LABORATORY FOR CHEMICAL TECHNOLOGY
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Coach	**Supervisor(s)**	**Funding**
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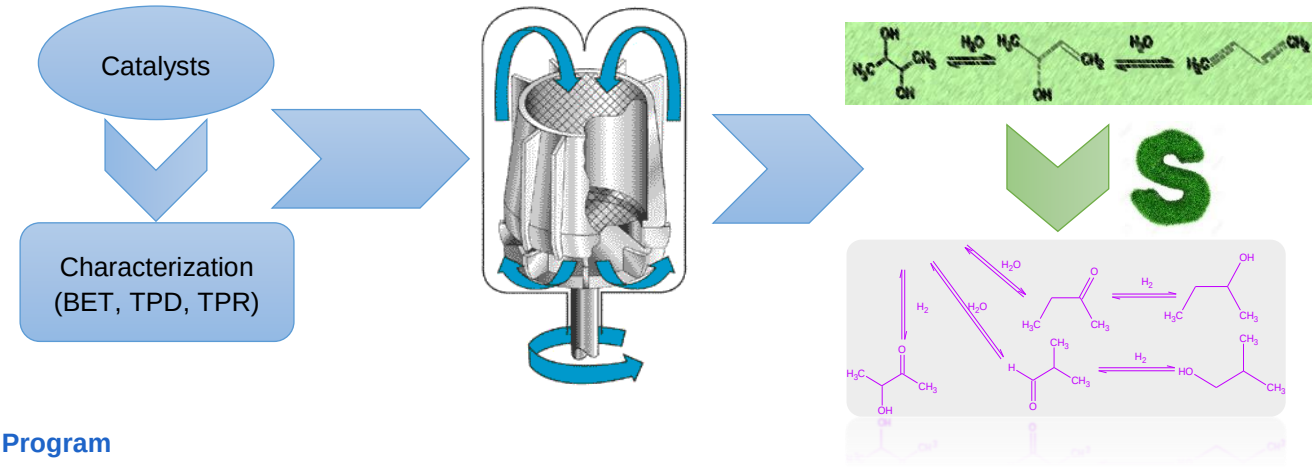
Experimental assessment of the selective dehydration of 2,3-butanediol into 3-buten-2-ol and 1,3-butadiene

Aim

Experimental assessment of the kinetics of the selective dehydration of 2,3-butanediol to 3-buten-2-ol on two or more alternative catalysts. Ultimately, a maximization of the 3-buten-2-ol yield will be targeted by optimizing the process conditions and catalyst properties.

Justification

Butadiene is the key building block for synthetic rubber production, polybutadiene (PB), acrylonitrile butadiene rubber (ABS) and styrene butadiene rubber (SBR), among others. Currently, butadiene is produced as a coproduct in the production of ethylene from naphtha cracking, but naphtha feed is recently being abandoned by replacement with shale gas which leads to significant decrease in the production of butadiene. Due to this reason along with environmental concerns, alternative bio-based production process starting from sugar or sugar derived feedstock are recently being considered. In the SPICY project, a collaboration between KU Leuven, UGent, UHasselt, BBEPP and VITO, the sugar will first be transformed to 2,3-butanediol which will be further converted to butadiene. In this process 2,3-butanediol will need to be selectively dehydrated to 3-buten-2-ol which will then be dehydrated to butadiene.



Program

- Literature survey on bio-based production processes of butadiene with the specific focus on properties of suitable catalysts for the selective dehydration of 2,3-butanediol to 3-buten-2-ol and consecutively to butadiene.
- Selection of suitable catalysts; assessment of expected performance by characterization of the catalyst.
- Testing of best candidate catalysts to determine performance and gain understanding of the mechanism.
- Maximize the 3-buten-2-ol yield by modifying the catalyst properties using the experimentally gained insights.