

Three X's and Six Core Technologies

Here, we introduce the three X's and six core technologies that will serve as vital assets for creating new value as we pursue our long-term vision of becoming an Innovative Solution Provider.

Organic & Polymer Material Function Design

By precise control of molecular structures, this technology endows materials with advanced functionality. For example, COMFORMER™ is a heat storage resin that absorbs and releases heat by using the latent heat of phase change, and it is a unique material that can be spun into fibers while maintaining its solid state. This technology overcomes the leakage risk, a challenge of conventional liquid heat storage materials, and enables comfort and energy savings across a wide range of fields, including apparel, construction materials, and automobiles.



Resin-based heat storage material "COMFORMER™"

T-shirt using "COMFORMER™"

Biological Mechanism Analysis

This technology involves elucidating the mode of action at the molecular level in living organisms and serves as a crucial method for the scientific evaluation of chemical safety. Leveraging this expertise, our company has long been engaged in the safety assessment of chemical substances. In particular, safety assessment is indispensable in the development of agrochemicals. By utilizing this technology, we are able to design pesticides with high selectivity for target organisms*, thereby minimizing the impact on the environment and non-target organisms. Through the application of this technology, we are committed to developing products that contribute to sustainable agriculture and to ensuring safe and prosperous lives for people.



*Target organisms: Organisms affected by pesticides (such as pests, pathogens, weeds, crops, etc.)

Various crop protection products, including insecticides and herbicides

Device Design

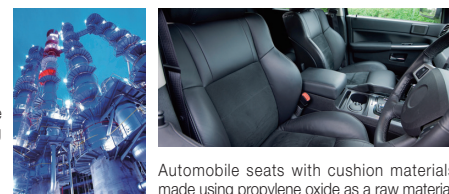
Our company has developed proprietary technologies that enable high-performance devices through integrated design capabilities spanning material development, structural design, and manufacturing processes. These technologies are applied to develop touch sensor panels for organic EL displays and transparent LED displays. For touch sensors, we have achieved structural designs that combine thinness, high sensitivity, and flexibility, contributing to next-generation devices such as smartphones. In transparent LED displays, our designs combine high transparency with excellent display performance, contributing to the creation of new markets such as advertising and mobility solutions.



Transparent LED displays

Catalyst Design

Through the precise design of catalysts that enable highly efficient chemical reactions, we have developed innovative processes that achieve both reduced environmental impact and strong economic performance. One of our key achievements is the propylene oxide-only process, which has received high international recognition. This process utilizes our proprietary, high-performance epoxidation catalyst to deliver a low carbon footprint while maintaining strong competitiveness. We will continue to advance our catalyst design technology as a driving force for shaping a sustainable future.



Propylene oxide manufacturing plant (Chiba Works)

Automobile seats with cushion materials made using propylene oxide as a raw material

Inorganic Material Function Design

This is our proprietary technology for suppressing crystal defects in inorganic compounds and controlling film thickness. Specific examples include highly uniform gallium nitride crystal growth technology developed through metal-organic vapor phase epitaxy (MOVPE), and thick film formation technology achieved using hydride vapor phase epitaxy (HVPE). These technologies provide self-supporting substrates and high-efficiency materials essential for the practical application of 5G communications and power devices, contributing to the realization of a sustainable society.



Compound Semiconductor Materials

Precision Processing

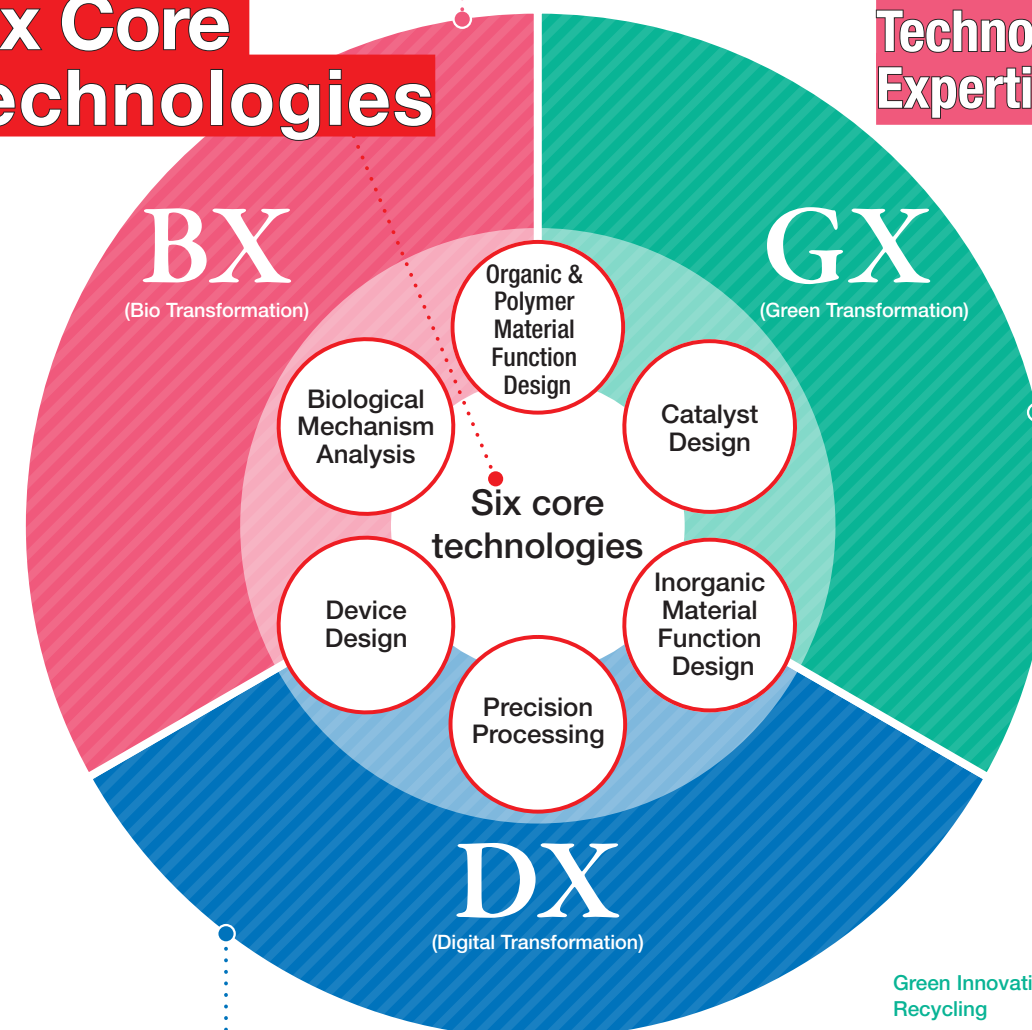
This technology enables control of material microstructures at the nanoscale, achieving advanced functionality. It has delivered remarkable results in the development and manufacturing of polarizing films, which are essential for liquid crystal displays. By employing advanced precision processing techniques such as coating, stretching, and lamination, we manufacture high-quality polarizing films on a mass scale. This enables us to ensure the stable supply of optical components optimized for high-definition displays in smartphones, televisions, and other devices, thereby contributing to the advancement of the information society.



Polarizing films "SUMIKARAN™"

High-end smartphone (for illustration purposes)

Six Core Technologies



Accumulation

Over **50** Years of
Research Achievements (Since the 1970s)

Starting from the Takarazuka Research Institute (1971-1984), biotechnology has been accumulated through research in agrochemicals and pharmaceuticals

Human Resource Strength

Over **280** PhD in
Biotechnology (FY2024)

Actively recruiting PhD level talent with advanced expertise.

Open Innovation

Accelerating collaboration with leading startups (Conagen, Ginkgo Bioworks) to develop high-performance chemicals using synthetic biology.

Technological Expertise

Over **200** BX-related
Patent Families

- Analytical Techniques**
 - Biological Mechanism Analysis
 - Comprehensive Omics Analysis
 - Microbiome Analysis
- Synthetic Techniques**
 - Development of Biocatalysts
- Cellular Techniques**
 - Early Initiation of ES/iPS Cell Research
 - Advanced Differentiation Induction Techniques

Promoting Carbon Neutrality

First comprehensive chemical manufacturer to receive SBT certification in 2018.

GHG Reduction Goal for 2030
50% reduction
compared to FY2013 levels.

- Committed to carbon neutrality through both "Obligation" and "Contribution."
- Achieved a 42% reduction by FY2024.

Open Innovation

Green Innovation (GI) Fund for Chemical Recycling

Approx. **50** billion yen
(project scale)

Development of innovative technologies through industry-academia collaboration (e.g., Ethanol to Propylene)

Technological Expertise

Catalyst and Process Technology Licenses

Approx. **70**

- Technologies enabling the production of low environmental impact chemicals (e.g., PO-only Process, Hydrogen Chloride Oxidation Process)
- Numerous awards, including the JCIA Technology Award "Grand Prize" (2022)

Accumulation

Over **50** Years of Research Achievements (Since the 1970s)

Developed a drug design system using computational science as early as the 1980s, laying the foundation for computer chemistry and contributing to the advancement of materials informatics (MI).

Technological Expertise

Selected as a Clarivate Top 100 Global Innovator for

4 Consecutive Years

Deepening the Utilization of Informatics (BI, CI, MI) by the Data Scientist Team

Human Resource Strength

DX Core Talent:
Approx. **1,700** People

- Developed through proprietary educational programs
- Enhanced digital literacy across the company through corporate events (DX Repository)

Human Resource Strength

Establishing development centers for technologies that reduce environmental impact (Innovation Center MEGURU)



Innovation Center MEGURU