

LanzaTech Abstract

Title: Innovations for a Carbon Smart Future

Abstract:

Gas-fermenting organisms such as acetogenic Clostridia offer an attractive route for sustainable production of low cost, low carbon fuels and chemicals from a range of abundant, inexpensive, and non-food feedstocks. Rather than on sugars, acetogenic bacteria have the ability to grow and synthesize products on gases containing carbon monoxide (CO) and/or carbon dioxide (CO₂) plus hydrogen (H₂) as their sole source of energy and carbon.

Founded in 2005, LanzaTech has pioneered carbon recycling. The process involves taking gas streams with a significant amount of carbon monoxide or carbon dioxide plus hydrogen, and converting those gases into high-value fuels and chemicals.

Over the past 10 years, LanzaTech's gas fermentation technology has been taken from the lab through pilot testing and demonstrated at scale at three separate sites with two facilities operating at a capacity of 300 tpa. The process has been shown to be extremely robust, with over 40,000 hours of total run time and multiple runs of >1,200 hours (50 days) operating above design specifications. LanzaTech is currently in the process of building its first commercial-scale units utilizing steel mill gas with the world's largest steel producer, ArcelorMittal, in Belgium and with China Steel in Taiwan. And with Capital Steel in China. These first commercial units will begin operation in 2017 with planned capacities of 60,000 and 150,000 metric tons per year.

The company has also demonstrated the use of a range of other feedstocks including biomass and municipal solid waste-derived syngas, reformed biogas and CO₂ rich PSA tail gas from the refining sector. Operation of these plants demonstrated the scalability, efficiency and industrial robustness of the microbial gas fermentation process. Unlike most sugar based fermentation processes, LanzaTech's gas fermentation process can be operated in true continuous mode, leading to lower cost industrial production.

This presentation will outline the application and commercial progress of this biological process, which has enabled LanzaTech to demonstrate synthesis of an array of over 20 different products from gas fermentation, including fuels ethanol or butanol and chemicals 2,3-butanediol, succinic acid, acetone or isopropanol via existing and novel routes.