

December 20, 2022 Management Briefing

Kuraray Co., Ltd.

Today's Agenda

1. Introduction

2. What is Activated Carbon (AC)?

~ Improving natural and living environment ~

Hitoshi Kawahara

President and Representative Director

Nobuhiko Takai

Director and Managing Executive Officer President, Functional Materials Company

3. Environmental Solutions Division (ESD) S and it's strategy

~ Potential growth of activated carbon ~

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Stevan R. Schott Executive Officer

General Manager of Environmental Solutions Division Calgon Carbon Corporation President

Kuraray Group Products that contribute to the Natural and Living Environments

Improving living environment



Initiatives to Achieve Net Zero Carbon Emissions

Toward our FY2050 target of net zero carbon emissions,* we aim to reduce GHG emissions arising from our operations by 30% until FY2030 compared with the FY2019 level.



* Scope 1 and 2 emissions

What is Activated Carbon (AC)? ~ Improving natural and living environment ~

















Photo Credit: U.S. Navy photo by Mass Communication Specialist 1st Class Luke McCall

Delivered critical treatment systems which included equipment and activated carbon within one week to provide safe and clean drinking water to the residents of Hawaii

"The appearance of U.S. Department of Defense (DoD) visual information does not imply or constitute DoD endorsement."

What is Activated Carbon (AC)?

Activated Carbon is a porous material that removes organic compounds from liquids and gases by a process known as "adsorption."

 In adsorption, organic molecules contained in a liquid or gas are attracted and bound to the surface of the pores of the activated carbon as the liquid or gas is passed through.

Raw Materials Used In Activated Carbon Production

Raw material dictates uniqueness of product

COCONUT

BITUMINIOUS COAL

LIGNITE





Microscopic view of carbon

Adsorbate (small molecular)

Macropore

Adsorbate

Micropore

Wide Range of Products and Various Applications

Wide range of products





Bituminous coalbased activated carbon Coconut-based activated carbon



Wood-based activated carbon



Granular activated carbon reactivation



Carbon cloth

(viscous rayon)



Wet molded carbon block



Carbon adsorption equipment



How our Products Help Customers and Society



Provide clean, safe drinking water



Reduce environmental impact and allow wastewater reuse or disposal



Remove and recover contaminants from air emissions



Enabling electrification and reducing emissions for automotive industry



Purify food products



Protect your personal environment



Enhance critical stages in chemical manufacturing



Improves the environment through remediation projects

Environmental Solutions Division (ESD)

In 2018, Kuraray completed the acquisition of Calgon Carbon Corporation and started two divisions – the Carbon Materials Division and Calgon Carbon Division.

In 2021, we combined two divisions into the Environmental Solutions Division and began to integrate our operations.

Today, we are better together:

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Chemviron A Kuraray Company

- Largest activated carbon player in the world
- Greater focus on innovation and R&D
- Diversified geographical manufacturing base— US, Europe, Japan, and China

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 Most complete activated carbon portfolio – coal, coconut and wood-based virgin carbon.

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- Undisputed global leader in activated carbon recycling or reactivation
- Focused on growing our business in key markets

Environmental Solutions Division (ESD) and it's strategy ~ Potential growth of activated carbon ~



A day in the life of Activated Carbon **Good Morning**

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Vegetable Oils & MSG Used to purify oils and MSG

Drinking Water and Shower Used to remove contaminants from municipal water

Processed Meat Amino acids, treated with activated carbon, are used for animal feed

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Orange Juice Removes unpalatable organics from the juice

Decoloring Sugar Removes natural color of sugar to make it white

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Dry cleaning chemicals are recycled through activated carbon

Gold Ring Activated Carbon is used to recover gold



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Activated Carbon is used to naturally remove caffeine



Activated Carbon is used to remove organic impurities

A day in the life of Activated Carbon

At Work

Natural Gas

Activated carbon is used to purify natural gas that powers buildings



Happy Hour

Activated carbon is used in the production of beer, sake, wine, & soda

Air Quality

Removes mercury from coal fired power plants, and other contaminants from industrial plants.

Construction Construction workers masks use carbon to protect from fumes

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Chemical Plants Removes contaminants emitted

and treats wastewater.



Desiccant packs for pharmaceuticals contain activated carbon to control moisture.



Offices

Carbon containing filters protect electronics from acid gases.

Automobiles

Activated carbon keeps the inside cabin clean, captures gasoline emissions and improves electrification.

A day in the life of Activated Carbon

At Home

Drinking Water / Home Water Filters

Removes harmful contaminants and poor tastes and odors in home water filters.

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Wound Healing Zorflex activated carbon cloth aids in the healing process.

Zorflex Marketer Definition Definition

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Pet Care – Aquarium and Kitty Litter

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Available at amazon

Activated carbon is used in fish tank filters, kitty litter and litter boxes.

Our Strengths

We are the largest and most capable global activated carbon manufacturer:



And we aren't *just an activated carbon supplier* – we solve the toughest purification, separation and concentration demands.



R&D, Applications Engineering, and Technical Service





Field Services



Logistics

Our strategy is to enable the use of our high-performing activated carbon products through our additional equipment and services.

Business Drivers Global Megatrends Drinking Wastewater Food & Industrial Specialty Air Water Beverage Treatment Process CAGR: 2 - 3% CAGR: 4 - 5% CAGR: 4 - 6% CAGR: 3 - 4% **CAGR: 1 - 3% CAGR: 3 - 5%** More than 1.5M people globally are added Rapid to the urban population every week and \checkmark \checkmark Urbanization this trend will continue into the foreseeable future By 2030, it is projected the demands from **Climate change** the global population will increase food \checkmark and resource (+35%), water (+40%) and energy (+50%) scarcity requirements By 2030, the world's population is Demographic expected to increase by more than one and social **V** billion people as people are living longer change and longer Connectivity, data and artificial intelligence **Technological** will play a much bigger role in daily lives breakthroughs across the world The future catalyst for global economic Shift in global growth will not be the western world, but economic come from India, Africa and to a lesser power extent China

*Created by Kuraray with reference to PwC Global Megatrends. CAGR is estimated by Kuraray

Global Megatrends		<u> </u>					
		Drinking Water CAGR: 3 - 4%	Wastewater CAGR: 1 - 3%	Food & Beverage CAGR: 2 - 3%	Industrial Process CAGR: 4 - 5%	Air Treatment <mark>CAGR: 4 - 6%</mark>	Specialty CAGR: 3 - 5%
Rapid Urbanization	More than 1.5M people globally are added to the urban population every week and this trend will continue into the foreseeable future	O		~			
Climate change and resource scarcity	By 2030, it is projected the demands from the global population will increase food (+35%), water (+40%) and energy (+50%) requirements			v	v		
Demographic and social change	By 2030, the world's population is expected to increase by more than one billion people as people are living longer and longer		~	v	v		
Technological breakthroughs	Connectivity, data and artificial intelligence will play a much bigger role in daily lives across the world						v
Shift in global economic power	The future catalyst for global economic growth will not be the western world, but come from India, Africa and to a lesser extent China		v	v		~	v

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New regulatory requirements for drinking water, including PFAS and DBP Stage III, will require broader utilization of activated carbon for municipalities

PFAS: Organic fluorine compounds

Improved performance of advanced batteries with activated carbon to promoted electrification in automotive and other markets



Increasing consumer concern for clean drinking water continues to drive demand for higher performing filter cartridges (Kuraray's wet molded block)

Utilization of activated carbon for biogas purification enables a reduced reliance on fossil fuels and a shift in the energy landscape

Regulations for wastewater, (i.e. US EPA's effluent limit guidelines for PFAS) will drive broader adoption of activated carbon and services

EPA: Environmental Protection Agency

- PFAS guidelines published in June 2022 (The US EPA established new or revised Health Advisory Limits (HAL) for drinking water)
- The US EPA recognizes activated carbon as a best available technology for PFAS treatment
- Based on third party report, demand for treatment system using activated carbon for PFAS in drinking water could increase to US\$ 600M in 2030 (3 times larger than in 2022)
- In the future we also expect EPA to publish PFAS effluent guidelines.



 Granular Activated Carbon that is optimized for PFAS treatment



 Not only just selling products but also manufacture equipment



 High temperature reactivation that remove and destroy PFAS safely



 Technical team ensure removal of PFAS

We are an unrivaled solution provider for PFAS treatment with proven experience for over two decades

Capacity Expansions – Completed, in Progress, and under Consideration

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U.S. • Mississippi (Virgin)

Expansion: 25,000 MT/year

Online: 2Q 2023

Manufacturing sites

- : Virgin carbon production sites U.S. (Kentucky, Mississippi), Japan (Tsurumi), France (Parentis en Born)
- Reactivated carbon production sites
 U.S. (Pennsylvania, Kentucky, Arizona, New York, Ohio), Belgium (Feluy), Italy (Legnago), U.K. (Tipton), China (Suzhou)

Belgium • Feluy (Reactivation) Online:Q3 2022 Expansion:11,000 MT/year

K · Durham (Cloth)
Online : Q1 2024
Expansion : 328,000 m2/year

At the end...

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0°0 We aren't just an activated carbon supplier

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- we are a solution provider

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- All figures are rounded to the nearest hundred million yen.
- This presentation contains various forward-looking statements which are based on the current expectations and assumptions of future events. All figures and statements with respect to the future performance, projections, and business plans of Kuraray and its group companies constitute forward-looking statements. Although Kuraray believes that its expectations and assumptions are reasonable, actual results and trends of Kuraray's performance could differ materially from those expressed or implied by such figures or statements due to risks and uncertainties in the future business circumstances. The factors which may cause such difference include, without limitation: (1) general market and economic conditions in Asia including Japan, the U.S., Europe and other regions; (2) fluctuations of currency exchange rates, especially between the Japanese yen and the U.S. dollar and other foreign currencies; (3) changes in raw material and fuel costs; (4) industrial competition and price fluctuations in Japan and international markets; (5) advance or delay in the construction of new plants and production lines; (6) successful development of new products and technologies; and (7) changes in laws and regulations (including tax and environmental) and legal proceedings.