



Awards

- **HCCI Combustion**
The 54th Society of Automotive Engineers of Japan, Inc., Asahara Academic Advancement Award
- **Gas oil desulfurization catalyst (C-606A)**
Fiscal 2004 Japan Petroleum Institute's Award (jointly with PEC)
- **Light naphtha isomerization catalyst**
Fiscal 2004 Japan Petroleum Institute, Noguchi Commemorative Award
- **ALA**
Fiscal 2004 Japanese Society for Chemical Regulation of Plants, Technology Award

R&D and New Business Ventures

研究開発・新規事業の展開

We are gradually realizing development of petroleum products and technologies having a smaller environmental impact, and clean energy that helps us sustain our planet. Applied technologies have also enabled us to enter new markets and areas other than those relating to oil and energy.

+ **Gas Oil Desulfurization Catalyst**
<Sulfur Free>

Cosmo Oil endeavored to develop a desulfurization catalyst that could produce sulfur free (sulfur content of 10ppm or less) diesel fuel, and succeeded in realizing a high performance catalyst of the highest standard in the world. In order to provide sulfur free automobile fuel, often capital investment is necessary since it would involve heavy use of the desulfurization unit. This newly developed catalyst made it possible to produce sulfur free diesel fuel without any major capital investment. Our participation since 1999 in the Petroleum Energy Center (PEC) and New Energy and Industrial Technology Development Organization (NEDO)'s, "Research and Development of Petroleum Refining Pollutant Reduction Technology" Project, and the resulting development and practical application of this catalyst, made this achievement possible. Our accomplishment was recognized by the Japan Petroleum Institute's Award, one of the most prestigious awards in Japan's energy industry.

* The awards received this year including this award are listed above.

We will continue our Challenge to become an Integrated Energy Company with our Diversified Mind-set and Technologies.

The following are examples of our work ranging from the development of energy-based products, to expanding our range of technologies to seek development opportunities in new fields.

Case 01

Wind Power Generation

Since launching the windmill operation in Sakata City of Yamagata Prefecture (December 2004), we have been busy surveying and discussing the potential for commercialization of the further operation. The allure of wind-generated power is, needless to say, that it is clean energy. If the amount of wind power that is expected to be generated at the Sakata Wind Power Station (3.8 million kWh per year) were to be generated by another power-generating method such as thermal power, wind-generated power would have the effect of reducing CO₂ by 1,200 tons a year. On the other hand, there are disadvantages. Since wind-generated power is dependent on the wind, it lacks stability, and even if a good location were to be found, some locations are not commercially viable because there are not roads wide enough to transport the tall steel towers (65m) and blades (35m x 3 fans). We must also be considerate of ecology, the birds and other animals in particular. After resolving the many difficult issues that are involved in starting a windmill operation, I cannot quite express in words emotions I feel when I see those large blades starting to move. This is the joy of having a role at Cosmo Oil as it endeavors to become an integrated oil company.



Hiromasa Kusatsugu
Power Generation Group
Business Development Department

Hiromasa Kusatsugu

Case 02

ALA (5-aminolevalinic acid) Business



I wonder if you have heard of a natural amino acid called ALA. The regular amino acid known around the world as an ingredient in health drinks produces protein, but ALA is a super amino acid that is a basis of chlorophyll and blood. ALA's practical application in society can be found in a remedy for skin cancer, but it used to be an extremely expensive chemical due to the degree of difficulty involved in its chemical synthesis. When something is considered difficult, it is the nature of the researcher to want to challenge it. In 1987, 2 years after joining the company and while I was dispatched to the University of Hiroshima, I came up with the idea that if ALA is a natural substance that is in our bodies, I should be able to produce it using a fermentation process. I wanted to produce cheaply an ALA that was benign for the environment, like soy sauce, bean paste and inexpensive, using a fermentation process. Thereafter, I worked tirelessly on producing it, and then on developing its uses, and in 1999, I succeeded in the factory production of ALA using a fermentation process. In 2003, I developed the world's first high performance fertilizer containing ALA, Pentakeep, and made it a marketable product. Recently, discovery of its hair growth promoting effect has been a topic to the extent that it was introduced in news programs. As a core element of life, ALA holds tremendous potential and for this reason, in addition to its everyday business, the ALA Business Center is making continuous efforts to discover new possibilities in the area of the environment and health, such as greening of the deserts.

Tohru Tanaka
ALA Business Center,
Business Development Department

Tohru Tanaka

Other Achievements in Business and Research

Independent Power Production Business

In July 2003, the operation at the Yokkaichi Kasumi Power Station, the 200,000kW power generating plant, was launched. It supplies electricity to Chubu Electric Power Co., Inc.

Fuel Cell

In March 2005, the field test of the LPG fuel cell in Mie Prefecture was commenced. We have also been studying the hydrogen production and filling technology for vehicles powered by fuel cell. In addition, we are developing fuel cell technologies for household use so as to participate in the the New Energy Foundation's large-scale demonstrative project on the stationary fuel cells.

Environmentally Conscious Fuel

In our efforts to reduce CO₂ emissions and clean automobile exhaust gas, we are developing renewable biomass fuels (Such as ETBE*¹, BDF*², and bioethanol) and technologies that use GTL fuels.

Distributed Power Generation

Distributed power systems can supply cheaper electricity by generating power at each energy-consuming locations such as hospitals and factories. By utilizing the exhaust heat when power is being produced, energy consumption efficiency is improved, and CO₂ emission is reduced. At Cosmo Oil, we engage in this type of "energy service business" by providing distributed power systems and other services.

*1 ETBE (Ethyl Tertiary Butyl Ether)

ETBE is high in octane, and is an effective fuel for increasing the octane number in gasoline. ETBE can be made from bioethanol which is currently the focus of attention as a renewable fuel.

*2 BDF (Bio Diesel Fuels)

As a fuel that is made primarily from vegetable oils, BDF is gaining attentions as an alternative to oil that possesses nearly the same quality as diesel fuel. Since BDF is a renewable fuel that originates from biomass (biological material), its CO₂ emissions would not be counted under the Kyoto Protocol.