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Abstract: **BioCOnversion – From Steel Offgases to Valuable Molecules**

CLIB - Cluster Industrielle Biotechnologie, Düsseldorf
Dr. Sarah Refai und Dr. Markus Müller

Polymer precursors and functional groups are of great industrial interest. So far, these medium chain carbon compounds are produced via petrochemical process routes. The use of renewable resources is an important step towards building a sustainable economy to replace conventional production from fossil fuels. This goal was pursued in the project BioCOnversion, funded by the German Federal Ministry of Education and Research (BMBF) and coordinated by the open innovation cluster CLIB. An international, multidisciplinary consortium joint forces to develop a process comprising the primary conversion of CO / syngas into an intermediate through gas fermentation and a subsequent enzymatic upgrading to a defined plastic precursor. The process development in the BioCOnversion project, which successfully finished in October 2021, was divided in two consecutive development phases. First, the individual process steps were experimentally tested independently of each other. In the second development phase, the most promising approaches were combined, and the composition of the overall process was developed step by step. The performance of the different process steps and the overall process was evaluated by ecological and economic assessments. Based on these results, further optimisations were implemented in the process design.

BioCOnversion unites several innovative providers of conversion and recovery technologies into a powerful consortium covering the entire value chain: Converting a CO-based feedstock into a high-value building block via a climate friendly process.