

Research & Business Development

Research & Business Development (R&BD) is a unique, specialized R&D concept and strategy that combines our determination to develop advanced technologies that can lead global markets with an innovative approach that will bring us closer to our customers and develop solutions which start right at the initial phase of business development. By focusing on R&BD investments and innovation, KKPC will become a global leading chemical group.

R&BD ORGANIZATION

In 2005, KKPC moved away from typical R&D and adopted a new concept called Research & Business Development. R&BD goes beyond simple R&D activities to undertake technological development which aims at creating value by connecting the project and commercialization right from the initial selection of the research project, and then planning for marketing, commercialization, etc. R&BD activities drive our sustainable growth, and revolve around two major pillars – the Kumho Petrochemical R&BD Center and the Kumho Electronic Materials Laboratory. Each of these focuses on maximizing synergy in core areas, and uncovering our next generation growth engines.

KUMHO PETROCHEMICAL R&BD CENTER

The Kumho Petrochemical R&BD Center was first established at our Yeosu plant in 1985, and it was subsequently expanded and relocated to Daedeok Innopolis in 1994. This was then followed by the integration of our Icheon R&D center and the Ulsan Latex R&D center in 2003 to launch the present Kumho Petrochemical R&BD Center.

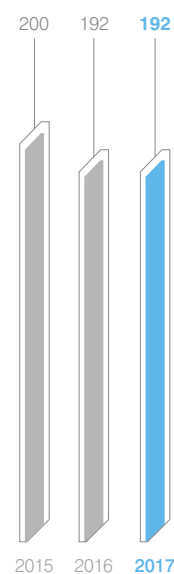
The Kumho Petrochemical R&BD Center is a comprehensive chemical materials research center which undertakes research to develop technological and price competitiveness for existing products, including synthetic rubbers, and also conducts R&D activities into future strategic areas. The Center became the first in chemicals research to build a research project management system, based on our unique R&BD, and it conducts company-wide feasibility analysis beginning with the selection of research projects. All projects are divided into basic research, development, and commercialization phases, and them managed in a systematic manner,

thus maximizing the efficiency of our R&BD activities. In addition, the Center aims to make technological breakthroughs that enable our products to become the best in the world by improving quality competitiveness, and it also develops market-leading products that meet customer needs.

In 2017, the research organization was reorganized in order to accelerate the development of new growth drivers. The Kumho Petrochemical R&BD Center will continue to operate flexibly, with a focus on research projects, so that we can respond promptly to the market environment and the technological changes of the future, in addition to strengthening our current core businesses. By doing so, the Center will identify and develop more world-class products, and it will also move beyond past success and develop next-generation technologies with an aim to create new synthetic materials.

R&BD Investment per Person

(Unit: KRW million)



KUMHO ELECTRONIC MATERIALS LABORATORY

The Kumho Electronic Materials Laboratory was opened in Asan, South Chungcheong Province, in 1998 alongside our electronic materials plant, in order to enter the high-value-added semiconductor chemical business. Its location next to a production plant gives the Laboratory strengths and focus, including efficiency and quality improvements, new product development and commercialization for semiconductor products such as photoresist (PR), bottom anti-reflective coating (BARC) and photosensitive polyimide (PSPI), as well as materials for displays, such as sealants. The Kumho Electronic Materials Laboratory focuses on developing next-generation products that will lead the evolution of semiconductor technology in line with semiconductor technology evolution, and in displays, the Laboratory aims to build economies of scale which will enable us to generate synergy with existing product groups.

With the global semiconductor market booming, the Laboratory is looking for new opportunities in the relevant materials. Our focus in 2018 will be 3D NAND flash memory, which arranges circuits of flat (2D) NAND flash memory vertically. Flat micro-processing technology reached its limit at around 10 nm, which has led to the development of 3D NAND flash memory. It is faster than 2D NAND flash memory, and with a much greater capacity. In addition to outstanding stability and durability, 3D NAND flash memory also consumes less electricity. The Laboratory is therefore focusing on developing KrF thick PR, which can increase the number of layers of 3D NAND flash, and is now nearing completion.



We have relocated the CNT Research Team, which was previously affiliated with the Kumho Petrochemical R&BD Center, to the Asan plant site, where our CNT production plant is located, and from 2018 the Team will be part of the Kumho Electronic Materials Laboratory. This has enabled the integrated operation of our overall CNT business, including research, production and quality assurance, and has also promoted convergence research between CNT and electronic materials. The Laboratory will therefore continue to develop ideas for new businesses.