Joint News Release

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LanzaTech and BASF achieve first milestone in utilizing industrial off-gases for chemical production

- **Industrial exhaust gas used to produce sustainable alcohol**
- **White biotechnology enables carbon recycling**

Ludwigshafen/Germany and Chicago/USA, May 11, 2021 – Transforming the carbon contained in industrial off-gases into valuable chemicals is the aim of a partnership between LanzaTech and BASF. Now the partners have achieved a key first success: With the help of special bacteria, they have been able to produce n-octanol at laboratory scale from carbon monoxide and hydrogen, the main components of emissions, e.g. from the steel industry. n-octanol is an important molecule that is used in cosmetics, among other uses.

“By connecting our competencies, we can speed-up bringing more sustainable products to the market. The interdisciplinary cooperation between biologists, biochemists and engineers is decisive for successful outcomes in the field of white biotechnology and therefore also for the success of this project,” said Dr. Detlef Kratz, President of the Process Research & Chemical Engineering research division at BASF. In this collaboration, LanzaTech contributes its unique, innovative gas fermentation technology, while BASF provides its expertise in the development and operation of chemical processes. “The integration of LanzaTech’s gas fermentation technology into BASF’s Verbund enables us to take an important step towards a carbon-neutral circular economy,” Kratz added. Jennifer Holmgren, CEO LanzaTech, stressed: “Our climate is changing, and the world is anxiously watching while we develop urgently needed technologies to keep the important raw material, carbon, in the cycle. BASF is leading the way in rethinking the chemical supply chain, by embracing a circular model of transforming waste carbon into new materials and keeping fossil fuels in the ground.”

Until now, industrial exhaust gases have either been flared or recovered for energy and used to produce electricity and steam. In this partnership, the two companies are working on a process using a biological capability developed by Dr. Ramon Gonzalez, currently a Professor at the University of South Florida, that will allow the carbon in the off-gas to be utilized as a raw material for the production of chemical products like n-octanol. This innovative carbon recycling approach thereby reduces CO_2 emissions from the industrial site and keeps fossil resources in the ground. LanzaTech's technology is already deployed at commercial scale transforming exhaust gas from steel production into ethanol. The collaboration has now paved the way to produce high value chemicals, such as n-octanol through gas fermentation.

Within just a few months, the companies have not only developed a suitable strain of bacteria to produce this important alcohol, they have also designed an innovative process concept to allow continuous product generation and purification. As a next step, the teams will focus on optimizing the biology and technology design to deliver an efficient production process.

One advantage of this process is that the microorganisms are not particular about the composition of the exhaust gas, as they are able to utilize varying ratios of carbon monoxide, hydrogen and carbon dioxide. The microorganisms are also tolerant to many different impurities, so there is no need for complex steps to purify the exhaust gas. LanzaTech's technology can use different feedstocks and can also recycle solid waste carbon from household or agricultural waste. By transforming solid waste materials into a gas stream via controlled partial oxidation, the carbon and hydrogen contained in these gases can be fixed into chemical products via the same gas fermentation process, instead of being released into the environment.

About BASF

At BASF, we create chemistry for a sustainable future. We combine economic success with environmental protection and social responsibility. More than 110,000 employees in the BASF Group contribute to the success of our customers in nearly all sectors and almost every country in the world. Our portfolio is organized into six segments: Chemicals, Materials, Industrial Solutions, Surface Technologies, Nutrition & Care and Agricultural Solutions. BASF generated sales of €59 billion in 2020. BASF shares are traded on the stock exchange in Frankfurt (BAS) and as American Depositary Receipts (BASFY) in the U.S. Further information at www.basf.com.

About LanzaTech

LanzaTech is turning our global carbon crisis into a feedstock opportunity with the potential to displace 30% of crude oil use today and reduce global CO_2 emissions by 10%. By recycling carbon from industrial off-gases; syngas generated from any biomass resource and reformed biogas, LanzaTech can reduce emissions and make new products for a circular carbon economy. LanzaTech's carbon recycling technology is like retrofitting a brewery onto an emission source like a steel mill, but instead of using sugars and yeast to make beer, pollution is converted by bacteria to fuels and chemicals! Imagine a day when your plane is powered by recycled GHG emissions, when your yoga pants started life as pollution from a steel mill. This future is possible using LanzaTech technology. Founded in New Zealand, LanzaTech is based in Illinois, USA and employs more than 200 people. Further information is available at www.lanzatech.com.

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