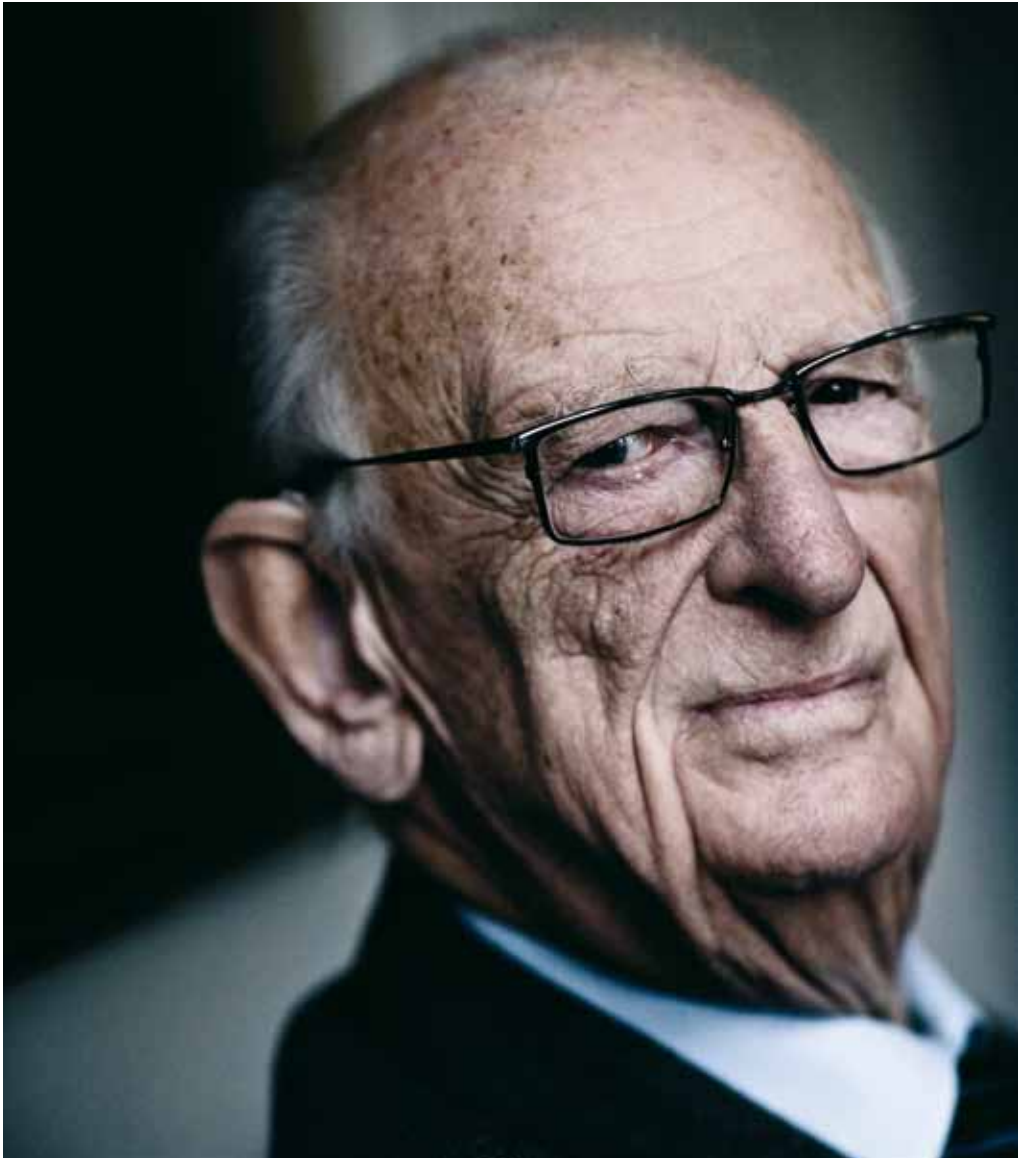




About Topsøe – and what we do

RESEARCH | TECHNOLOGY | CATALYSTS

HALDOR TOPSØE 
CATALYSING YOUR BUSINESS



“The corporate world in itself means nothing unless it improves the lives of people and the conditions in poor countries.”

Dr Haldor Topsøe

Topsøe – the company

Energy, climate, and nutrition: at the top of agendas around the world, and Haldor Topsøe’s catalysts and technologies play a key role in tackling these concerns.

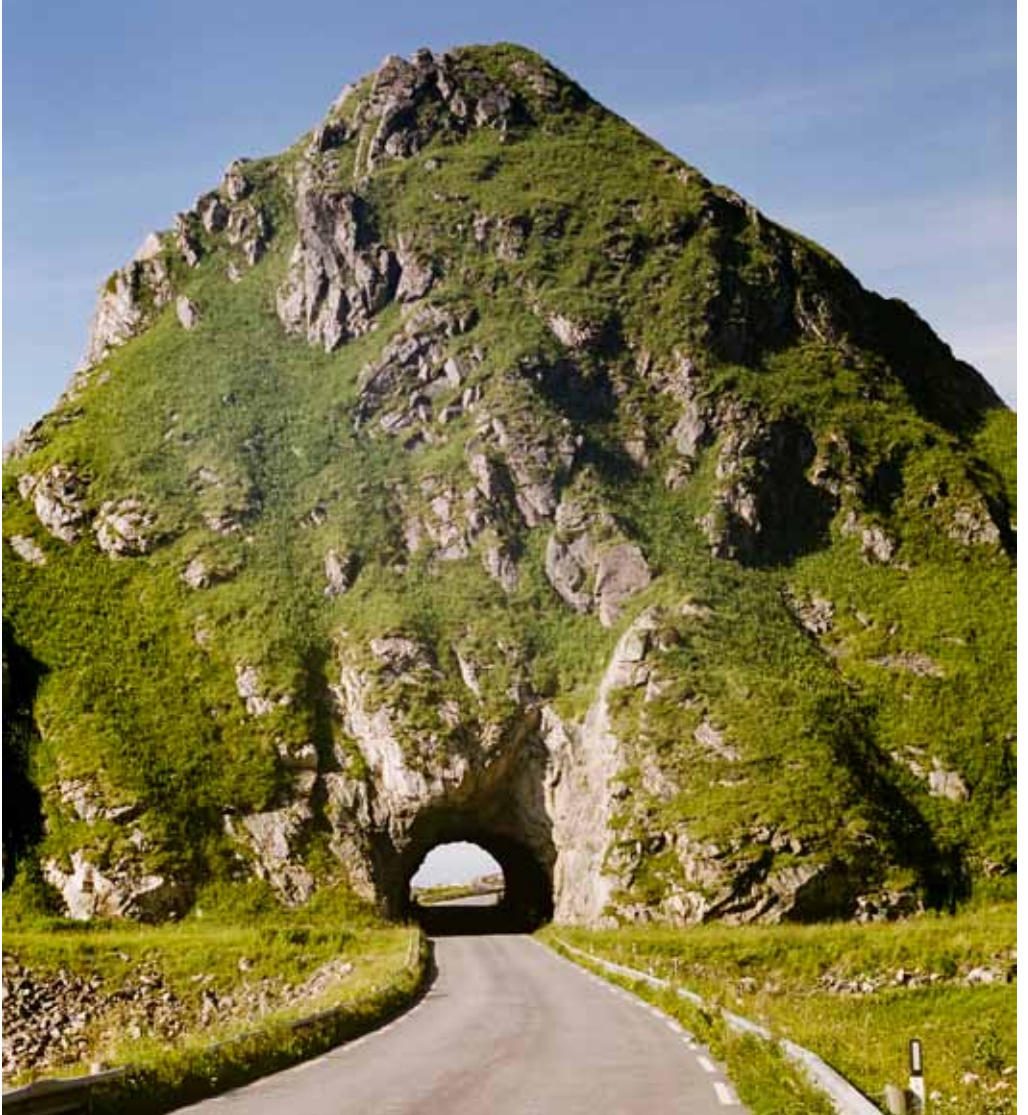
Catalysis is involved in 90% of all industrial production, and our product portfolio promotes energy-efficient and eco-friendly use of the world’s resources.

Topsøe’s position as market leader is the result of more than 70 years of effort concentrated on catalysis. Our business focuses on four areas: research, sales, technology and plant design, as well as catalyst production.

Dr Haldor Topsøe founded the company in 1940. In his vision, the business ideally grows through constant product development and penetration of new markets. Following his vision enables us to supply our customers with the most advanced, reliable and economically advantageous products possible.

Dr Topsøe calls this approach “from science to dollars”.

We take the greatest pride in our products and our business, because they make a real difference when it comes to the energy efficiency in chemical processes, to the environment and to the use of the world’s resources.



What is catalysis?

But what is a catalyst? What does it do? And where are Topsøe's catalysts and processes used?

Catalysis is the process in which a catalyst promotes a chemical reaction, without being consumed by the reaction itself.

The cyclist

To illustrate the process more clearly, we can use the image of a cyclist who is at the bottom of a mountain. Without the catalyst, he has to climb over it, using a tremendous amount of energy.

A catalyst, however, is like taking an energy-saving shortcut through a tunnel in the mountain. This allows the cyclist to reach the other side quicker and spend less energy than without the help of a catalyst. Because catalysts are not consumed during the process, they can be used for years, helping many cyclists get through the mountain.

What does catalysis do?

A catalytic process converts one chemical component into another. For instance, it is possible to convert natural gas into hydrogen, and hydrogen and nitrogen can be catalysed into ammonia.

What does the catalyst do?

When a catalyst produces a chemical process, the chemical reaction happens faster and uses much less energy. Production increases, and resources are saved.

Catalysis in the world's industry

Catalysis is essential to the world's industrial production. As much as 90% of all chemical processes utilise catalysts, and 60% of all industrial products are made using catalysis.

Catalysis speeds up chemical processes. For example, an ammonia plant typically produces 1,000 tonnes of ammonia per day. Without catalysis, it would take approximately one million days to produce the same amount of ammonia.



From nano to mega

At Topsøe, our scope is broad: from nano-technology research and development of catalysts and catalytic processes to after-sales service of our customers' plants.

Between these points is the sales process in which our sales engineers engage in detailed technical discussions with our customers to find better catalytic solutions, ensuring efficient production. In the design phase, plants and processes are designed to provide customer-specific solutions.

The researcher and the businessman

Another goal of Dr Topsøe's is to combine the researcher's skills with those of the businessman. Our research positions us at the cutting edge of our technology, and research is a decisive factor when offering our clients the best solutions, allowing us to venture into new areas. In other words, we fund our research through business.

By combining the relevant competencies across the departments, we meet our goal of providing the highest quality possible.

On the smallest scale

Our knowledge of chemical reactions and processes on an atomic level serves as the basis of our product development.

Our research ranges from atomic-level studies to large-scale demonstrations of catalysts and processes. We strive to continuously improve our catalysts and processes while exploring and developing products in new business areas.

Research and development take place in close collaboration across the company. Researchers explore the possibilities. Sales engineers uncover clients' needs. Design engineers develop the chemical plants. And employees at the production plant optimise catalyst production.



Production

All Topsøe catalysts are manufactured in Frederikssund, Denmark, or Houston, Texas.

We continually optimise our production process and, each time a new catalyst is developed, the production facilities are reconfigured to fit the latest design. This extraordinary flexibility is the result of the close collaboration between our researchers, our production group, and our sales team.

Expert sales

Marketing, selling, and servicing our catalysts and processes requires an in-depth technical knowledge of the clients' facilities. Our sales managers are specialists in the fields they represent. Their knowledge enables us to work closely with our customers, offering the optimal solution every time.

Process design

At Topsøe, we also develop technologies and design industrial plants, for example for the production of hydrogen and ammonia as well as oil refining. Our processes and industrial plants are tailored to meet our customers' specific needs, and Topsøe engineers are present during the construction and start-up of these large plants.

Where are Topsøe's catalysts and technologies used?



Ammonia

Ammonia was one of Topsøe's first major business areas and remains to this day one of our largest. Ammonia is used mostly to produce fertiliser. It is also used as refrigerant in large-scale refrigeration equipment and in the production of detergents.



Automotive

Since 2005, Topsøe catalysts have been used in trucks and busses. The catalysts remove harmful nitrous gases and carbon particles from the engine's exhaust gas, greatly reducing pollution, and allowing them to meet the high environmental standards of the future.



In oil refineries, large amounts of hydrogen are used in the conversion of crude oil into end-products such as gasoline, jet fuel, and diesel. This is why oil refineries often have a separate hydrogen plant. Topsøe catalysts and processes help make hydrogen from natural gas and oil.



Approximately half of the world's production of methanol, also called wood alcohol, is used for the production of formaldehyde. Formaldehyde is a building block of the glue used in the furniture industry.

Methanol is also used for making plastic materials for manufacturing products such as GORE-TEX. Additionally, methanol can be used as fuel in fuel cells.



Oil refineries

When a refinery treats oil in the production of transportation fuels, numerous toxic and environmentally damaging impurities are removed. Topsøe's products help refiners meet increasingly stringent environmental standards.

Topsøe is the world's number one supplier of catalysts for the production of diesel with ultra-low sulphur content.

Topsøe catalysts and processes are also used to make biofuels, for instance, by converting biomass such as woodchips and household waste into diesel.



Flue gas cleaning

Contrary to common belief, the white exhaust from the chimney in power plants is vapour. The toxic, nitrous gases in the smoke are removed by Topsøe catalysts early in the process.

Topsøe has supplied catalysts and process design to virtually all Danish coal-fired power plants. Worldwide, more than 600 flue gas cleaning units use Topsøe products.



Synthesis gas

Many chemical processes begin by converting natural gas into synthesis gas, which is the main component in many chemicals such as hydrogen, ammonia and methanol.

Synthesis gas can be produced from coal, natural gas and biomass, and it can even be converted into liquid transportation fuels.

This approach is used in a plant in Qatar, which utilises Topsøe catalysts and processes. Here, the production of diesel from natural gas corresponds to half the total consumption of diesel in Denmark per year.



Sulphuric acid

The first Topsøe catalyst was the VK38, which is used to produce sulphuric acid. Sulphuric acid is the chemical product most widely produced and sold in the world. Most of it is used in the manufacture of fertiliser. Today, Topsøe offers a wide variety of VK catalysts.

Sulphur is present as an impurity in many raw materials. When producing oil, steel, and other metals, this sulphur is released as sulphur dioxide in various exhaust gases. With Topsøe WSA and SNOX™ processes, this sulphur dioxide is converted into sulphuric acid, which transforms it into a saleable product.



Topsøe and the energy supply of tomorrow

Environment, energy, and climate are key to the world's future, and Topsøe catalysts and processes make a difference in these vitally important areas.

Catalytic processes create flexibility in the energy supply, which is crucial to meeting the world's increasing demand for energy while helping to meet global environmental and climate-related challenges.

Can a car run on paper?

Topsøe has developed a technology that turns wood waste and biomass, such as household waste, into DME, a clean, environmentally friendly fuel. In fact, it's so clean that you can use the hot exhaust gas to dry your hair!

In Piteå in northern Sweden, Topsøe is participating in a project where black liquor, a waste product of the paper mill industry, is turned into DME.

Volvo has tested DME and describes it as their "preferred fuel" among alternative fuels.

Wood in the tank

Topsøe TIGAS technology converts synthesis gas into gasoline. In the United States, Topsøe is using woodchips to produce synthesis gas, which is then converted to gasoline. In this way, we create a sustainable alternative to fossil fuels and thus contribute to the reduction of the world's CO₂ emission.

Removing sulphur from oil

Topsøe products are also used to remove sulphur, nitrogen and other pollutants and toxic elements from oil. Cleaning low-quality crude oil makes it possible to use these large crude sources, enabling a more efficient use of the world's energy resources

Topsoe Fuel Cell

Topsøe's subsidiary Topsoe Fuel Cell develops and commercialises fuel cells, a technology that transforms different fuel types and air into electricity with a high degree of energy efficiency. For example, fuel cells can be used in micro-sized power plants, where they supply heat and electricity to private households.



”Topsøe shall be a good place to work – and to have worked”

Dr Haldor Topsøe

The story

Topsøe is a business with a history.

Haldor Topsøe founded the company in 1940 with a vision of building a company that would help create a better world, a need that became more pressing after the Second World War.

Dr Topsøe’s interest in chemistry and catalysis was sparked during his study of physics with the prominent professor Niels Bohr at the Niels Bohr Institute in Copenhagen. This is where Dr Topsøe first saw the potential of catalysis.

Topsøe’s first catalyst was for the production of sulphuric acid.

In 1958, Haldor Topsøe bought a farm, Linderupgaard, in Frederikssund, where the catalyst production plant is situated today. Catalyst production commenced the following year.

A good place to work

Since 1975, the headquarters have been located in Ravnholm north of Copenhagen. The surroundings are beautiful – completely in line with Dr Topsøe’s idea: Topsøe shall be a good place to work – and to have worked.

The employees are independent and free to solve tasks using their creativity and curiosity. This also means they have the responsibility to do their best.

Our employees are committed to their jobs and to creating a pleasant working environment where care and consideration are of utmost importance.

As leaders in our field, we attract international talent, making Topsøe a multicultural company, in which as many as 50 different nationalities are represented.





Topsøe worldwide

More than 90% of our turnover stems from export, and global commerce is the core of our business.

In order to ensure direct contact with our customers, Topsøe has a number of representative offices and subsidiaries around the world.

Topsøe has a tradition of cooperating with universities and research institutes all over the world. We believe that our international network serves as our goal of sharing the knowledge of catalysis.

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