

# R & D

The Showa Denko Group is promoting market-oriented R&D and building new business models by encouraging interconnections of inorganic, aluminum fabricating, and organic chemical technologies.

Through lively discussions within and exchanges among respective technical fields, we are strengthening our technical base, accelerating the speed of development, and deepening core technologies and nurturing their interconnections. By doing so, we are creating individualized products to ensure sustainable growth. This technical development strategy supports the creation of next-generation products through the six strategic marketing unit (SMU) projects.

We have also established a “technology liaison” system whereby a team of specialists, having advanced engineering skills, supports respective production sites in a timely manner.

## ● Showa Denko Group's core technologies

### · Inorganic chemical technologies

We are fully utilizing our nanotechnology to create new materials with greater value, including carbon nanofibers and advanced ceramics.

### · Organic chemical technologies

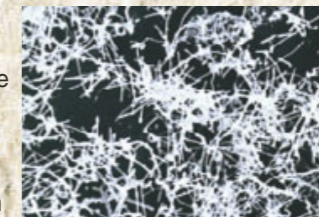
We have established functional molecular design and organic synthesis technologies based on our expertise in gas/petrochemical operations. We are producing stabilized vitamin C, pharmaceutical/ agrochemical intermediates, photoresist and other high-value products, pursuing infinite possibilities of chemistry.

### · Aluminum fabricating technologies

We are developing a wide variety of high-precision fabricated aluminum products to contribute toward building a more environment-friendly society.

### · New technologies created through interconnections of various technologies

We will continue creating new values through advancement and interconnections of these individualized core technologies.



Carbon nanofiber VGCF™



LED chips



Aluminum automotive heat exchanger parts fabricated with Showa Denko's new refrigerant tube (NRT™) technology



Thermoset solder resist for use in the manufacture of electronic parts based on the chip-on-film technology



## Electronics

Organic electronic materials  
Batteries  
Capacitors  
Magnetic recording materials  
Inorganic electronic materials  
Crystal growth process  
Thin film deposition processes  
Precision fabricating process  
Micro-system process  
Functional gases  
Ultimate conditions process

## Automotive parts

Heat transfer system  
Casting process  
Plasticity processing  
Bonding  
Functional metallic materials

## Personal Care/ Environmental Goods

Functional molecular design  
High-performance catalysts  
Controlled reaction design  
Specialty polymer design  
Fine particles  
Bio chemistry  
Organic chemicals manufacturing process  
Surface and interface chemistry

Structural analysis, Chemical analysis, Computational science