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**Turning greenhouse gases into valuable chemicals: thyssenkrupp starts production**

Today thyssenkrupp in Duisburg commenced production of the synthetic fuel methanol from steel mill gases. It is the first time anywhere in the world that gases from steel production – including the CO2 they contain – are being converted into chemicals. The start-up was part of the Carbon2Chem project, which is being funded to the tune of around 60 million euros by Germany’s Federal Ministry of Education and Research (BMBF).

Carbon2Chem is a major project coordinated by thyssenkrupp in collaboration with institutes of the Fraunhofer Society and the Max Planck Society and involving 15 further partners from research and industry. Implemented on an industrial scale, the technology has the potential to convert around 20 million tons of the annual CO2 emissions from the German steel sector. It can also be used in other CO2-intensive industries.

“There’s no point just prescribing climate protection targets if we don’t have the technical means to implement them. That’s why we are supporting forward-looking projects like Carbon2Chem. They show that investments in climate-friendly technologies are worthwhile. Thanks to research and innovation efforts, climate protection and competitive steel production can now be combined successfully, protecting the environment and securing jobs,” said Education and Research Minister Anja Karliczek. “Today the Carbon2Chem concept is proving its value in practice,” said Guido Kerkhoff, CEO of thyssenkrupp. “Our vision of virtually CO2-free steel production is taking shape.”

Carbon2Chem is based on the fact that steel mill gases contain valuable chemical elements such as carbon (in the form of carbon monoxide and CO2), nitrogen and hydrogen. As a result they can be used to produce carbon- and hydrogen-containing synthesis gas, a starting material for the manufacture of various chemicals such as ammonia, methanol, polymers and higher alcohols. Synthesis gases are currently extracted from fossil fuels such as natural gas and coal. Carbon2Chem not only converts the CO2 contained in the steel mill emissions, it also saves the CO2 that was previously created during the production of synthesis gas.

The first batch of methanol has been produced in the Carbon2Chem technical center, a pilot plant in which laboratory results are tested under industrial conditions using gases from normal steel mill operations. This work builds the foundations for a possible transition to industrial scale.

In addition to gas cleaning and water electrolysis systems from thyssenkrupp, the technical center includes various laboratory rooms, some of which are already being used by project partners: In one lab Covestro AG will carry out research into the production of isocyanates; Clariant supplied the catalyst for methanol production and chemicals for the gas cleaning system; the Fraunhofer Society will operate three laboratories; and the Max-Planck Institute will also be active at the technical center. thyssenkrupp has invested 33.8 million euros in the technical center, while 8.5 million euros from the BMBF funding has also been allocated for equipment and operation.

Carbon2Chem is attracting a great deal of interest, also from outside Europe. Worldwide there are around 50 steel mills that would be suitable for Carbon2Chem. Moreover thyssenkrupp is already conducting talks with interested parties from various regions about how the technology can be transferred to other CO2-intensive sectors. Carbon2Chem can make an important contribution to meeting the target formulated at the 2015 UN Climate Change Conference of achieving greenhouse gas neutrality in the second half of the century.

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