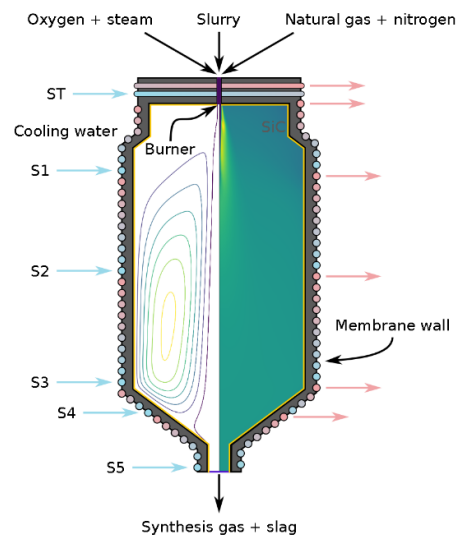


Master thesis

Mathematical modelling and simulation of thermal radiation

Motivation

High-pressure entrained flow gasification is an efficient technology for the conversion of low-quality carbonaceous feedstocks (such as biomass, plastic waste or tire waste) into high-quality synthesis gas, which can be used for the production of renewable liquid fuels and chemicals in a circular economy. The process exhibits high temperatures and large partial pressures of water vapour and carbon dioxide. Thermal radiation is thus the dominant mode of heat transfer and requires an appropriate mathematical description. Therefore, we are developing numerical models and programs for simulating thermal radiation.



Possible tasks

- Literature study
- Development of software packages based on existing source codes in Fortran, C and Matlab, for example, for automated derivation of FSK distributions
- Development of software methods for CFD (ANSYS Fluent and OpenFOAM)
- Application of the developed software to several, gasification-relevant gas conditions
- One-dimensional radiation simulations for selected gas conditions
- Verification of predictions with reference predictions
- Documentation

Contact

If you are interested, please send me an Email with a brief statement of your motivation. Please also include your study programme, your semester and an overview of your grades. If you have any questions, please do not hesitate to contact me.

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