CATCH, TRANSPORT & RELEASE HEAT - VERSATILE, POLYSACCHARIDE-BASED COMPOSITE MATERIAL FOR WATER & HEAT STORAGE

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HINTERGRUND

Energy storage, particularly heat, is a major issue in the sustainable energy landscape. Many Industrial processes, as well as private applications, demand important optimization steps in order to minimize energy waste.

A number of materials are currently used as storage medium, including water, zeolites or phase-change materials (PCM). Due to the increasing demand for higher capacity, these solutions show some limitations in terms of performance.

We are introducing a new hydrogelderived composite material for thermochemical heat storage and fresh water extraction from air. Our innovative material reversibly absorbs and releases heat through a chemical reaction: hydration/dehydration of salts, suggesting a robust alternative to current solutions.

LÖSUNG

This innovative composite polymer for thermochemical heat storage is based on a polysaccharide matrix embedding absorbing salt particles.

A versatile synthesis route allows creating a material with different thermochemically active salts. Particle size can be adapted, to adjust the hydration/dehydration kinetics. This facilitates full adaptability of the material to different applications. The particles can be obtained in spherical beads of 1-5 mm in diameter, making it ideal for a packed bed application.

A very efficient water exchange is achieved through a highly porous structure that contains up to 90 wt.-% of absorbing material. Based on a chemical reaction, the heat storage capacity is manifold higher than that of zeolites or PCM, achieving, at the current development status, >1,2 GJ/m³. The material can be charged with heat at temperatures between 100 and 200°C.

Depending on the reaction conditions it is possible to absorb up to 0.9 g of water...
per gram of composite.

Final composite material with beads in the size of 2 mm. Different salts can be incorporated depending on the required application conditions

**VORTEILE**

Our material can be used in numerous processes that require heat storage over flexible periods of time. Industrial and residential cooling and heating processes, optimization of energy consumption and drinking water production and
purification are some relevant uses for this material.

An excellent performance is ensured by relevant features, which have been experimentally tested.

- Simple, robust & flexible synthesis
- Inexpensive feed stock
- No energy-demanding synthesis steps
- High water & heat storage density
- Adaptability to numerous applications
- High cycle stability
- Toxicologically non-hazardous

**ANWENDUNGSBEREICHE**

- Industrial & residential heat storage
- Energy sector
- Industrial & residential water harvesting & purification

**SERVICE**

- R&D Cooperation
- Transfer of rights
- Licensing