Recovery of hexanoic acid during its microbial electrosynthesis

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Project Description

Using CO_2 as feedstock in renewable electricity-based processes (Power-to-X) for is an appealing option for the chemical industry. Specific microorganisms can efficiently utilize CO_2 into valuable chemicals using an external electron supply provided through electrodes. This Power-to-X process is called microbial electrosynthesis (MES) and is the focus of this postdoctoral project, which is part of a larger project (2 PhD and 2 postdocs) and a consortium composed of four international companies, which all together will develop a scalable MES process that produces hexanoic acid, a base chemical, from CO_2 and renewable electricity.
In this sub-project a clean, scalable process is developed for recovery of hexanoate that is produced by MES. This should lead to the hexanoic acid in high purity and yield. Anion-exchange is the primary method for downstream processing. Adsorption and desorption will be measured and modelled, to predict conditions to increase performance. The recovery process will be integrated with an established MES set-up, and the overall system will be fully characterized. Techno-economic analysis will be used to guide the direction of this work.

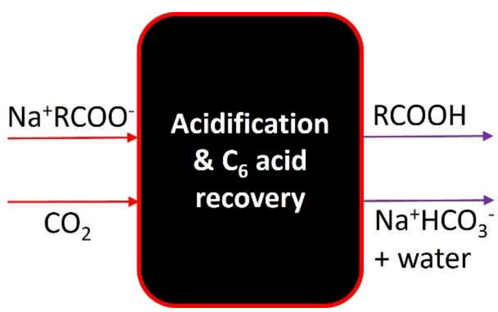

Figure: Hexanoate is adsorbed, and desorbed as hexanoic acid using CO_2.