# The Kuraray Group's Business Model

# Our Unique Technical Strengths Create Products with the World's Top Market Share\*

We at Kuraray have used our unique technical strengths to create products that the world had never seen before. We were the first company in the world to commercialize KURALON<sup>TM</sup> (PVA fiber), the first synthetic fiber produced using made-in-Japan technology. Other businesses we have created include poval resin (PVA resin), which is a raw material of KURALON<sup>TM</sup>; PVA film, which is essential for liquid crystal displays (LCDs); EVAL<sup>TM</sup> (ethylene vinyl-alcohol copolymer [EVOH] resin) which features excellent gas barrier properties; and a lineup of various commercialized chemical products that use the world's first industrialized synthetic isoprene monomers as materials. We have also launched a wide range of products that have become an integrated part of people's lives, such as CLARINO<sup>TM</sup> (man-made leather), which recreates the structure of natural leather, and MAGIC TAPE<sup>TM</sup> (hook-and-loop fastener). Sales of products with the highest global market share\* that we have created using our unique technologies accounted for more than half of the Kuraray Group's total sales in fiscal 2019.

# **Invisible Assets**

# Core Competences

"For people and the planet—to achieve what no one else can" Unique technical strengths

Application development capability



Accumulation of unique technologies and know-how

We have accumulated knowledge, unique technologies, and commercialization know-how cultivated over 90 years.



Information on particular markets acquired through development efforts

Information obtained through product and market development is leveraged in new product development.



Strong and trusting relationships with our business partners

We meet the world's most stringent performance and quality standards required by our business partners and have earned their trust.



High-quality human resources well-versed in their areas of expertise We contribute to solving the world's issues with our advanced expertise and unique technologies.

# Kuraray Group Products with Top Market Share Worldwide\*



#### PVA resin (Excluding China)

PVA resin was industrialized as a raw material for the synthetic fiber KURALON™. It has a number of characteristics: It is water soluble, emulsifiable, resistant to oil and chemicals, and easy to form into film. It is used in a wide range of applications such as paper processing agents, adhesives, and as a stabilizer for the polymerization of vinyl chloride resin.



#### **Optical-use PVA film**

Optical-use PVA film is used as a polarizing film, which is vital to LCD displays such as flat-panel TVs, PC monitors, tablets, and smartphones.



#### Water-soluble PVA film

Water-soluble PVA film is used for unit dose applications in detergents, personal care, agrichemicals, food ingredients and water treatment. Because the film dissolves completely in water and is environmentally friendly, it does not contaminate the recycling stream or contribute to micro-plastic pollution.



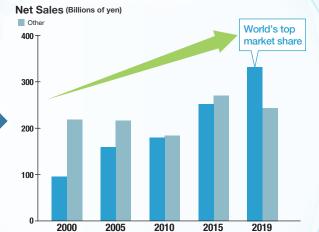
#### **EVAL™** (EVOH resin)

EVAL™ provides excellent barrier properties against the permeation of gases, superior to those of any other plastics. It is used widely in food packaging materials to block out oxygen and preserve the flavor and quality of foods. It is also adopted in automotive plastic fuel tanks, as it provides a highly effective barrier against fuel vapor permeation. It is being used increasingly in a wide variety of applications, such as vacuum insulation panels for large refrigerators, in order to improve energy efficiency.



### KURALON™ / KURALON K-II™ (PVA fiber)

KURALON™ is a synthetic fiber based on polyvinyl alcohol (PVA) with several unique properties, including high tenacity, low elongation, and hydrophilicity. It is widely used in various industrial fields for applications that include as a substitute for asbestos in cement reinforcement and as a separator for alkaline manganese batteries. KURALON K-II™ is another PVA fiber made by new production technologies. Water-soluble fibers with different dissolving temperatures and high-tenacity fibers can be obtained.



Sales of our products with the world's top

market share\* reached 58% of the Kuraray

Group's net sales in fiscal 2019.

A Wide Variety of

**No. 1 Products** 

### Isoprene chemicals

We apply our unique synthesizing technologies to produce a cleaner MMB that is highly safe and easy to handle, as well as diols, aroma chemical and cosmetic ingredients, pharmaceutical and agrichemical intermediates, and more.

Note: One-of-a-kind products derived from synthetic isoprene (MMB, MPD, etc.)



# GENESTAR<sup>TM</sup> (Highly heat-resistant polyamide resin)

GENESTAR™ is a new highly heat-resistant polyamide resin created with our proprietary technologies. It is used in electronic parts of mobile phones, personal computers, and the like, and it is applied in backlights for LED liquid-crystal TV panels and in the automotive field as well.



#### Activated carbon

Activated carbon is created through a reaction with gas and chemical agents at high temperatures using a carbon substrate, such as bituminous coal and coconut shells, and has micropores (diameter: 10 - 200 Å. 10 Å = 1 nm). The micropores form a meshwork structure inside the activated carbon, and the walls of these micropores give the material a large surface area (500 - 2,500 m<sup>2</sup>/g) for adsorbing a wide range of substances by the capillarity of the micropores.



# VECTRAN™ (High-strength polyarylate fiber)

VECTRAN™ fiber has about seven times the tensile strength of steel by weight and provides excellent abrasion, flex fatigue, and chemical resistance, among other physical properties. It is used in a range of applications including aerospace uses, composites, electronic components, ropes, and sporting goods.

\* In-house survey