

# Research & Business Development

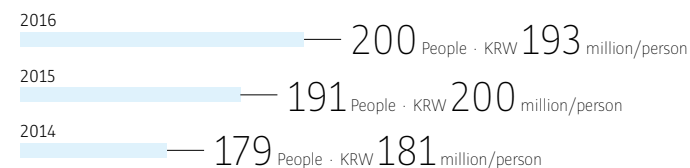
OUR SOLID, LONG-TERM FOUNDATION FOR COMPETITIVENESS AND GROWTH IS BUILT ON A TIRELESS COMMITMENT TO RESEARCH AND DEVELOPMENT. OUR TWO RESEARCH CENTERS SPECIALIZING IN CHEMICALS AND ELECTRONIC MATERIALS PLAY A KEY ROLE IN KEEPING US ON THE LEADING EDGE OF TECHNOLOGY IN THOSE RESPECTIVE FIELDS, ENABLING US TO RAPIDLY RESPOND TO CUSTOMER NEEDS TO DELIVER PRODUCTS WITH THE POTENTIAL TO LEAD THE INDUSTRY.

## R&BD Organization

Since 2005, we have referred to our R&D activities as “R&BD” or research and business development. This reflects the common sense idea that business strategy as well as marketing and commercialization considerations must be taken into account from the R&D planning phase to ensure that each project makes a concrete contribution to the bottom line.

Our R&BD activities revolve around two main centers—the Kumho Petrochemical R&BD Center in Daejeon and the Kumho Electronic Materials Laboratory in Asan. Looking beyond past and present successes, these centers are tasked with developing the next generation of technologies and materials that will define our future.

## R&BD Manpower & Investment



## Kumho Petrochemical R&BD Center

Our R&BD organization dates back to 1985 when we opened our first R&D center at our Yeosu plant. In 1994, we opened the Kumho Petrochemical R&BD Center in Daejeon. In 2003, we relocated our Icheon R&D center and Ulsan latex R&D center to the present Daejeon campus, completing the integration of our R&BD operations.

In addition to its primary mission of securing technical and cost competitiveness for our synthetic rubbers and other existing businesses, the center focuses on developing the products and businesses that will drive future growth. The center is tasked with making the technical breakthroughs that will make us a top-tier player in product categories where we are a latecomer as well as creating first-to-market products that meet specific customer needs.

The center was the Korean chemical industry's first to adopt a comprehensive R&D project management system. This system plays a key role in maximizing the effectiveness of project execution, involving the entire organization from the project selection stage through feasibility analysis, basic research, development, and commercialization.

## Kumho Electronic Materials Laboratory

Opened in 1998, this laboratory conducts research in a broad range of fields from semiconductor processing materials such as photoresist, BARC (bottom anti-reflective coatings), and PSPI (photosensitive polyimide) to LCD sealants and other materials for the display industry. Its ceaseless efforts are key to improving the quality of existing products and developing and bringing new ones to market.

Among the lab's notable achievements in recent years is the development of technology to produce ArF (argon fluoride) photoresist for 193-nm lithography, the advanced process used to create nanometer-scale semiconductor circuits. We continue to work closely with major global semiconductor makers to develop products that meet their specific needs. Building on synergy with other existing product areas, our research in the display field is aimed at fostering economies of scale in this growing industry.

In the display field, research on sealants for OLED and LCD panels continues to be the focus of our efforts. Since becoming Korea's first commercial manufacturer of sealant for the small and medium panel market in 2012, we have continued to expand our sealant lineup to include products for the large LCD and OLED panel segments. For LCD panels, sealant is used as an adhesive in the LCD cell assembly process to join the color filter and TFT substrates together, containing and protecting the liquid crystal. For OLED panels, sealant blocks moisture and oxygen so the OLED cells are able to work properly. We are also developing sealants for narrow bezel displays and an encapsulation solution for flexible OLED displays as we keep pace with the evolution of the industry.