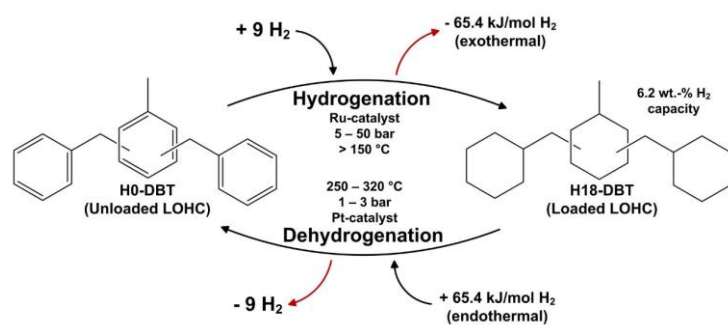


## Announcement for Research project

# Data-based Dynamic Modeling of a LOHC Dehydrogenation Reactor with Gaussian Process Regression

### Motivation

In times of climate change, a transition to renewable energies is taking place. One promising energy carrier in this context is hydrogen. To avoid its disadvantages in store and transportation, Liquid Organic Hydrogen Carrier (LOHC) technology is under constant development. In this process, the hydrogen is chemically bound into the LOHC (hydrogenation) and dissolved out again before further use (dehydrogenation).



Quelle: <https://hi-ern.de/hi-ern/h2Storage>

For the application of advanced control methods like model predictive control, a sufficiently accurate model description is needed. Due to the high complexity of the processes, methods from machine learning, like gaussian process regression (GPR), offer a promising approach to modeling.

### Task description

In this project, the dynamic system behavior of a LOHC dehydrogenation reactor is to be modeled. For this purpose, influences of different variables on the hydrogen release of the reactor are to be analyzed based on measured data. In the following, promising model approaches for system identification with GPR will be selected, implemented and applied. Finally, the different models are validated and compared with each other.

### Requirements

- Lecture: Machine Learning for Control Systems
- First experiences in MATLAB programming

Note that the thesis can be written in either English or German.

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