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1D numerical performance model of a PEM fuel cell

Task description

Creating a numerical performance model of a 1D PEM fuel cell to set the foundation for detailed degradation investigations

To support and enhance the ongoing development of increasing the lifetime of fuel cells in mobile applications, several paths of optimization need to be investigated. These paths can follow a material – based, design-based or operation-strategy-based optimization approach. All approaches require a proper, as physical as possible, description of degradation mechanisms and effects. To enable a mechanistic description of degradation processes, a reliable 1D performance model is of crucial first step.

The goal of this master thesis is to create such a 1D performance model of a PEM fuel cell, based on specific literature.

Knowledge of Matlab/Simulink (M/S) and basics in numerical methods are an advantage.

Assignment

- Getting familiar with fuel cell basics and selected publications (2 weeks)
- Research on suitable numerical methods and implementation in M/S (2 weeks)
- Implementation of 1D performance model in M/S (16 weeks)
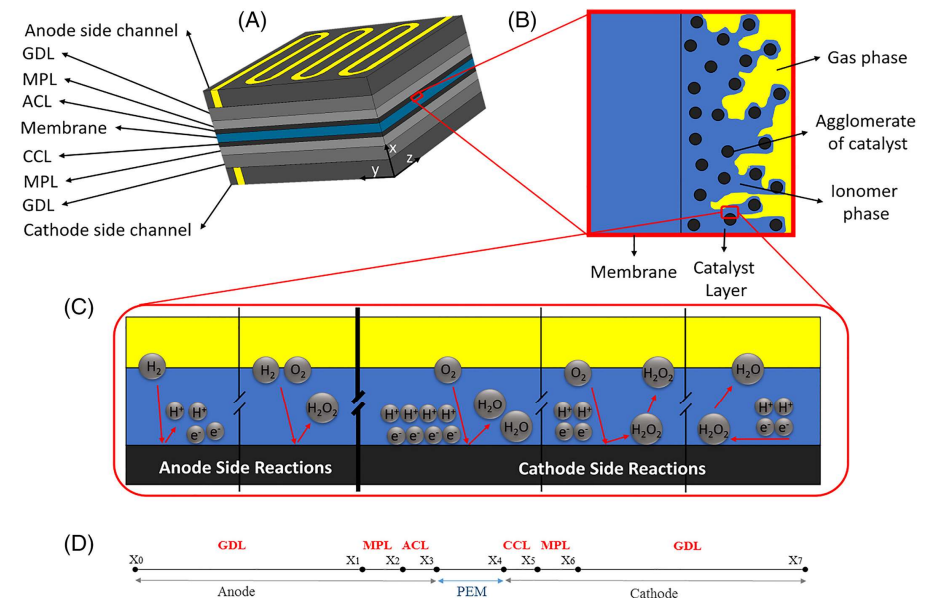- Writing of thesis report (4 weeks)

Start: as of now

Duration: ca. 6 months

Paid Master Thesis

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