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Fakultät III Prozesswissenschaften
Institut für Prozess- und Verfahrenstechnik

Fachgebiet Dynamik und Betrieb technischer Anlagen

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Unser Zeichen:
KWT 9

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Master Thesis (Experimental)
Biogas utilization for ethylene production via Oxidative Coupling of Methane

Biogas is produced from biological treatment of organic waste, such as, agricultural, animal and urban waste. Its composition consists of 35-75% methane, 25-65% carbon dioxide, and minor quantities of water, ammonia hydrogen sulfide and hydrogen.

The Oxidative Coupling of Methane (OCM) is the catalytic conversion of methane (CH_4) into ethylene (C_2H_4). Ethylene is primarily produced by steam cracking and it is the building block for the manufacture of polymers and a vast range of chemicals. The OCM enables a shift from oil into feedstock such as natural gas or biogas. Unlikely conventional natural gas, biogas contains significant amounts of CO_2 and other trace gases. These gases are likely to interact with the catalyst, thereby influencing the catalytic behavior. The aim of our project is to develop a biogas-based OCM process and to assess its feasibility on an industrial-scale.

Objective:

Analyze the effect of different process parameters and the reaction mechanisms involved.

Tasks:

- Design and operation of a reaction system in a laboratory-scale.
- Study the relationship between factors that govern the OCM process (e.g. temperature, methane to oxygen ratio) and their effect into the catalytic performance and ethylene yield.
- Determine the optimum process parameters in maximizing C_2^+ yield.
- Comparison and evaluation of measured data and critical discussion of results.

Candidate's Profile:

- Field of study: Process/Chemical/Environmental engineering, or equivalent.
- Engagement and knowledge in the planning and execution of laboratory experiments.
- Knowledge of catalytic processes is desirable.

Start: February 2020

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