback and tools and adapting them for use worldwide.
- o (Status) Cefic’s tools are under improvement, Q&A principles are prepared for global utilization, and local database connections are being reviewed.
 - The answer consists of six defined (regulated) responses and not applicable.
 - Q&A guidebook production and final improvements currently in progress.

[RC Self Assessment Guidebook Contents]

No.	Section	Key Processes
1	A Corporate Leadership Culture	Scope&Commitment, Compliance, Management Structure, Ensure Improvement, Resources, Training&Employee Involvement, Document Management, Management of Change
2	Safeguarding People and the Environment	Occupational Health&Safety, Process Safety, Distribution, Security, Environment
3	Strengthening Chemical Management Systems	Product Design&Improvement, Prioritization of Products, Product Information, Risk Characterization, Product Risk Management, Value Chain Management
4	Influencing Business Partners	Responsible Sourcing, Value Chain Collaboration, Business Integrity, Labour Rights, Logistics Partners, Downstream Users
5	Engaging Stakeholders	Stakeholder Assessment, External Dialogue and Transparency, Local Communities
6	Contributing to Sustainability	Materiality Assessment, Sustainable Development, Communication, Sustainable Portfolio, Resource Efficiency, Circular Economy, Water Use, Land Use&Biodiversity, Climate&Energy Use, Diversity

- **(Future plans)** Complete professional consultant consultation and final design work(11/2022); Complete design by the end of 2022; start implementing (11/2023); To recruit candidates from all member companies for testing (03/2023); Test beta version(05/2023); Online training for beta tester participants(06/2023); Public test(06/2023), Release web tool final version (09/2023); Announce ICCA at ICCM5(3Q of 2023); Lead worldwide campaign(2024)

2 Introduction to KPI Working Group Projects and Reports

- **(Background)** RCLG surveys the RC performance of member countries every year, compiles them, and announces them as an annual report.
- **(Results)** Summary of data collected from 33 associations
 - Due to the difficulty of data collection, member companies are not cooperative and do not feel comfortable disclosing data. Sometimes they find reasons not to share and track data.
 - As many as 73% said it was impossible to directly submit member company data to ICCA, with only 27% possible
(Reason for impossibility: Confidentiality, not authorized to share data, must verify data, etc.)
- **(Problem)** Difficulty with the current method of collection of KPI data
 - RC non-member companies' data are sometimes included and difficult to separate.
 - Without a proper web tool, it is difficult for the Association to collect data from each member company
- **(Improvement)** Review of KPI Reporting System Improvement
 - To provide guides for unifying input units, develop FAQ documents and additional

- websites to improve data quality
- Review of Development of Educational Programs and Support (data consistency and quality improvement, collection, etc.)
- To improve data collection methods by 2026 as the target

3 Sustainability Initiatives

- **(Background)** According to the content described in the ICCA position paper, RCs should contribute to not only sustainability but also broadly to building a foundation that includes sustainable development initiatives and goals.
 - It is necessary to discuss how to share the details of each country's sustainability initiative activities and to demonstrate progress to international stakeholders.
- **(Discussion)** RC is striving to strengthen RC in the implementation region and expand it to a new scope, and the chemical industry is also working to explain how their commitments and actions through RC play a key role in advancing sustainability.
 - Each association needs to review whether similar activities of RC can be coordinated and integrated, etc.
- **(Plan)** The potential direction of sustainability program is based on communication and outreach.
 - Facilitator: A safe society through resource efficiency and circulation, carbon emission reduction
(based on SDG and SDI roadmap)
 - Risk Management: Resolving the gap in establishing new policies (advisory group)
 - Leadership: Long-term strategy, issues (positioning)

4 Plans for the 17th APRCC (Asia Pacific Responsible Care

Conference)

- o The 17th APCRCC will be held online from December 1 (Thu) to 2 (Fri), 2022, hosted by the Taiwan RC Association (TRCA).
- o The event is free of charge and will consist of one keynote speech and six panel sessions*
 - * Sustainable RC, climate change, process safety, major RC issues, chemicals, security
- o Up to 1,000 attendees can participate, and 300 are expected to participate in Taiwan.
- o The event will be held in English, and simultaneous interpretation will be provided to all attendees.

5 2022 RCLG Budget Execution Status and Future Plans

Item	Budget	Execution (including expected execution in 2022)	Balance
< RCLG >			
Consulting service	30,000	30,000	0
KPI reporting tool	23,000	16,153	6,847
ICCA self-assessment tool	105,000	107,492	-2,492
< CB TF >			
Capacity-building support (including RC video)	150,000	150,000	0
RC Expansion Project (Africa)	10,000	0	10,000
RC pilot project (Colombia)	70,000	70,000	0
Total	388,000	373,645	14,355

- o RCLG meeting in the first half of 2023 will be held in-person in Washington

in March.

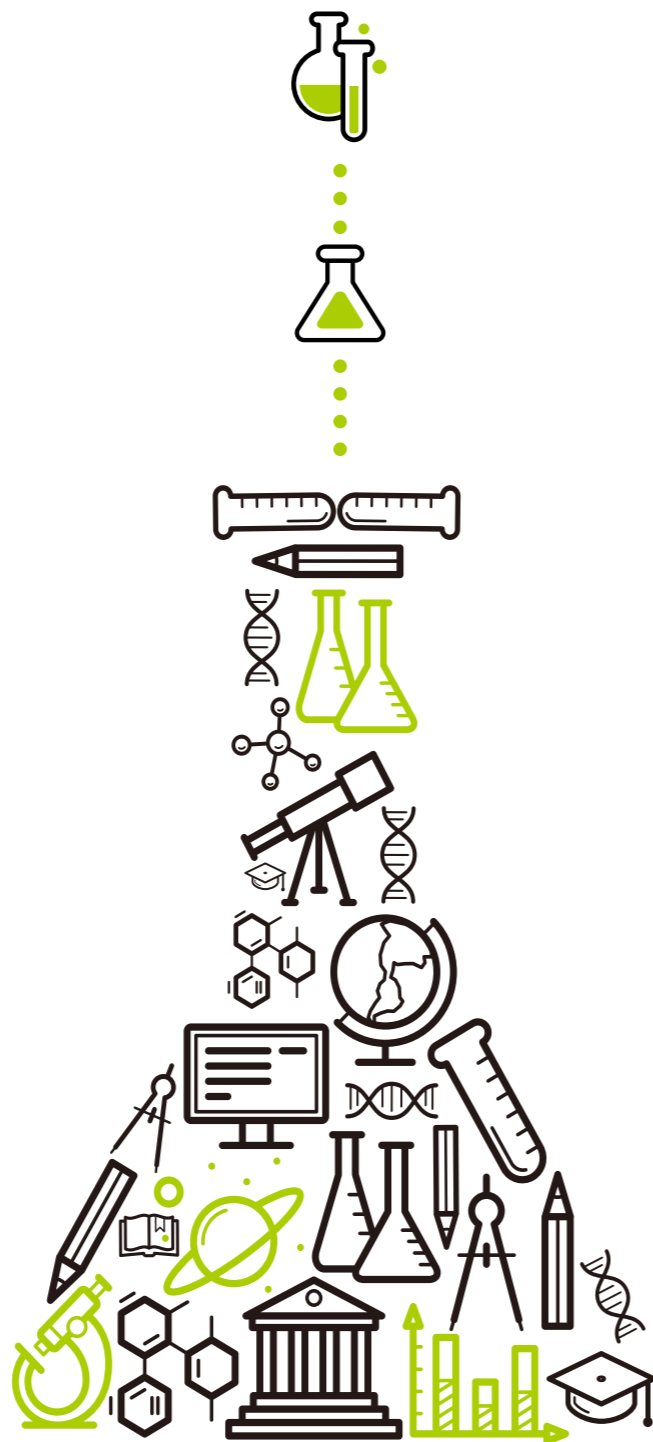
6 Korea RC Council Plan

- o Future plans
 - Translate and distribute RC self-assessment tool
 - Information on the results of the RCLG meeting in the second half of the year 🌱



2022 Come! Fun world of Chemistry Online Event Results

The Korea RC Council held a 100-day 'Come! Fun world of Chemistry' event. Come! Fun world of Chemistry (hereinafter, Yeoljeolhwa) is a chemistry activity program that provides various opportunities for elementary school students (4th-6th grades) to understand and experience the principles of chemistry in an easy and fun way. About 21,000 elementary school students participated from 2003 to 2019, with local teachers' groups and volunteers from member companies teaching them about the principles of chemistry in daily life, establishing it as a channel for community exchange.



Changed into an Online Event in 2021

Since last year, Yeoljeolhwa has been changed into an online event due to COVID-19 and the spread of the contactless culture. This not only enabled children to participate regardless of region but also provided an opportunity to realize their chemistry dreams by increasing their interest in chemistry using an online platform. The 2022 Yeoljeolhwa selected about 300 children's chemistry reporters, who wrote and discussed chemistry articles themselves, published media contents (articles, cartoons) serially, and built an online platform to learn from chemistry lectures (www.chemworld.kr). Ten children who collected many points while working as children's chemistry reporters were awarded various prizes and benefits of participating in a daily internship at Lotte Chemical.

Summary of 100-day activities of the Children's Chemistry Reporters

1 Learn Chemistry with Online Lectures



< Special Chemistry Lecture 1 >

- Good chemistry that saves the world
 - Appropriate technology to prevent environmental pollution with simple technology
 - Dr. Son Moon-tak, CEO of DnA Boy
- Donga Science YouTube channel live broadcast
 - June 29, 2022 (Wednesday) 7:00-8:00 p.m.



< Special Chemistry Lecture 2 >

- Chemistry Experiment Show Show Show!
 - Three experiments and principles explained
 - Congratulation on the selection of chemistry reporters and information on benefits
- Donga Science YouTube channel live broadcast
 - August 30, 2022 (Tuesday) 7:00-8:00 p.m.



< Special Chemistry Lecture 3 >

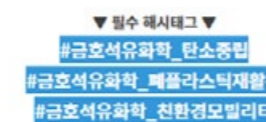
- Good chemistry that saves the world
 - Chemistry reporters Q&A
- Donga Science Zoom Meeting
 - October 31, 2022 (Tuesday) 7:00-8:00 p.m.

2 Learn Chemistry at Children's Science Donga



< Learn Chemistry with Cartoons >

- Dr. Chuck's Chemistry Comic Adventures
 - 'Come! Fun world of Chemistry' to learn chemistry through cartoons
 - Published a series of Children's Science Donga cartoon six episodes (April-Sept., 4 pages)
 - Disclosed simultaneously on the online website



첫번째 주제 탄소중립



< Seven-day chemical tour with Kumho Petrochemical >

- Special points for writing related articles with required hashtags
 - #Kumho Petrochemical_CarbonNeutrality
 - #Kumho Petrochemical_WastePlasticRecycling
 - #Kumho Petrochemical_EcofriendlyMobility

3 Participate in a Chemistry Experiment



< Chemistry Experiment Kits Sent >

- Chemical experiment kits sent to all 300 chemistry reporters (6/30)
- Wacky and lively chemistry experiment show (6/17)
 - Guideline on experiment items and safety issues through online broadcasting
- Kit components sent
 - ① Save Dr. Chuck (candle pump experiment)
 - ② Find Chemimi's voice (electrolyte experiment)
 - ③ Let Tolly escape (chemical bubble experiment)



< Follow the Chemistry Experiment >

- Produced safe experiment videos that can be followed at home (Released six times on the 1st and 15th of each month)
 - <https://www.chemworld.kr/contents/list/100300>
- ① Prevent Apples from Browning
- ② Bubbling Dancing Bells
- ③ Homemade Mayonnaise
- ④ Paper Boat that Moves by Itself
- ⑤ Write a Secret Letter
- ⑥ Who is the Culprit that Popped the Balloon?

4 Write a Chemistry Article



< Writing a Chemistry Article >

- Total of 212 written articles
 - An actual reporter corrected an article written by a child reporter of the Chemistry Reporter Group and provided feedback



< Selection of Excellent Articles >

- No. 1 - Summer Uninvited Guest!!! Let's catch fruit flies!!!!
- No. 2 - Volcanic Explosion Test!
- No. 3 - Chemistry in the Movie 2 <The Incredibles>
- No. 4 - Precautions When Experimenting
- No. 5 - Giant Bear Jelly Experiment made Using Osmosis!
- No. 6 - Electric Car Reappeared
- No. 7 - Two Faces of Plastic
- No. 8 - Colorful Fireworks! What's the Secret?
- No. 9 - Chemical Principles behind the Thermometer
- No. 10 - Old Cave Paintings! How Will It be Preserved?
- No. 11 - Strange Chemical Elements
- No. 12 - The Story of Rainbow Sugar Towers and Density

5 Chemistry Discussion



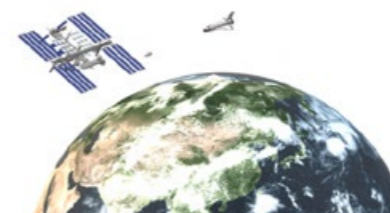
< Participate in Chemistry Discussions >

- A Forum for Opinions on Chemistry Issues
 - Six proposals for discussion topics (July–October/every other Thursday)
- ① Will driving an electric car reduce environmental pollution? [64% agreed, 36% disagreed]
- ② Is plastic a great invention? [73% agreed, 27% disagreed]
- ③ What are your thoughts on chemical development? [94% agreed, 6% disagreed]
- ④ Should environmental regulation be state-controlled or privately controlled? [60% agreed, 40% disagreed]
- ⑤ Will recycled plastic help the environment? [80% agreed, 20% disagreed]
- ⑥ Separate collection of waste masks [62% agreed, 38% disagreed]

<https://www.chemworld.kr/contents/list/100400>

6 Chemistry Community Forum (Posting)

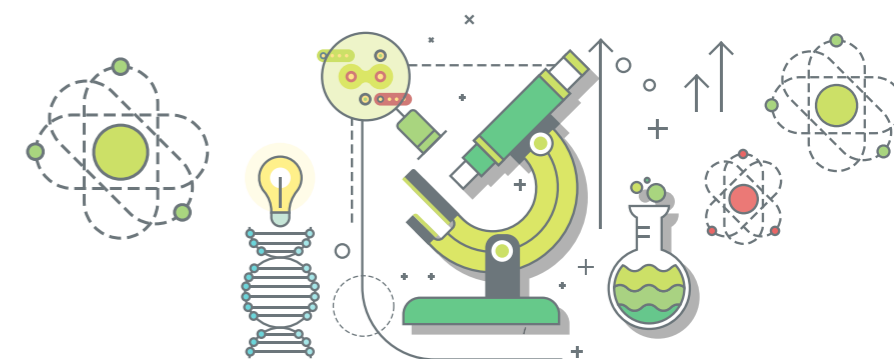
화학이 없으면 어떤 것들이 가능 할까요? 화학은 우리에게 어떻게?



< Chemistry Reporter Community >

- Healthy communication channels for young chemistry reporters (2,948 posts)
 - Introduce chemistry books
 - Share chemical information
 - Follow the experiments, share behind the scenes, etc.
 - Write chemistry novels
 - Draw characters using elements

Chemistry



RC Newsroom

2022 Safety Seminar: On November 30 (Wednesday), Korea RC Council held a chemical industry safety culture improvement seminar for executives and employees of member companies at Sangyeonjae (Seoul Station Branch). Under the theme of <Presentation of Key Cases of the Act on Punishment of Companies in Severe Accidents>, this seminar explained major issues recently at Kim & Chang Law Firm, and provided time to discuss the establishment of member companies' safety management system.



Attended the 2022 APRCC (17th) Conference

The 2022 APRCC (Asia-Pacific Responsible Care Conference) was held as an online video conference from December 1 (Thu) to 2 (Fri). At this two-day conference hosted by Taiwan, the attendees discussed RC and sustainability, energy conversion and carbon neutrality, RC implementation status and safety management implementation status by country.



The First Executive Committee in 2022

The Korea RC Council held the '1st Executive Committee in 2022' on November 30 (Wednesday) at Sangyeonjae. In this executive committee, two agenda items were discussed: ① Review of RC self-evaluation items, and ② Sharing of the 2022 RCLG meeting results.



2022 Third Steering Committee

The Korea RC Council held the '2022 Third Steering Committee' offline on December 13 (Tuesday). Through this committee, four agendas were deliberated: ① 2022 business and settlement report ② 2023 business plan and budget (draft), ③ New member companies joining, and ④ Executive improvement.



2022 Open! Happy Chemistry World Held Online

2022 Open! Happy World of Chemistry (hereafter Yeoljeolhwa) was held online for 100 days from July 7 to October 14. This time, Yeoljeolhwa selected about 300 children's chemistry reporters, who built an online platform providing media contents (articles, cartoons, chemistry lectures, etc.) so that children can write chemistry articles on their own and participate in discussions. www.chemworld.kr). This Yeoljeolhwa provided an opportunity for children to participate in a one-day intern program at Lotte Chemical and awarded 10 excellent active children's reporters who accumulated many points. Two of the excellent children's reporters said, "I learned the role of a chemical company by exploring chemistry myself," and "It was a rewarding time to clarify my dreams."



Kumho Petrochemical Co., Ltd.

1

Kumho Petrochemical (CEO Baek Jong-hoon) scored key achievements such as obtaining the EcoVadis Gold rating and winning the Gold Award at the 2021 Vision Awards. On September 27, Kumho Petrochemical announced that it obtained a Gold rating from EcoVadis, a global ESG and sustainability evaluation agency, and its sustainability management report won the Gold Award at the '2021 Vision Awards' hosted by the U.S. LACP. Key achievements of Kumho Petrochemical by EcoVadis evaluation area include: ▲Environmental – Establishment of climate change response strategies and Scope 1, 2 reduction targets ▲Labor/Human Rights – Joining the UNGC and expanding disclosure indicators ▲Ethics – Reinforcing ethics audit organization (support for compliance) designation ▲Sustainable Procurement – Establishing sustainable procurement policies and introducing supply chain ESG evaluation. Kumho Petrochemical especially received excellent scores in the Environment and Labor/Human Rights sectors, and as a result, it acquired the Gold grade, which is awarded to the top 5% of companies out of 90,000 companies that received satisfactory evaluations in all areas. In this regard, CEO Baek Jong-hoon remarked, "We will not be satisfied with the current performance, but rather strive to further expand the base of ESG activities in the future."



DL Chemical

2

DL Chemical has set out to strengthen ESG management by establishing a world-class compliance management system. It announced on September 2 that it had obtained ISO 37301 certification for the compliance management system of the International Organization for Standardization (ISO) from the Korea Compliance Agency. ISO 37301 is an international standard certification established by ISO last April, which ISO grants after evaluating whether compliance policies and risk response systems that may occur throughout company management meet global standards and are effectively operated. DL Chemical established a compliance management system that meets global standards prior to international compliance management standard certification. Accordingly, it carried out practical activities to establish compliance management such as ▲Creating a risk identification, evaluation and control, and monitoring plan; ▲Establishing a responsible operating system by appointing a compliance manager, ▲Enacting and announcing CMS (Compliance Management System) policy, ▲Regularizing compliance management education for all employees, which were all recognized. In this regard, Hyun-sik Shin, Legal Division Head of DL Chemicals, commented, "DL Chemicals will continue to conduct righteous management in line with its status as a global petrochemicals firm."



Lotte Ineos Chemical Co., Ltd.

3

On September 26, Lotte Ineos Chemical set out to clean up the ecological wetland area of Hoiya Dam, Ulju-gun, with CEO Jeong Seung-won and 40 executives and staff members participating. This environmental cleanup activity is carried out by the employees of Lotte Ineos Chemical to improve the environment upstream of Hoiya Dam, a source of drinking water for Ulsan citizens. CEO Jeong Seung-won explained, "This cleanup activity, which we are doing for the first time in a long time since COVID-19, allowed us to think about the importance of environmental preservation. Lotte Ineos Chemical will continue to make efforts to protect the local environment."



Lotte Chemical

4

Lotte Chemical announced on September 28 that it had commercially produced the industry's first petrochemical products using naphtha based on pyrolysis oil made from waste plastic. The product, which is polycarbonate (PC), is a high value-added synthetic resin that is resistant to shock, has a high heat-resistance and transparency, and is applied to electric, electronic, home appliances, and automobile headlamps. Waste plastic pyrolysis oil is obtained by heating discarded plastics such as vinyl to high temperatures, and it can be recycled as naphtha or diesel through post-processing to remove impurities. Injecting naphtha obtained from this process into a petrochemical process leads to the production of plastic raw materials. This is attracting attention as a key technology for establishing a circular plastic economy in that previously incinerated waste plastic can be recycled and used as a raw material for petrochemical products. Hwang Jin-goo, CEO of Lotte Chemical's Basic Material Business, explained, "We will expand our chemical recycling business, including the production of waste plastic pyrolysis naphtha-based products, and lead the establishment of a virtuous cycle of resources. We will contribute to meeting demand and improving ESG competitiveness."



Aekyung Chemical

5

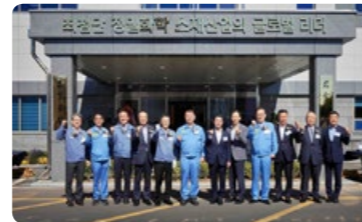
Aekyung Chemical (CEO Pyo Kyung-won) set out to strengthen its on-site management system and spread a safety culture in the company. The company announced on October 7 that it is bolstering the site-management system to create an 'accident-free site' while carrying out a campaign to spread safety culture within the company. Last August, Aekyung Chemical made EHS (Environment, Health, and Safety) management policy its top priority and established a process to prevent safety accidents at all business sites, including the Ulsan Plant, Cheongyang Plant, Jeonju Plant, and Daejeon Research Center. A total of 79 sites were equipped with an electronic patrol chip to operate an electronic safety patrol system, replacing outdated firefighting facilities and finishing automation construction. Also, emergency response drills are conducted regularly to create a safe working environment. Other campaigns implemented for improvement include ▲ 'Safety Walk' by supervisors on a daily basis to eliminate onsite potential risk factors, ▲ Accident prevention through the operation of the 'Safety Committee' once a month, ▲ Clean-up campaign for all employees once a week, ▲ Leading by example 5S, ▲ Safety accident prevention campaign with partners once a quarter ▲ 'Visual Safety', which promotes tripod prevention rules in confined spaces and fall disaster prevention, and ▲ 'Valves,' a campaign to expand valves and switches in factories.



OCI

6

On October 20, OCI (CEO Kim Taek-joong) held a completion ceremony for the hydrogen peroxide production plant (located in Gwangyang, Jeollanam-do) of PNO Chemical, a joint venture established with POSCO Chemical. The ceremony was attended by OCI President Kim Taek-joong, POSCO Chemical President Min Kyung-joon, P&O Chemical President Kim Jong-kook, business officials, and local officials such as Gwangyang Mayor Jung In-hwa. Hydrogen peroxide (H₂O₂) is a typical oxidizing agent mainly used as a raw material for disinfectants or bleaches. High-purity hydrogen peroxide is used in the cleaning of advanced manufacturing fields such as semiconductors and displays. Although demand for high-purity hydrogen peroxide is increasing due to the increase in production facilities and process steps of domestic semiconductor manufacturers, it is difficult to respond flexibly to long-term demand growth with domestic production only. Accordingly, through the completion of this plant that expands semiconductor production lines, PNO Chemical is expected to contribute to the stable supply of core semiconductor raw materials by responding to new demand for hydrogen peroxide.



LG Chemical

7

LG Chemical participated in the K Show 2022 held in Düsseldorf, Germany, on October 19 and introduced many next-generation eco-friendly technologies to target the global market. K Show is the world's largest plastics exhibition, and LG Chemical introduced 'Sustainability with LG Chem' as its theme at K Show 2022 with the following goals: ▲ Sustainable products for realizing net zero by 2050 ▲ Ecofriendly, biodegradable, and recycled materials with LG Chemical's next-generation technology ▲ DX (Digital Transformation) platform that enables real-time communication with global customers. LG Chemical especially captured global attention with its 100% bio-based plastics (PLA, Polylactic Acid), which are drawing attention as future eco-friendly technologies, materials that decompose naturally within 6 months when buried underground (PBAT, Poly Butylene Adipate-co-Terephthalate), eco-friendly recycling (PCR, Post-Consumer Recycling) products, aerogel, a high-performance insulator that blocks battery thermal runaway, and other next-generation material technologies. LG Chemical plans to lead eco-friendly materials by continuously expanding its eco-friendly portfolio that meets the needs of the global market.



BASF Korea Co., Ltd.

8

On October 12, global chemical company BASF announced its plan to provide neopentyl glycol (NPG) and propionic acid (PA), which achieved zero (0) Product Carbon Footprint (PCF) throughout the entire process from production to shipment, for the first time in the industry. With a zero-product carbon footprint, NPG ZeroPCF and PA ZeroPCF are solvent-free drop-in solutions. Since they have the same quality and characteristics as the standard product, they can be applied and used in the production system without adjusting the existing process. This enables customers to contribute to the transition to a circular economy by reducing upstream Scope 3 emissions in an easy and efficient way (including all CO₂ emissions produced along the value chain) and increasing the proportion of using renewable raw materials in the value chain.





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CALENDAR

2023

KRCC's Major Events in the First Half of 2023

KRCC's major events of 2023

2023 First Half RCLG (RC Leadership Group) Meeting
Date September 7 (Wed) - 8 (Thu), 2022
Venue Both online/virtual event

2023 First Half RCLG (RC Leadership Group) Meeting
Date March 2023

2023 Come! Fun world of Chemistry Held Online
Purpose To promote the chemistry industry
Eligibility 4th-6th graders of elementary schools nationwide



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RESERVATION