

Ammonia: Decarbonize production and diversify energy input


Ammonia is one of the most commonly produced chemicals worldwide. Its potential to decarbonize the industry is still widely underestimated. It is not only an ideal means of transport for hydrogen but can also be directly used as fuel without producing CO₂.

By testing the use of ammonia as a fuel in production, Aurubis is taking an additional consistent step on the way to diversifying the energy supply and switching to sustainable alternatives. Our goal: As an industrial pioneer in sustainability, we want our production to be climate-neutral well before 2050.

Savings potential in the rod plant at the Hamburg site

Reduction of 20,000 MWh in natural gas

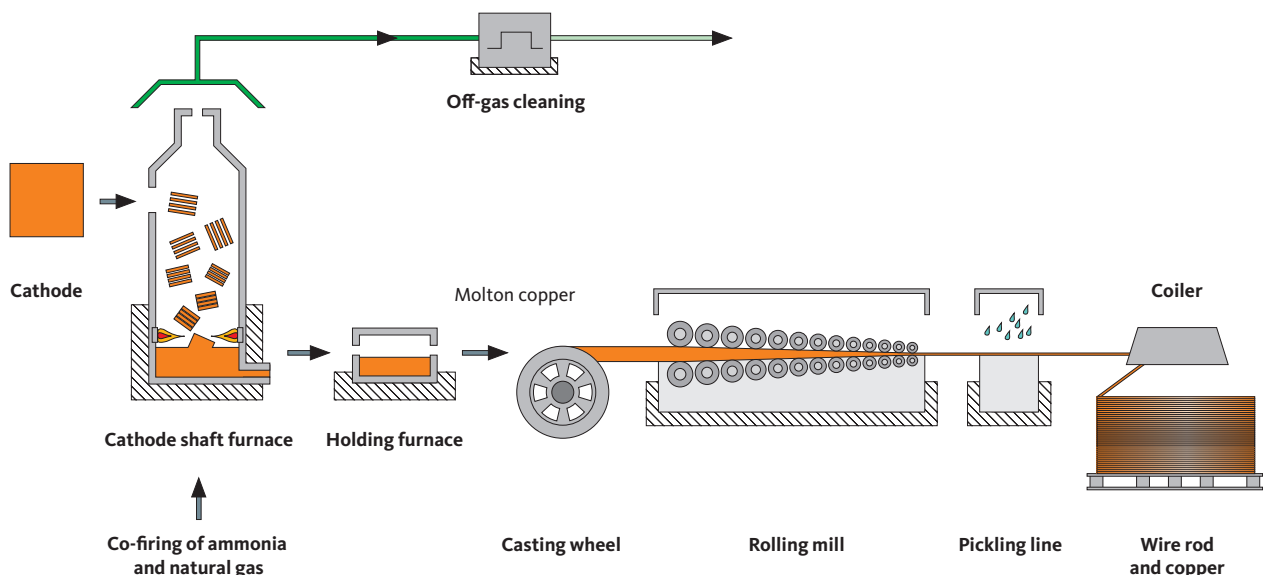
Reduction of 4,000 t of CO₂ per year



First step: Series of tests with ammonia as alternative fuel

At the Hamburg site, Aurubis is starting a series of tests to assess the use of ammonia in production. In them, 20 % of the natural gas usually used in rod plants is to be substituted with ammonia. The series of tests is to take place over a period of six to eight weeks in fall/winter 2022. If the pilot project is successful, the permanent use of ammonia on an industrial scale will be tested. The first 13 t of ammonia that were required for the test phase were delivered by ship from the United Arab Emirates.

Ammonia in wire production



What is ammonia?

Ammonia (NH₃) is obtained from a process known as “ammonia synthesis,” in which a gaseous chemical compound is produced by means of a catalyst and high pressure using hydrogen and nitrogen as input materials. If ammonia is produced using exclusively renewable energy, air and water without any fossil-based input materials, it is referred to as green ammonia because it has no carbon footprint. Due to the still limited availability of green ammonia, Aurubis is currently working with low-carbon blue ammonia for its test series. Together with its partners, Aurubis is already working on solutions for carbon-free production. Similar to camping gas, ammonia can be liquefied at 8 bar of pressure and stored indefinitely without cooling.

Opportunities and challenges at a glance

Opportunities



Climate-friendly: No CO₂ is released when ammonia is burned. Green ammonia is climate-neutral.



Versatile: In addition to its use as fuel, ammonia is suitable as a means of transport for hydrogen. It is also one of the most important and versatile products in the chemical industry.



Storable: Due to its high energy density, ammonia is simple, efficient and inexpensive to store.



Existing infrastructure: 20 million t of ammonia are already transported by ship every year. Safe handling is established, tried and tested around the world.

Challenges



Availability: There is still not enough green ammonia in particular to cover the demand on the global market.



Technology: Further research and development work is needed on the industrial use of ammonia. Improper combustion methods can generate nitrogen oxides, which cause acid rain, and nitrous oxide, a greenhouse gas.



Storage: More elaborate due to ammonia's properties, but quite manageable with appropriate safety measures.



Did you know? Ammonia has been used for energy storage and as a fuel since 1872, among other places in New Orleans streetcars.

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