

Master's Thesis

Advanced Cycles for Adsorption Heat Pumps with Heat Recovery

Research Group and Project

Systems for heating and cooling of buildings comprising renewable energies are one research focus of the Institute for Fluid Machinery (FSM). In this context, advanced adsorption heat pump cycles are being investigated through simulations and experiments. A cycle concept, *Stratisorp*, where the adsorption heat pump is coupled with a stratified thermal storage, has been developed at the institute. Models for the various components as well the system have also been developed here.

Topic

The objective of this thesis would be to simulate advanced adsorption heat pump cycles for a new adsorber module, with activated carbon/methanol as the working pair, where a stratified thermal storage is used for internal heat recovery. In particular, a control strategy should be implemented which allows the decoupling of the storage and the use of alternate heat sources for short durations during the cycle.

Definition of the Project (modifications are possible)

- Familiarisation with the thermodynamics of adsorption cycles
- Identification of adsorber model parameters based on experimental data
- Simulation of the 'Stratisorp' cycle for this adsorber model
- Implementation of controls to decouple the adsorber from the storage
- Testing of control strategies to provide improved cycle performance

Requirements

- Working knowledge of programming in MATLAB
- Knowledge about adsorption or other thermodynamic cycles (preferred)

Start

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