

Master Thesis

Development of a dynamic pressure-driven model for air separation units

Most processes in the chemical industry rely on fossil raw materials, which serve both as feedstock and energy source and give the opportunity to operate in a static manner. This has resulted in the processes being optimised to a high degree for these conditions, but reach their limits as soon as dynamic boundary conditions are being introduced. These occur, for example, due to varying feed compositions or the provision of energy from renewable energy sources. The chemical industry is undergoing change. In the wake of political regulations, companies are being forced to adapt their processes to these new fluctuating conditions, which means that the predictable process control achieved through continuous (steady-state) operation is no longer possible. One process that is heavily dependent on a new dynamic process strategy is cryogenic air separation due to its low temperatures and highly dynamic system.

This Master's thesis forms part of an EU-funded project examining how chemical process plants can be operated under dynamic conditions. It involves developing a digital process twin for an air separation unit. First a steady-state model of the plant is developed and validated using real data. Thermodynamic properties for the substances must also be taken into account and verified. Building on this, work will begin on developing a dynamic model of the different process units and investigating various operating scenarios as well as optimisation strategies.



Topics: process simulation, air separation units, thermodynamic modelling, dynamic process modelling, gProms simulation software

Qualifications:

- Experience in process simulation software (e.g., Aspen plus) is desired
- German language skills are desired but not mandatory
- Ability to work independently as well as in a group environment
- Personal initiative and creativity in new fields of research; open to learning new things
- Critical thinking and interpretation, as well as presentation of research results



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Interested?

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