

Individual heat management in the living room

BEST Day – Central European Biomass conference
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Definition of comfort

Individual human.

Activity, clothing, personnel preferences and behaviour



Air.

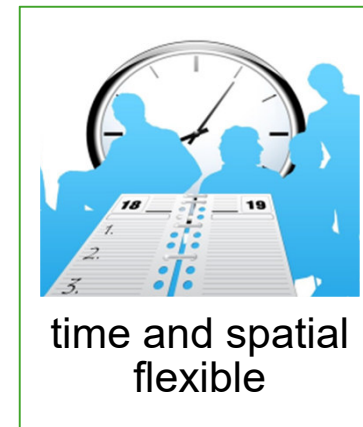
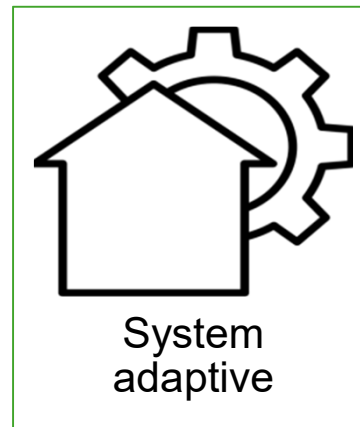
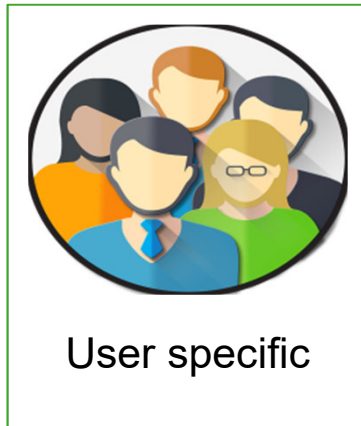
Temperature, velocity, humidity

Radiation.

Surface temperature, heat radiation, short wavelength radiation

picture: www.austroflamm.com

Requirements for heat management



Heat management for firewood room heaters



- **Radiation** via the front glass fastly dissipates heat released by the flames. The heat may be varied by coadings, appertures or by innovative electric shutters
- **Convection** allows spatial distribution of heat, the release occurs slightly time delayed. The heat released is depending on dimensioning of heat exchangers.
- **Heat storage** accumulates the heat and release it at a different time. Heat storage capacity, heat conductivity and mass of the storage material influence the amount and duration of stored heat.
- **New smart prediction models** and decision making support allow the user define mass of firewood and time for ignition to optimally adapt for their current needs.

Heat storage



sensible.

Heat is stored in the thermodynamical movement of molecules. The higher the temperature of the material, the higher is the stored energy.



latent.

Heat is used to induce a phase change of a material. E.g. from solid to liquid or from liquid to gaseous. The heat storage occurs at a constant temperature level.



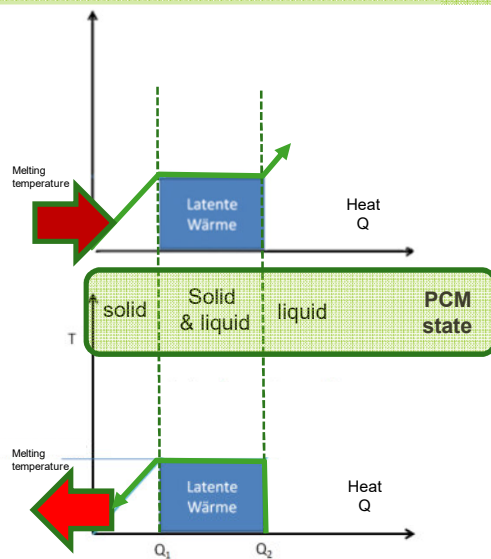
thermochemical.

Heat is stored in a reversible chemical reaction. As for example is the combination of zeolith and water. Water is absorbed on the surface and heat is released. When the zeolith is heated up, the water is desorbed again and the storage is ready for a new cycle.

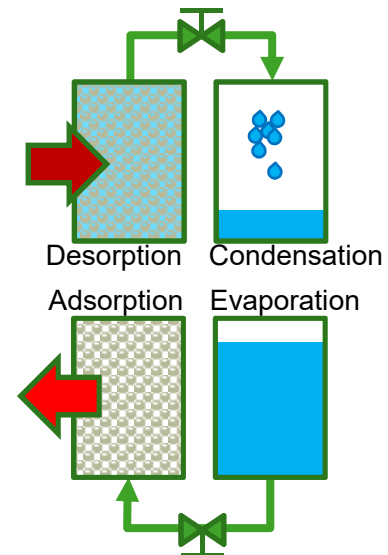
Heat storage release at the push of a button



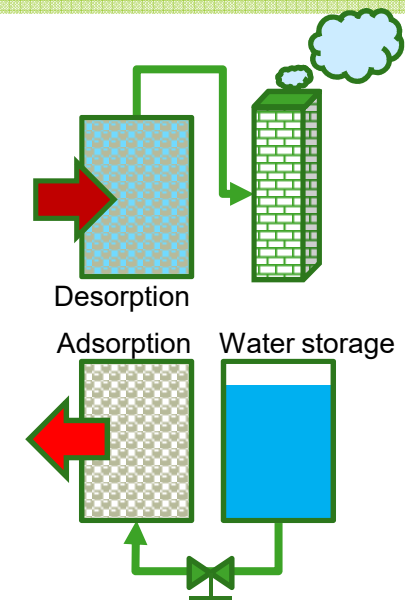
Phase change material.



Closed sorption storage.



Open sorption storage.



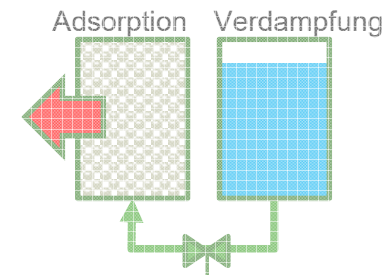
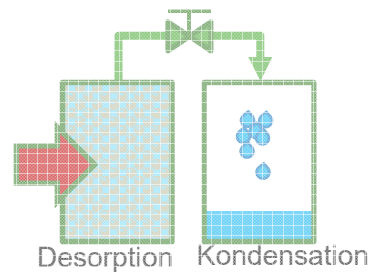
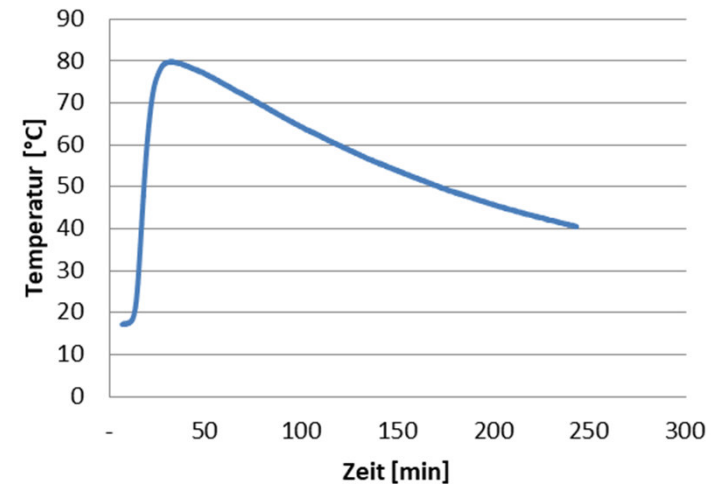
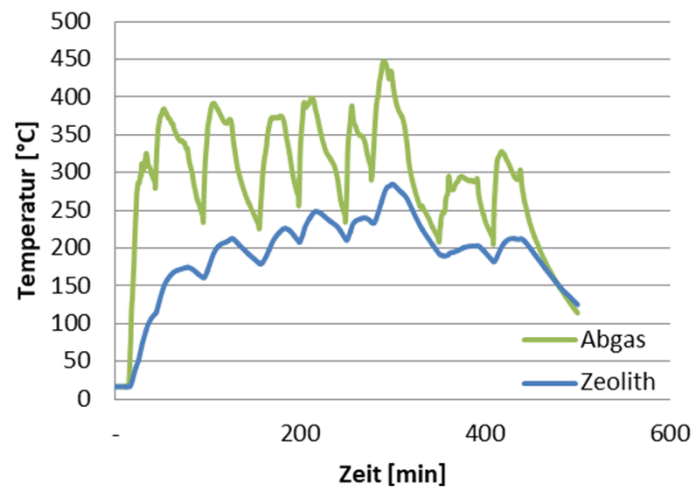
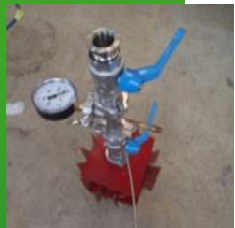
Heat storage release at the push of a button



Phase change material.	Closed sorption storage.	Open sorption storage.
Energy density		
Up to 120 Wh/dm³	Up to 200-500 Wh/dm³	Up to 75 Wh/dm³
Working temperature (storage– release)		
Max. 120 °C / 50-70°C	Up to 300 °C / Up to 100°C	
Heat release process		
Upon push of a button	adjustable	
Heat storage process		
No stop until all PCM is molten	Variable and accumulative	



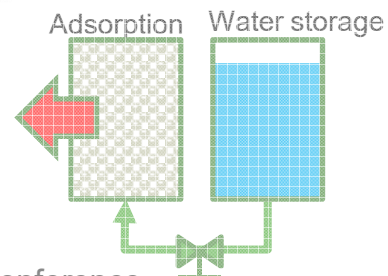
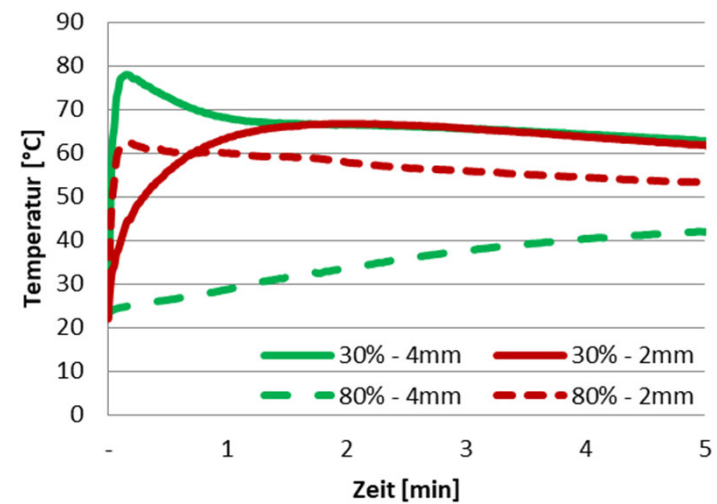
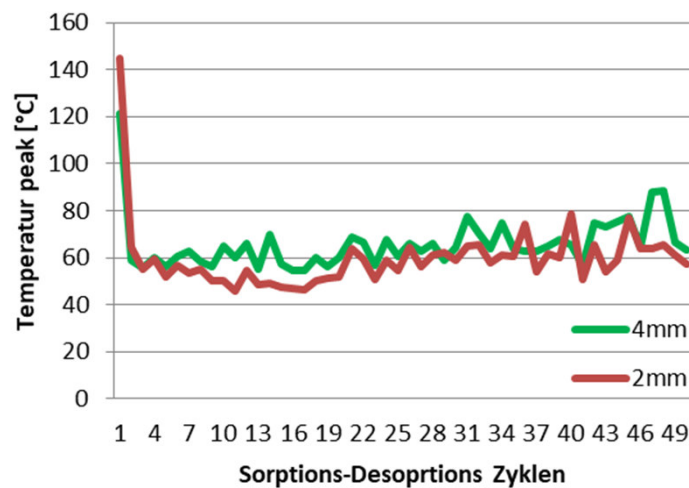
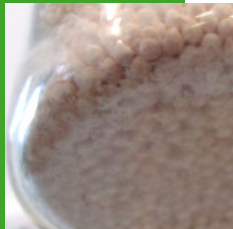
Closed sorption storage test appliance for release and storage process





Open sorption storage

Laboratory-Tests with 2 differen Zeolith-sizes



Conclusions



- Innovative technologies for heat storage allow **time independent and fast responding** heat release
- Efficient heating needs an **effective heat management**
- Heat management describes the **adaptive heat release** on the individual heat demands



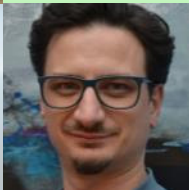


AUSTRO
FLAMM

**Thanks for
your attention.**

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Ein Fonds der
Stadt Wien

