

Special
Feature

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Environment &
Energy

Addressing the Issue of

Development of Processes and Products that Reduce Environmental Impact

The growing consumption of resources and energy and its impact on the global environment has become a major issue faced by the world community. Sumitomo Chemical is developing Green Processes, which are manufacturing processes that limit environmental impact, and Clean Products, which are products with improved performance in terms of environmental friendliness, safety, and quality.

Green Processes

Developing simple, efficient processes that conserve resources and energy usage

Sumitomo Chemical aims to recycle the chlorine used in the production of some chemical products. A process called **hydrochloric acid oxidation converts by-produced hydrogen chloride**, into chlorine using catalysts and oxygen. This process achieves an extremely high chlorine conversion rate of 99% and uses far less electricity than conventional methods of producing chlorine through electrolysis.

In 2014, this process was internationally recognized as a way to reduce CO₂ emissions and was newly registered as a method of calculating CO₂ emission reduction under the United Nations Framework Convention on Climate Change.

In addition, CO₂ separation technologies extract unneeded CO₂ from target gases, which is essential in the production of hydrogen and the refinement of natural gas. Recognizing that conventional methods require large amounts of thermal energy and huge facilities, Sumitomo Chemical has developed a process that uses **CO₂ separation membranes**. It is a simple method of removing CO₂ by letting gas flow through the process, helping reduce energy used in separation and scaling down the size of facilities. In 2012, Sumitomo Chemical established a joint venture to advance the CO₂ separation business, and has been accelerating efforts to develop full-fledged operations.



Hydrochloric acid oxidation process equipment

CO₂ separation membrane

Environmentally friendly production processes that do not produce by-products

The production of caprolactam, which is used to make nylon for garments, entails the use of oleum as an auxiliary feedstock, so large amounts of ammonium sulfate are generated as a by-product. Although chemical manufacturers around the world confronted this problem throughout the years, in 2003, Sumitomo Chemical established the world's first **vapor-phase caprolactam process** that does not produce ammonium sulfate as a by-product. This is because it does not use oleum thanks to the development of a proprietary catalyst and new processes. The removal of ammonium sulfate prolongs the service life of plants while reducing the amount of feedstock required in production 25 to 40%.

Sumitomo Chemical manufactures propylene oxide (PO), which is used mainly as a raw material for polyurethanes, through its proprietary **PO-only process**. This process does not generate unneeded by-products owing to the reuse of cumene, a major chemical compound. This process also contributes to the effective use of heat generated in chemical reactions, and the reduction of wastewater emission.



Vapor-phase caprolactam process equipment



PO-only process equipment