

FOR IMMEDIATE RELEASE

March 2, 2022

Progress in Kao and Kyoto University's Verification Testing of a Used Disposable Diaper Carbonization Recycling System

Since January 2021, Kao Corporation and Kyoto University have been conducting verification testing of a Used Disposable Diaper Carbonization Recycling System in cooperation with Saijo City, Ehime Prefecture, Japan. Technology for converting used diapers into carbon material is expected to be established by 2023, with public implementation scheduled to begin in or after 2025. This is a report on current progress with the project.

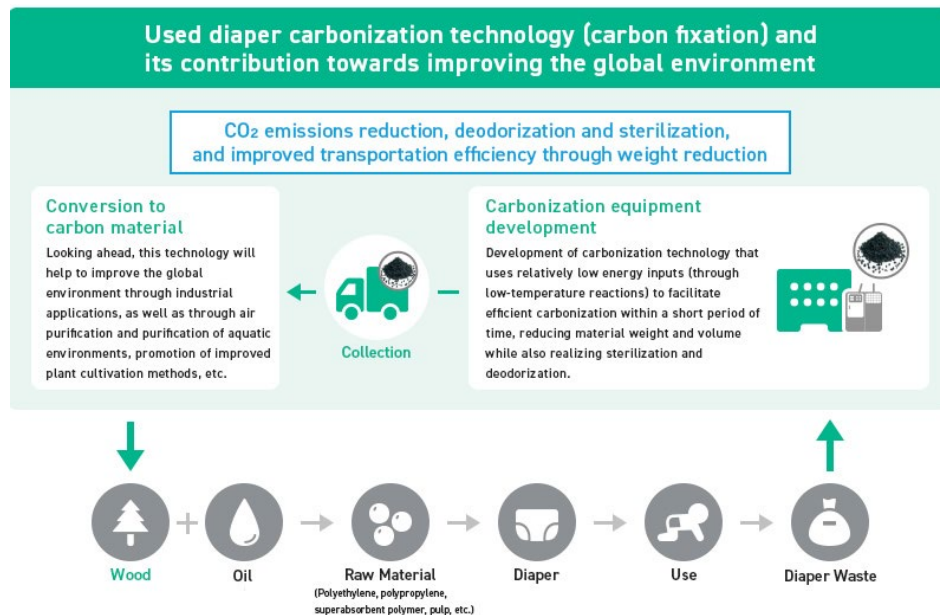
Overview

■ Objectives

- **Development of carbonization equipment for used disposable diapers**
 - Efficient carbonization from relatively low energy inputs (through low-temperature reactions)
 - Carbonization reduces material weight and volume, while also sterilizing and deodorizing, which will solve any hygiene problems
 - Reduced weight and volume can also reduce collection frequency
- **Conversion of carbonized used disposable diapers to carbon material**

The goal of achieving these two objectives is to contribute to reducing environmental impact by reducing CO₂ emissions.

When used disposable diapers are incinerated, they generate CO₂ emissions. However, when carbonization is performed, the carbon is fixed in carbon material, making it possible to reduce the amount of CO₂ emitted, thereby reducing negative environmental impact.



■ Targets

Establish technology for converting used disposable diapers to carbon material by 2023

Public implementation of the recycling system in or after 2025 (review of infrastructure, including sites for installation of carbonization equipment and methods for collecting used diapers)

News Release (January 14, 2021)

Kao and Kyoto University Begin Verification Testing of a Used Disposable Diaper Carbonization Recycling System in Saijo City, Ehime Prefecture, Japan

<https://www.kao.com/global/en/news/sustainability/2021/20210114-001/>

Progress

■ Development of carbonization equipment

- In basic experimentation, Kao advanced research into carbonization of the various materials used in disposable diapers. Kao and Kyoto University also moved ahead with an analysis of the carbonized materials, confirming that carbon can be fixed at high yields.
- Based on the results of this research, Kao worked to develop new carbonization equipment, building on existing diaper processing equipment, already successfully in use at nursing homes and other facilities and food waste carbonization equipment.
- In November 2021, the newly developed carbonization equipment was installed at a childcare facility in Saijo City.



The newly developed carbonization equipment, and used disposable diapers being put into the device

Carbonized used disposable diapers

■ Verification of issues around use of the carbonization equipment at a childcare facility

- About a month was spent verifying the volume of waste generated and the amount of work involved for childcare workers using the newly installed carbonization equipment.
- The volume of used disposable diapers generated averaged about 7 kg per day. The equipment collected this volume once a day, and the carbonized used diapers were stored in the device, with the conclusion being that in general, once-monthly collection would be appropriate. This means childcare workers will collect a day's worth of used diapers, place them in the carbonization device and run the equipment, with the carbonized used diapers collected once a month.
- In addition to the recycling system, between August and November, Kao also supplied the childcare facility participating in the verification test with *Merries* baby diapers, enabling the facility to provide disposable diapers and verify that this would reduce the burden on parents/guardians and childcare facility staff. This confirmed that the burden was relieved for both parents/guardians and childcare workers, with the former noting that it was helpful not having to worry about preparing diapers every day, and the latter saying that it saved time when they were busy.

■ Future developments

The carbonized used disposable diapers will be collected from the carbonization equipment installed at the childcare facility in Saijo City, and Kao and Kyoto University will carry out research into converting them into carbon materials; the goal is to establish this conversion technology by 2023. Saijo City will also consider building a resource recycling system. A review of infrastructure, including sites for installation of carbonization equipment and collection methods, will also continue in advance of the public implementation of a recycling system in 2025 and beyond.

By integrating ESG into the core of its company management, Kao will drive business growth and better serve consumers and society through its enhanced products and services. With this socially

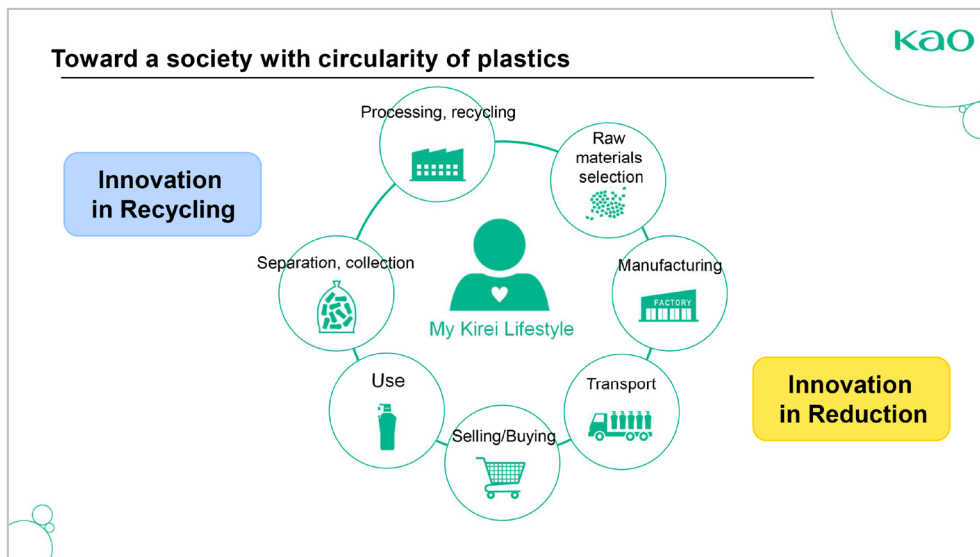
conscious ethos, Kao will create a Kirei life for all—providing care and enrichment for the life of all people and the planet.

[Initiatives for Kao’s ESG Strategy, the Kirei Lifestyle Plan and plastic circularity in society]

Recognizing its responsibility as an enterprise that provides products which people use on a regular basis in their daily lives, Kao takes active steps to reduce the environmental footprint of its products throughout the entirety of the product lifecycle. In April 2019, Kao launched the Kirei Lifestyle Plan, its ESG (environmental, social and governance) strategy, which incorporates 19 key leadership actions. Kao’s purpose is to create a Kirei life for all. The Japanese word ‘kirei’ describes something that is both clean and beautiful. For Kao, Kirei not only encapsulates appearance, but also attitude—to create beauty for oneself, other people, and for the world around us. The Kirei Lifestyle Plan aims to integrate ESG as the foundation of its management to accelerate business growth and create products and services of better value for consumers and society.

Regarding the issue of plastic waste, which is a significant problem for society, in 2018, Kao announced its “Our Philosophy & Action on Plastic Packaging” declaration, and are abiding by the 4Rs: Reduce, Replace, Reuse, Recycle. We are substantially reducing the amount of plastic used in our packaging, by making them thinner, reusable, refillable, and reduced in volume, as well as improving our liquid concentration. We are also developing packaging that is easier to recycle. Plus, we will make efforts to switch away from fossil fuel-based plastics toward the use of sustainable materials.

In September 2019, Kao announced that it would be focusing on Innovation in Reduction and Innovation in Recycling, so as to help realize a society characterized by effective plastic resource circulation. In the area of Innovation in Recycling, we are collaborating with other companies and organizations on the horizontal recycling of plastic packaging. Initiatives for which we are undertaking verification testing include the recycling of film packaging made using multiple different materials, which in the past has been considered difficult to recycle, as well as recycling of mono-material film packaging (which is made using a single material), and of mono-material bottle containers. We are also conducting demonstration testing for many other projects, including recycling of items other than packaging, such as used diapers.



*This news release is a translation of a Japanese-language news release dated February 24, 2022.

About the Kirei Lifestyle Plan

Over the past 130 years, Kao has worked to improve people’s lives and help them realize more sustainable lifestyles—a Kirei Lifestyle. The Japanese word ‘kirei’ describes something that is clean, well-ordered and beautiful, all at the same time. The Kao Group established its ESG strategy, the Kirei Lifestyle Plan in April 2019, which is designed to deliver the vision of a gentler and more sustainable way of living. By 2030, Kao aims to empower at least 1 billion people, to enjoy more beautiful lives and have 100% of its products leave a full lifecycle environmental footprint that science says our natural world can safely absorb.

For more information please, click <https://www.kao.com/global/en/sustainability/>

About Kao

Kao creates high-value-added products that enrich the lives of consumers around the world. Through its portfolio of over 20 leading brands such as *Attack*, *Bioré*, *Goldwell*, *Jergens*, *John Frieda*, *Kanebo*, *Laurier*, *Merries*, and *Molton Brown*, Kao is part of the everyday lives of people in Asia, Oceania, North America, and Europe. Combined with its chemical division, which contributes to a wide range of industries, Kao generates about 1,420 billion yen in annual sales. Kao employs about 33,500 people worldwide and has 135 years of history in innovation. Please visit the Kao Group website for updated information.

<https://www.kao.com/global/en/>

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<Related Information>

■Kao launches new ESG Strategy “Kirei Lifestyle Plan” to support consumer lifestyle changes

<https://www.kao.com/global/en/news/sustainability/2019/20190422-001/>

■Kao's New Challenges for the Future: Accelerating Purposeful Business Commitment with ESG

<https://www.kao.com/global/en/news/business-finance/2019/20190926-001/>

■Kao Sustainability website

<https://www.kao.com/global/en/sustainability/>