Jiang energy storage heat exchanger

How effective is a heat exchanger?
As mentioned in Section 2.5,the effectiveness of heat exchanger is usually regarded as an ideal valuein previous studies,that is,it is set to be equal in energy storage and energy release phases and is not affected by other parameters.

How does pressure affect heat exchanger performance?
The pressure lossin the effectiveness of heat exchanger also affects heat exchanger performance. In addition,due to changes in the pressure in compressed air storage during energy storage and release process and changes in operating conditions,the air mass flow also changes,which also leads to changes in the effectiveness of heat exchanger.

Do enhanced heat transfer techniques improve the performance of heat exchangers?
The adoption of enhanced heat transfer techniques enhances the performanceof the heat exchangers thereby enabling energy saving. The review paper is organized as follows: Section 2 explains the designs and constructions of double pipe,plate heat exchangers,and extended surface heat exchangers.

Can compact heat exchanger design overcome PCM thermal conductivity limitations?
Results show that reducing the PCM-encasement thickness yields substantially better performance than by improving the thermal conductivity,thereby demonstrating the potentialfor compact heat exchanger design to overcome the PCM thermal conductivity limitations. 1. Sol. Energy Mater.

What are heat exchangers used for?
Among thermal systems, heat exchangers (HEXs) find extensive applications in various domains, including domestic, industrial, and commercial purposes [7, 8]. Heat exchangers facilitate the efficient exchange of heat between two or more fluids characterized by different temperatures, all while preventing the mixing of these fluids [9, 10].

How does a heat exchanger work?
Internal fins are positioned inside the heat exchanger tubes, thereby increasing the surface area available for heat transfer within the fluid. These fins are in direct contact with the fluid flowing inside the tubes, promoting efficient heat exchange as displayed in Fig. 8, Fig. 9.

Liquid cooled microchannel heat exchanger has absolute advantages in solving the heat dissipation problem for high heat flux. For example, a cross flow plate heat exchanger [20], tube in tube heat exchangers [21], new N-type microchannel heat exchangers [22], double-layer tree microchannel heat exchanger [23], double-layer horizontal microchannel radiators ...

(LTES),,? , ...

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This paper introduces a novel solar-assisted heat pump system with phase change energy storage and describes the methodology used to analyze the performance of the proposed system. A mathematical model was ...

@article{Jiang2024ExperimentalAN, title={Experimental and numerical study on the attenuation and recovery characteristics of ground temperature during deep-buried pipe heat transfer}, author={Chao Jiang and Chao Li and Zilong Jia and Gaozhe Xing and Yanling Guan and Ruitao Yang and Jiale Wu}, journal={Energy and Buildings}, year={2024}, url ...

Compressed air energy storage (CAES) is a large-scale physical energy storage method, which can solve the difficulties of grid connection of unstable renewable energy ...

HEAT EXCHANGERS FOR THERMAL ENERGY STORAGE The ideal heat exchanger... What are the requirements? o Big increase in exchanger enquiries for Long Duration, High Capacity energy storage (10"s/100"s MWhrs) o Such exchangers require 1,000"s m² of heat transfer area plus many (if not all) of the following: 1.

As shown in Fig. 1, this system is composed of solar collector (solar energy evaporator), a heat exchanger (air-source evaporator), a compressor and a PCM energy storage condenser. The system can operate in different modes which includes solar heat pump mode, air source heat pump mode, energy storage heating mode and energy storage defrosting mode.

Results show that reducing the PCM-encasement thickness yields substantially better performance than by improving the thermal conductivity, thereby demonstrating the ...

The yawing and heaving motion can impact the heat transfer performance of the exchangers within the power generation system. The additional inertial forces introduced by different movement patterns alter the two-phase flow heat transfer characteristics within the exchanger [], thereby affecting its performance.Particularly in harsh marine conditions, ...

In this study, we have established an experimental platform featuring a shell and tube heat exchanger (STHE) combined with phase change material (PCM) to investigate its ...

Read the latest articles of Journal of Energy Storage at ScienceDirect , Elsevier"s leading platform of peer-reviewed scholarly literature ... Yu Jiang, Qunting Qu, Linze Lv, Jie Shao, ... Honghe Zheng. Article 110403 ... select article Real-time outdoor experiment and performance analysis of dual-coil heat exchanger integrated thermal ...

An air flow channel on the side of the battery pack serves as the heat exchanger, where air could be blown through the finned condenser using fans. ... Numerical study of finned heat pipe-assisted thermal energy storage system with high temperature phase change material. Energy Convers Manage, 89 (2015), ... B. Jiang, Q. Xue, H. Sun, B. Li, H ...

The spiral fin-and-tube heat exchanger is a widely used heat transfer device in heating and cooling applications, and its performance is influenced by multiple structural parameters, including the ...

-PM2.5 formation mechanism in complex air pollution in China -Energy efficiency in industry -heat transfer -Waste heat recovery -Energy storage

For these reasons, solar energy cannot provide with a continuous and stable heat source, and therefore, it is essential to introduce an efficient and reliable thermal energy storage system [2]. At present, the main thermal energy storage types include sensible heat thermal energy storage (SHTES), LHTES, thermochemical thermal energy storage [3].

The heat transfer enhancement of microencapsulation phase change material, latent heat emulsion, and the heat transfer enhancement of thermal storage heat exchanger such as shell and tube, plate and spiral coil heat exchanger.

The results indicated that the heat exchanger with square fins can significantly improve the heat storage rate and shortened the complete melting time of PCM. Compared with heat exchangers without fins, the melting time of PCM in a 40 mm equidistant fin heat exchanger was shortened by 15.85%, and that in a 70 mm, non-uniformly spaced fin heat ...

Latent heat thermal energy storage (LHTES) has received more and more attention in the thermal energy storage field due to the large heat storage density and nearly constant temperature during ...

Integrating heat pumps with high-efficiency latent heat thermal energy storage systems with phase change materials (PCMs) can increase the heat temperature and heat ...

Jianguo Jiang: Investigation, Resources, Validation, ... Changing the inner tube shape proves to be an effective method to enhance the efficiency of horizontal latent heat thermal energy storage exchangers (H-LHTES), which can improve the heat transfer efficiency of exchangers. This paper proposed an I-beam inner tube exchanger, which contained ...

Compact heat exchangers provide many benefits to long term energy storage, but more is still needed... o Further increases in plate length will help with efficiency (but may ...

Integrating heat pumps with high-efficiency latent heat thermal energy storage systems with phase change materials (PCMs) can increase the heat temperature and heat quantity, enabling flexible heat regulation and cascade utilization. ... B. Xie, S. Du, R. Wang, X. Kou, J. Jiang and C. Li, Energy Environ. Sci., 2024, 17, 6943 DOI: 10.1039 ...

In this comprehensive review, a thorough analysis of recent literature has been undertaken to explore the latest

advancements in tubular, plate, and extended surface heat ...

Fig. 10 presented the profiles of the temperature in cold storage heat exchanger with time. It could easily be found from Fig. 10 that there were four stages of the temperature variation in cold storage heat exchanger, namely (1) primary cooling stage, (2) freezing stage, (3) secondary cooling stage and (4) constant temperature stage. In the ...

An experimental and numerical study on the energy storage and release performance of shell and tube heat exchangers with phase change material for the data center Applied Thermal Engineering (IF 6.1) Pub Date : 2024-07-18, DOI: 10.1016/j.applthermaleng.2024.123966

The excellent heat transfer behaviour and thermal energy storage ability have made them an ideal energy transfer and storage medium in concentrated solar power generation, peak shaving of power grids, effective use of curtailed wind energy, and waste heat recovery and utilization [30]. However, in some special applications, a mixed molten salt ...

They are: (1) the lack of methodology for heliostat design and field layout optimization, (2) significant performance degradations of solar-thermal conversion, heat storage and transfer in receiver and thermal energy storage due to high temperature, (3) the lack of suitable supercritical CO 2 (S-CO 2) Brayton cycle for CSP and mature design ...

Non-supplementary Fired Compressed Air Energy Storage System (NF-CAES) consists of compressor, turbine, gas storage chamber, heat exchanger equipment, such as the complementary combustion type compressed air energy storage system is an important link in the thermal efficiency of heat exchanger. Tube heat exchanger as the research object, builds ...

The reverse cycle defrosting method is applied and the fan of the indoor heat exchanger is shut down. The refrigerant out of the compressor flows through the outdoor heat exchanger, throttle valve, the heat storage pipe in the PCM-HE, valve F4, the gas-liquid separator and finally back to the suction of the compressor. Fig.8.

Heat transfer enhancement measures of the slab type, packed bed, and tube-and-shell TES heat exchangers were discussed for TES devices. Besides, TES systems based on latent heat storage and thermal ...

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