Current Projects

Optimus
Development, optimization and application of PCM emulsions with high thermal storage density

In the “Optimus” project, we are working with industrial partners to develop new PCM emulsions for use in buildings and industry, for heat pump systems and for battery cooling in motor vehicles. We primarily use paraffins with melting temperatures suitable for these applications, which are dispersed or emulsified in water. The aim of the development is to achieve a high stability of these emulsions as well as to produce them on a large scale.

PCM Metro II
Dynamic behavior and aging of PCM components

The long-term stability of storage materials is one of the most important preconditions for successful application. In the PCM Metro II project, we are investigating different aging and analysis methods for accelerated aging of PCMs. In addition, we are developing models that enable the results of accelerated aging to be transferred to real applications. The aim of the work is a more efficient investigation of long-term stability without lengthy and costly experiments.

Further Information on Current Projects

Project website “Optimus”

Project website “PCM Metro II”

Cover image: Cost efficient modular latent storage system.

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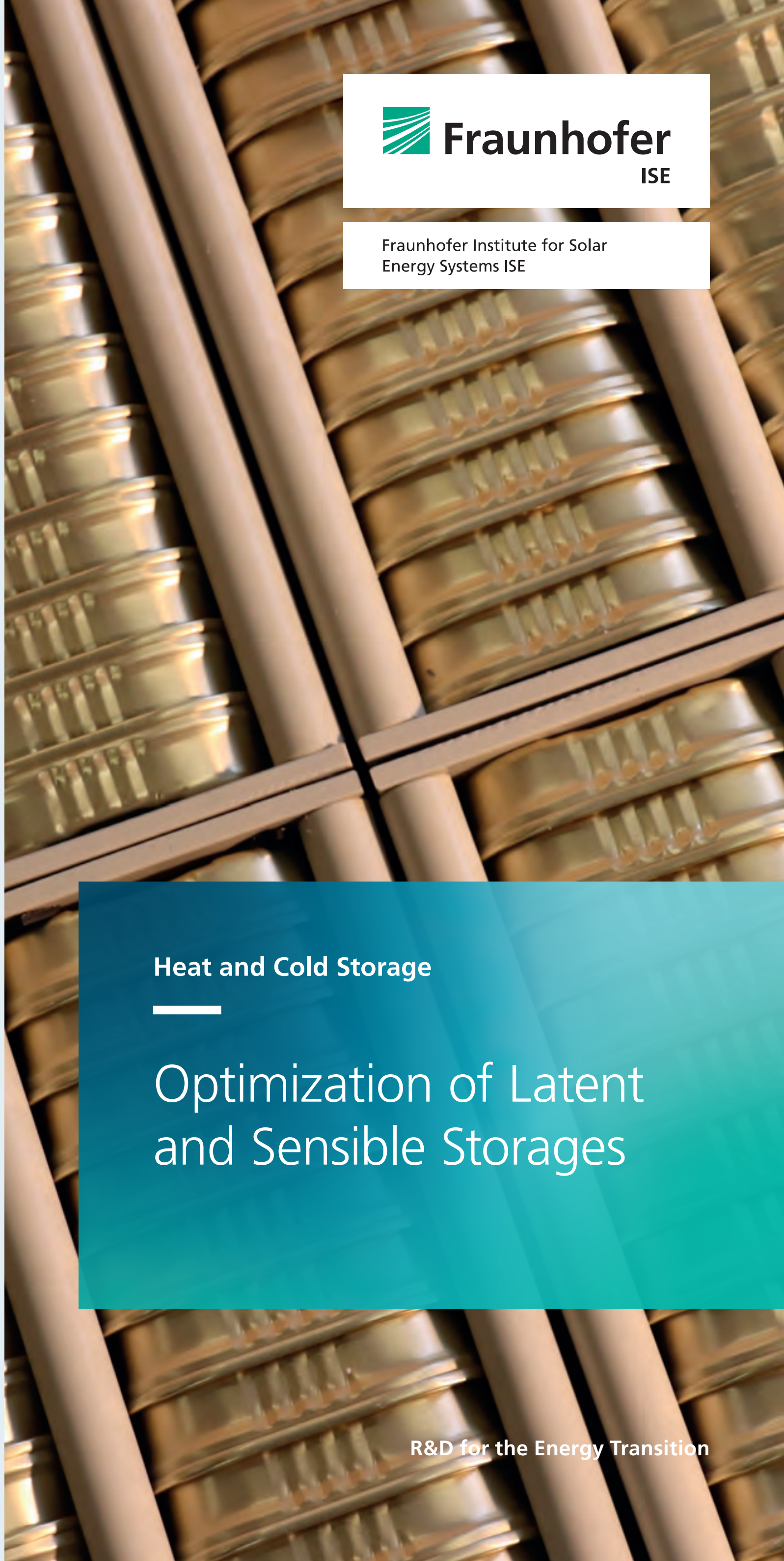

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Heat and Cold Storage

Optimization of Latent and Sensible Storages

R&D for the Energy Transition

Optimization of Latent and Sensible Storages

Thermal energy storage is essential for many applications in buildings, transport, medicine, engineering and industry. We develop, optimize and characterize new materials as well as new and existing components and assemblies for thermal storages and entire storage systems.

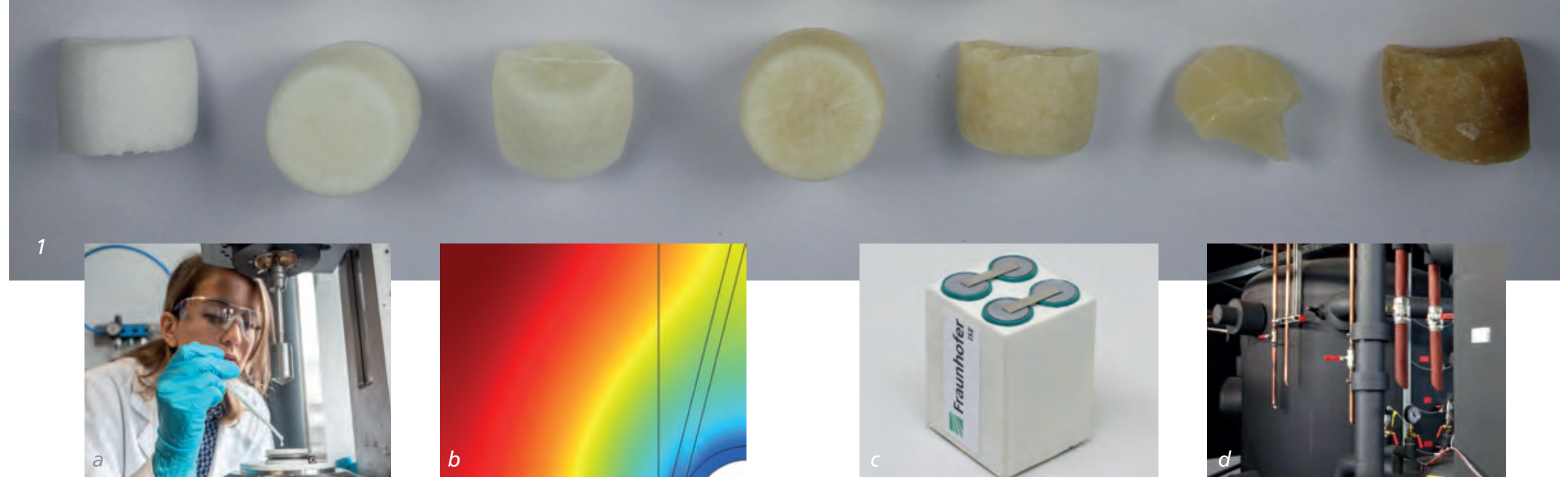
Our Offer

Heat Storage Materials, especially PCMs

- testing and characterization services (specific heat capacity, enthalpy of fusion, thermal conductivities, etc.)
- stability and degradation analyses
- development of PCM slurries
- micro- and macro-encapsulation of PCMs

Heat and Cold Storage Components and Systems

- development of heat exchanger systems
- integration in buildings, industrial processes and power cycles
- optimization of components for heat and cold storage with thermal simulation
- testing, characterization and evaluation of storage systems
- monitoring, analysis, evaluation and optimization of storage systems in the field
- failure analysis and predictive maintenance of systems



a: Viscosity measurement of phase change slurries; b: Simulated temperature distribution of PCM around a heat exchanger.

c: PCM composite for thermal management of batteries; d: Thermal energy storage tank in demonstration plant.

Development of Individual Materials and Components

In close cooperation with customers and users, we develop and optimize new materials for latent heat and cold storage also with the aid of molecular dynamics simulations. We also develop the corresponding components for integrating these materials into storage systems. One of our core competencies is the development of PCM (Phase Change Materials) slurries: Due to their high storage density, the storage volume can be significantly reduced with these fluids.

In addition to high storage density, we also aim for durability in our development work. For this, we have an extensive, state-of-the-art infrastructure for stability and degradation analyses and for characterizing PCMs in terms of their thermal and rheological properties.

1: Erythritol after thermal aging at constant temperatures above melting point after defined time intervals.

Development of Complete Storage Systems

For the optimization of heat exchanger solutions and encapsulation of PCM, we use different software tools (especially COMSOL Multiphysics, Modelica and ColSim) and have various facilities for testing, for example, the performance characterization of heat exchangers in the temperature range from -30 °C to 1400 °C.

Measurement setup for characterization of sensible storages.