

## Evonik catalyst in the life support system of the ISS

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- Catalyst from Evonik in the new Advanced Closed Loop System (ACLS) of the ISS
- Commander Alexander Gerst installs the new life support system
- High performance catalyst in Sabatier reactor saves expensive transport of water into space

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The International Space Station ISS will receive a new element for the life support system called the "Advanced Closed Loop System" (ACLS), which recently was installed by Commander Alexander Gerst and now is being tested. A catalyst from Evonik plays an important role in the system. The ACLS was developed by Airbus for the European Space Agency (ESA) to ensure a very efficient life support system on board. The system is capable of removing exhaled carbon dioxide from the air whilst generating water and oxygen to breathe. With the commissioning of the system, it will generate about 40 percent of the fresh water required on board and thus significantly reduces the amount of water which needs to be transported from the earth to the ISS. The transport of water to the ISS is extremely expensive costing up to 60,000 Euro per liter. At the beginning of 2019, the system should be fully operational on the space station.

At the heart of the system is a Sabatier reactor, which converts carbon dioxide and hydrogen into methane and water. The oxygen needed for breathing is then obtained by electrolysis of the water produced. To make the reaction of carbon dioxide and hydrogen possible, a hydrogenation catalyst is necessary. This was jointly developed by Evonik and Airbus for the special application in the ACLS and prepared for use in the ISS in a multi-year qualification. It is a high performance catalyst that has high stress resistance and reliably delivers the required activity and selectivity over a long period of time, even when small quantities are used.

"It is a privilege to be able to realize this forward-looking project together with Airbus," explains Tim Busse, Product Group Head for fixed bed catalysts in Evonik's Catalysts Business Line. "If this system, designed for a 3-passenger crew, proves to complement

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the permanent life support system of the ISS, it will ensure optimal cabin air quality and efficient water supply in the near future. In addition, we expect it to be used in other applications on Earth when difficult-to-access habitats provide for challenging conditions in a small space."

#### **About Evonik**

Evonik is one of the world leaders in specialty chemicals. The focus on more specialty businesses, customer-orientated innovative prowess and a trustful and performance-oriented corporate culture form the heart of Evonik's corporate strategy. They are the lever for profitable growth and a sustained increase in the value of the company. Evonik benefits specifically from its customer proximity and leading market positions. Evonik is active in over 100 countries around the world with more than 36,000 employees. In fiscal 2017, the enterprise generated sales of €14.4 billion and an operating profit (adjusted EBITDA) of €2.36 billion.

#### **About Resource Efficiency**

The Resource Efficiency segment is led by Evonik Resource Efficiency GmbH and produces high performance materials and specialty additives for environmentally friendly as well as energy-efficient systems to the automotive, paints & coatings, adhesives, construction, and many other industries. This segment employed about 10,000 employees, and generated sales of around €5.4 billion in 2017.

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