

# ADEKA—Onward to the Next

# 100 Years

ADEKA aspires to create value for tomorrow. For that reason, we will continue to develop innovative technologies and to accumulate know-how based on experience to address social issues and meet expectations over the next 100 years.

## Meeting society's expectations with innovative technology

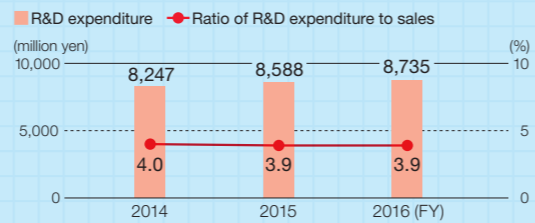


### ADEKA's R&D

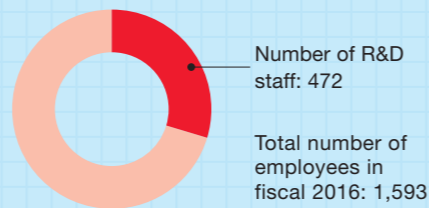
ADEKA aspires to contribute to affluent lifestyles through innovative technologies, and the engine that drives us toward this goal is our robust R&D.

Our eight research laboratories develop basic technologies across broad areas of chemicals and food. Moreover, we seek to integrate technologies beyond our current expertise so that we can take on the challenges of promising growth areas, such as IT related chemicals, life sciences, and environment and energy.

▶ ADEKA Group's R&D Expenditure and Ratio of R&D Expenditure to Sales



▶ Ratio of R&D Staff to Total Employees (ADEKA)



### R&D Laboratories and Research Themes

<b>Polymer Additives R&amp;D Laboratory (Urawa)</b>	Additives for polyolefin, PVC stabilizers, Plasticizers, Flame retardants
<b>Information Media Materials Development Laboratory (Ogu)</b>	Photo (Light)/Thermal curing resin, Photoinitiators, Imaging materials
<b>Electronic Materials Development Laboratory (Ogu, Kuki)</b>	Semiconductor materials, Etching materials, Sheet materials for packaging
<b>Functional Chemicals Development Laboratory (Ogu)</b>	Surfactants, Lubricant additives, Functional cosmetic ingredients, Water borne resins
<b>Functional Polymers Laboratory (Kuki)</b>	Epoxy resins, Polyurethane raw materials, Epoxy resin adhesives
<b>Food Development Laboratory (Ogu, Kansai)</b>	Margarine, Shortenings, Filling cream, Whipping cream, Baking mayonnaise, frozen dough
<b>Life Science Materials Laboratory (Ogu)</b>	β-glucan, Mevalonolactone, Regenerative medicine materials
<b>Environmental &amp; Energy Materials Laboratory (Ogu)</b>	Graphene, Materials for rechargeable batteries and organic solar batteries

# 1

## Development of SAPS-Free Extreme-Pressure Agent

The Challenge

### Preventing wear and seizure of metal parts

While extreme-pressure agents are a typical solution for wear and seizure, these lubricant additives contain sulfur, phosphorous, and other metals known as SAPS, which produce side effects such as degraded performance of peripheral devices in automobile engines.

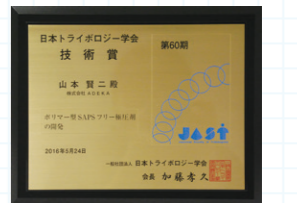
The Solution

### An innovative lubricant additive that reduces wear and is gentle to metals

Many research labs and corporations have put a lot of effort into developing SAPS-free extreme-pressure agents, but none of these offer dramatic improvements in functionality as compared to conventional agents. ADEKA, however, has surmounted formidable technological obstacles through joint research with Professor Masayoshi Muraki at the Shonan Institute of Technology and Dr. Nakamura at the Tokyo Metropolitan Industrial Technology Research Institute, and received the Japanese Society of Tribologists Technical Award in May 2016. We plan to commercialize the results of this research for use as lubricants for automobile gears and engines to enhance the performance and prolong the life of various metal parts while creating a safer, more energy-efficient society.



**Kenji Yamamoto**  
Lubricants Department  
Functional Chemicals  
Development Laboratory



Japanese Society of Tribologists  
Technical Award

We surmounted technological obstacles

This is one of the world's top energy-saving technology



**Ryo Ogawa**  
Functional Polymers Laboratory



# 2

## Commercializing the World's First Energy-Saving Laser Curing Adhesive

The Challenge

### Creating higher performing adhesives

The expanding functionality of automobiles has led to internal parts with higher precision and sophistication. These changes in turn require more reliable and efficient adhesives for processing the parts to ensure automotive safety.

The Solution

### Proprietary technology for efficiently achieving adhesive strength

ADEKA and DENSO Corporation jointly developed a new adhesive system for fastening epoxy resins that uses infrared laser irradiation to achieve snap curing. Compared with conventional adhesion methods, the system shortens the time required for curing, achieves stronger adhesion, and accelerates the parts manufacturing process, thereby realizing world-class energy savings. Production of the new adhesive was made possible by harnessing technologies we have accumulated over the years to review material design at the molecular level, as well as the advanced manufacturing technology we have cultivated in the areas of IT and electronic chemicals. In 2016 we received the DENSO CORP. Technological Development Award. We intend to make this technology available for enhancing the functionality and reducing the weight of automobiles and thereby contribute to the creation of greater convenience and a safer society.

## ADEKA—Onward to the Next 100 Years

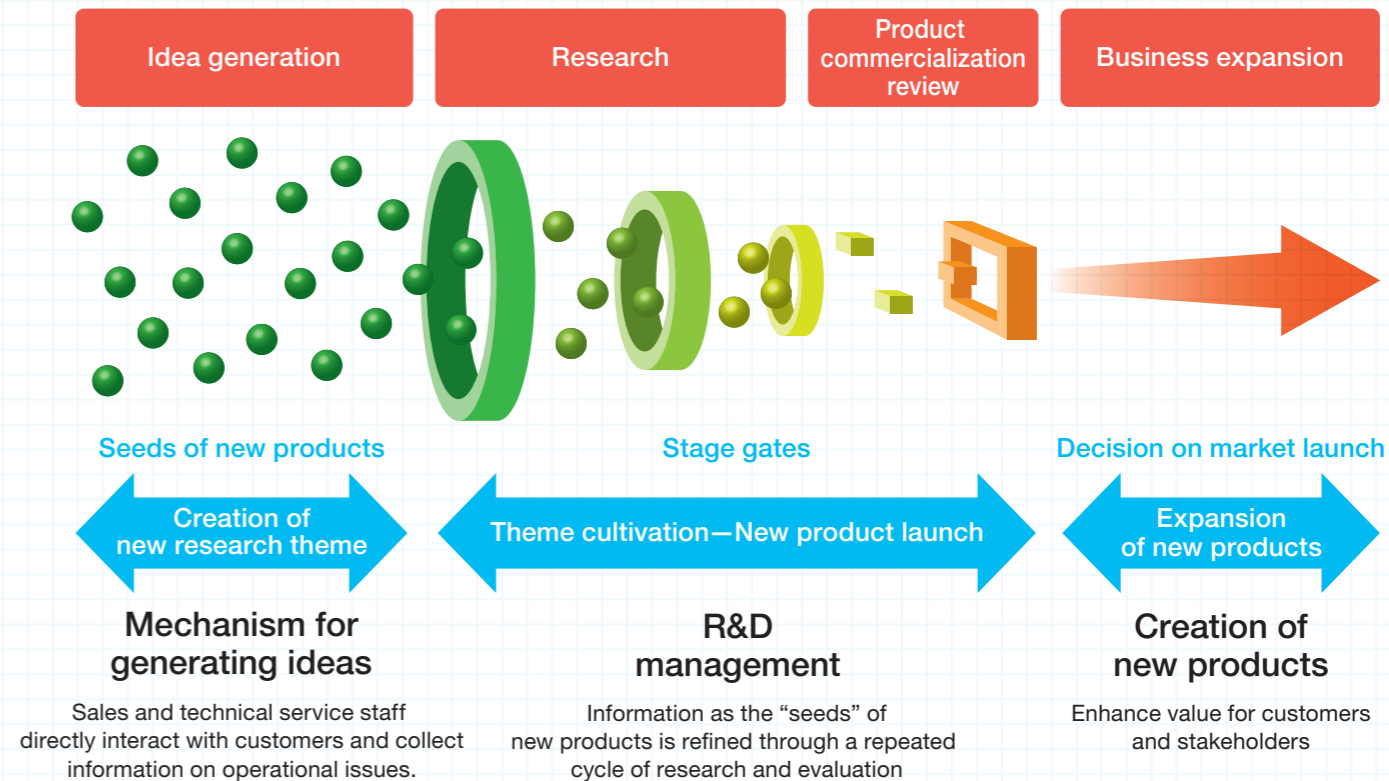
Open up the future filled with dreams by our innovative technology

### Stage-Gate process for Research Management

Stage-Gate is an R&D management process for delivering products with true value to society by refining the development theme at “gates” set at each stage of product development up to commercialization. ADEKA has set gate requirements for idea generation, research, product commercialization review, and business expansion. The director heads of the research laboratories

responsible for unrelated areas, and the general manager of business planning, serve as gate keepers and hold meetings to objectively decide whether a project should advance to the next stage. Since gate requirements include product marketability, technological trends, and competition, we also established a dedicated marketing research group to increase decision-making accuracy.

#### Stage-Gate Process



## Voice

From the site of the Stage-Gate process, we present the insights and learnings of the executive officer in charge, sales representative, and a researcher.



**Atsuya Yoshinaka**  
Operating Officer and General Manager, R&D Planning Dept.

1

### Making a United Effort to Nurture the Seeds of Innovation and Create New Products

Technology is the driving force of ADEKA's growth, and it's no exaggeration to say that our future depends on creating more and more new products that benefit society. The key to this lies in multiplying the “seeds” of new products and enhancing the efficiency and probability of nurturing those seeds into new products. Therefore, we introduced the Stage-Gate process and sought to reinforce our marketing functions.

As part of this initiative, in fiscal 2016 we began holding discussions on specific themes to apply the expertise of our eight research laboratories by having them introduce their specialized technologies and new materials to each other. I particularly hope this will provide an opportunity for young researchers to learn about fields unrelated to their own and discover ideas for new seeds.

In another initiative, the needs picked up by our sales and technical service staff through casual conversation with customers are collected and organized by the planning department to be shared across the company and turned into development themes. We hope to set in motion a vigorous cycle that includes providing feedback to customers and identifying their emerging needs. We will make a united effort to boost the creation of new products so that one day we can earn the gratitude of people all over the world.

2

### Raising an Antenna to Sense Customer Needs as a Sales Staff

I sell epoxy resin, a material used in products such as adhesives for automobiles and electronic materials. As a sales person, I'm in close contact with customers and try to understand and integrate the various challenges they face in order to identify the needs of the entire market. I share information about these needs with R&D and technical service staff and cooperate with them in our quest to develop promising new products that satisfy our customers. In addition, I always keep my antenna up, so to speak, for a sense of the burgeoning trends among automobile and electronics manufacturers, which are my customers' customers, so I can anticipate and respond to their emerging needs.



**Yui Asuka**  
Group-3 Commodity Materials Dept.

3

### Developing Products by Listening to the Voice of the Market from an Engineer's Standpoint

Our technical service involves directly interacting with customers in Japan and abroad both not only to introduce new products, but also to discuss the challenges our customers face. This allows us to develop a total solution from an engineer's standpoint. We also play the key role of relaying actual feedback from our customers and market trends to the R&D team, which leads to the development of new products that provide value to society. The job gives me a sense of reward and satisfaction commensurate with the heavy responsibility. I always do my best to absorb knowledge for precisely responding to any situation and therefore fulfill my role as the public face of ADEKA by responding quickly and accurately.



**Yota Tsuneizumi**  
Additives Solution Dept.,  
Polymer Additives R&D Laboratory