Simulation calculation of phase change energy storage device

The structural optimization method outlined in this paper offers a cost-effective approach to accurate prediction results, demonstrating practical engineering implications for ...

Finally, the challenges and future developments in the solution methods, theoretical models, and numerical simulation applications of phase change materials are ...

e change behavior is essential for the design and evaluation of systems with PCM. This paper proposes an accurate phase change model that is integrated into the commonly used thermal ...

In this paper, the thermal energy storage characteristics of a packed bed thermal energy storage device (PBTESD) filled with spherical phase change capsules are analyzed. ...

Abstract Two sequentially integrated LHTES devices based on paraffin waxes (PW), PW-L and PW-H with different phase change temperature ranges are numerically ...

Solid-liquid phase change materials (PCMs) have been studied for decades, with application to thermal management and energy storage due to the large latent heat with a ...

Phase change energy storage devices are extensively utilized in latent heat thermal energy storage and hold significant potential for application in the thermal ...

Latent thermal energy storage (LTES) utilizing phase change material (PCM) represents an important energy-balancing technology. This paper develops a numerical model ...

Firstly, the heat transfer characteristics of the heat storage and heat release process of the phase change storage device under different temperature and flow conditions ...

A numerical transient three-dimensional heat transfer investigation of a hybrid PCM based heat sink cooling technique was presented in this study. Thermal energy was ...

Thermal energy storage systems (TESS) have emerged as significant global concerns in the design and optimization of devices and processes aimed at maximizing energy ...

Abstract In order to study the heat transfer characteristics of the plate-type phase change energy storage unit, the Fluent Enthalpy method was used to simulate the heat storage ...

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The results will provide reference for the application of large heat storage. To solve the imbalance between energy supply and demand, it is necessary to explore the heat ...

Phase change materials (PCM) play an important role in energy storage, conversion, saving and utilization. In this paper, the Al-Cu-Si alloy PCM is selected for WHR. ...

In this paper, an energy storage interconnected heat pump system is proposed. Numerical simulation is performed to investigate the melting and solidification processes of ...

Abstract This work concerns performance enhancement of phase change material (PCM) based thermal energy storage (TES) devices for air-conditioning applications. Such ...

Thermal energy storage (TES) applications have significantly increased because of changes in energy price and changes in environmental regulation. TES units can work as a ...

Abstract and Figures Through simulation calculations, the cooling process of the phase change cold storage device in the carriage of rail vehicles under natural convection ...

Multiple thermal storage units are stacked to create the heat exchanger. Experimental validation of the heat transfer performance of this thermal energy storage heat ...

Abstract Given that the performance of the phase change thermal storage device (PCTSD) is limited by the low thermal conductivity of the phase change material, more ...

Latent heat thermal energy storage systems (LHTES) in the field of solar thermal utilization have been extensively studied [2]. Phase change materials (PCMs) are distinguished ...

However, the thermal conductivity of medium and low temperature phase change materials is poor, leading to its inefficient utilization. This paper focuses on optimizing ...

As the core of the phase change energy storage technology, the heat transfer per-formance of the phase change energy storage unit has an important impact on the operating eficiency of the ...

The packed-bed latent thermal energy storage system (PLTES) is the key to ensuring stable and effective energy output in the process of resource utilization. It has great ...

A numerical model based on the enthalpy method for solidification/melting that incorporates liquid-phase convection was established for a shell-and-tube phase-change ...

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