

Research & Development

Development of products and technologies with lower environmental impact

We have worked on manufacturing of sulfur free diesel and practical application of long-life catalysts.

Development of high-performance desulfurization catalysts for sulfur free diesel oil manufacturing

Cosmo Oil has participated in the Research & Development on Petroleum Refining Pollutant Reduction Technology project *1 and developed high-performance desulfurization catalysts for sulfur free diesel fuel manufacturing. We have succeeded in increasing the desulfurization performance of catalysts almost threefold compared with conventional catalysts (500ppm) by modifying the structure of active sites (to multiple layers) to enhance their performance as well as increasing the number of active sites using our unique catalyst formation technology. These catalysts have enabled us to manufacture sulfur free diesel fuel (sulfur content of 10ppm or less) without a large scale capital outlay. Their long life (possibly four years of continuous use) is expected to result in a reduction of industrial waste. These catalysts have been undergoing verification testing at Chiba refinery since May 2004.

Finalization of direct desulfurization catalysts verification testing

Enhancing performance of the catalysts required for manufacturing of petroleum products from crude oil will lead to not only a cost reduction but also an environmental pollutant reduction. We have developed direct desulfurization catalysts that are 30% more durable than existing catalysts and confirmed their predefined level of performance by verification testing conducted from November 2002 to October 2003 using the direct desulfurization unit at Chiba refinery. They are currently in trial operation at Chiba refinery's direct desulfurization unit.



High-performance desulfurization catalysts for sulfur free diesel oil manufacturing

Development of new energy sources

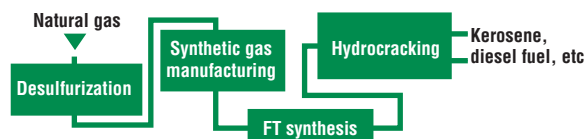
We are developing new energy sources with lower environmental impact.

GTL oil commercialization research

Cosmo Oil participated jointly with other companies in a project initiated by Japan National Oil Corporation : JNOC (currently Japan Oil, Gas and Metals National Corporation : JOGMEC) and successfully produced Japan's first GTL (Gas to Liquid) oil using our self-developed GTL catalysts at a Hokkaido pilot plant in 2002. Since GTL oil contains very little sulfur or aromatic substances, it is expected to be put to practical use as next generation kerosene/diesel fuel. We make further improvements to our self-developed catalysts while conducting commercialization research based on GTL oil utilization at the pilot plant, including study of GTL oil preparation that will meet the existing JIS requirements, evaluation of GTL diesel fuel emission gas, etc. Moreover, we took part in the Japan Hydrogen & Fuel Cell Demonstration Project (JHFC)*2 and succeeded for the first time in Japan in manufacturing hydrogen for fuel cells from GTL oil at the hydrogen station in Daikoku-cho, Yokohama, in 2003.

GTL

GTL stands for "Gas to Liquid" and refers to chemical conversion of natural gas to liquid fuel (GTL oil). The conversion process features simultaneous production of joint products including LPG, gasoline, kerosene, diesel, WAX, etc. Precise application for each fraction needs to be developed.



Advantages

- The resulting liquid fuel can contribute to a reduction of environmental impact because it is clean fuel containing very little environmental pollutants (sulfur, aromatic substances, etc.).
- It can contribute to the development of natural gas fields with impure gas.
- It can contribute to efficient utilization of remote or small to mid-sized gas fields with a transportation cost problem

Development of environmental technologies

We develop technologies to cut industrial waste and conserve soil environment.

Development of soil conservation technologies

We have established analytical technologies for fuel contaminated soil and assessment procedures for soil remediation by microorganisms. Several field tests were conducted at our sites using these technologies.

In 2003, we continued to work on the development of bioremediation technology to clean fuel components in soil or ground water.

*1 "Research & Development on Petroleum Refining Pollutant Reduction Technology" Project: A technology development project of the Petroleum Energy Center (PEC) commissioned by the New Energy and Industrial Technology Development Organization (NEDO) to reduce environmental pollutants in petroleum products.

*2 Japan Hydrogen & Fuel Cell Demonstration Project (JHFC): An initiative by the Ministry of Economy, Trade and Industry, consisting of the "Fuel Cell Vehicle Demonstration Study" and the "Demonstration Study of Hydrogen Fuelling Facilities For Fuel Cell Vehicles"