

heat transfer area of the energy storage material and the heat pipe, hence improving the heat transfer efficiency between them two. Four collector tubes, each with an absorber section of 0.42m ...

Wei et al. [24] constructed a two-stage sensible heat storage system and phase-change heat storage system by extracting the main steam and reheated steam, and the influence of the heat distribution in the TES system was analyzed. Using the main steam or reheated steam as the heating source to heat the molten salt can improve the flexibility of ...

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 established for the key parts of the system including solar evaporator, condenser, phase change energy storage tank, and compressor. In parallel ...

The total floor area in China is $644 \times 10^8 \text{ m}^2$ at present, and its energy demand accounts for about 28% of the total energy use [1,2]. The district heating area in China reached $122.66 \times 10^8 \text{ m}^2$...

DOI: 10.1016/j.est.2023.106785 Corpus ID: 256749600; Numerical investigation of a plate heat exchanger thermal energy storage system with phase change material @article{Taghavi2023NumericalIO, title={Numerical investigation of a plate heat exchanger thermal energy storage system with phase change material}, author={M M Taghavi and Minna ...

PCM based heat exchanger was also widely investigated in refrigeration systems. Vakilaltojjar et al. presented a semi-analytic solution model for flat plate type phase change heat accumulator, and pointed out that the thickness reduction of the PCM could improve the energy storage efficiency [8]. As a continue work, Vyshak et al. numerically studied the heat ...

The maldistribution of working medium restricts the heat transfer performance of the spiral-wound heat exchangers (SWHEs), especially when the heat exchangers are applied in floating production ...

1 Introduction. Up to 50% of the energy consumed in industry is ultimately lost as industrial waste heat (IWH), [1, 2] causing unnecessary greenhouse gas emissions and ...

Ying Jiang, Nan Guo, Feilong Dong, Haiming Xie, Jun Liu. Article 108809 View PDF. Article preview. ... Latent heat thermal energy storage in a shell-tube design: Impact of metal foam inserts in the heat transfer fluid side ... Natural convection heat transfer analysis of a nano-encapsulated phase change material (NEPCM) confined in a porous ...

The experimental platform system for the energy storage performance testing of the shell-and-tube phase change energy storage heat exchanger studied in this article is mainly composed of a heater, constant

temperature water tank, pumps, electromagnetic flowmeter, shell-and-tube phase change heat exchanger, thermocouple, and data acquisition and ...

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 ...

In this paper, the three-dimensional numerical simulation of the phase change heat transfer process in the square-finned concentric tube heat storage exchanger was carried ...

This paper proposes an air source heat pump (ASHP) system integrated with a latent heat thermal energy storage (LTES) unit based on a specially-designed heat exchanger, condensing heat storage ...

A printed circuit heat exchanger (PCHE) is a compact heat exchanger with the surface area density reaching $2500 \text{ m}^2/\text{m}^3$ [1]. A heat exchanger with surface area density larger than $700 \text{ m}^2/\text{m}^3$ or hydraulic diameter no larger than 6 mm for gas as at least one of the working fluid, and over $400 \text{ m}^2/\text{m}^3$ for multi-phase flows or liquid as the working fluid can be ...

As a zero-pollution and zero-carbon emission energy source, hydrogen storage technology [1, 2] plays a crucial role in promoting the widespread use of renewable energy and addressing the challenges of mismatch between energy supply and demand. Among the various hydrogen storage methods, metal hydride hydrogen storage has emerged as the contemporary ...

In this way, different heat storage conditions are reflected as a combination of different inlet water temperatures and durations in buried pipes. As shown in Fig. 1, water circulating in the solar collector passes through the dividing wall heat exchanger and heats water in the heat storage tank during the storage period. The circulating water ...

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MA Suxia, Jiang Yongming, and Wen Bo. "Experimental study on the performance of the ASHP with phase change thermal storage evaporator." *Acta Energiae Solaris Sinica*, 36 (3) (2015): 604-609. ... [17] Dong Jiankai, Li Lu, and Jiang Yiqiang. "Effect of two kinds of phase change materials heat exchanger on energy storage performance ...

More commonly, researchers analyze the performance of CBHEs over a period of one year, with total operational times extending up to decades. The employed methods cover a wide range of numerical approaches, including: COMSOL, used by Priarone et al. [8] to study fluid temperature changes; Commercial programs like Earth Energy Design and Ground Loop Heat Exchanger ...

Sorption thermal energy storage is a promising technology for effectively utilizing renewable energy, industrial waste heat and off-peak electricity owing to its remarkable advantages of a high ...

DOI: 10.1016/j.energy.2020.118346 Corpus ID: 224886266; Effective waste heat recovery from industrial high-temperature granules: A Moving Bed Indirect Heat Exchanger with embedded agitation

In concentrating solar power systems, for instance, molten salt-based thermal storage systems already enable a 24/7 electricity generation. The use of liquid metals as heat transfer fluids in thermal energy storage systems enables high heat transfer rates and a large operating temperature range (100°C to >700°C, depending on the liquid metal).

Experimental Study on Heat Transfer Enhancement of Phase Change Material using Embedded Oscillating Heat Pipe for Thermal Energy Storage C Liu, Z Ma, R Jiang, J Qu, Z Rao ISIJ International 60 (10), 2157-2164, 2020

Semantic Scholar extracted view of "Comparative study of thermally stratified tank using different heat transfer materials for concentrated solar power plant" by Tielu Jiang et al. ... This work evaluates the influence of combining twisted fins in a triple-tube heat exchanger utilised for latent heat thermal energy storage (LHTES) in three ...

Jiang et al. [64] Buildings: ... Bouzidi et al. [125] investigated how to improve heat transfer and thermal energy storage rates by an anisotropic layer of metal foam. Heterogeneity angles ranging from -90°; or +90°. It was found that the most effective case was 0°; heterogeneity angles, the charging time and discharging time were 623 and ...

Non-supplementary Fired Compressed Air Energy Storage System Ping Jiang, Ranran Chang a and Haijian Lv. College of Electronic and Informational Engineering, Hebei University, Baoding 071002, China. ... The model of NF-CAES system using heat exchanger storage of compressed air, the cooling water as the heat storage medium, cooling after high ...

To address this challenge, researchers and scientists have developed methods that encompass the convection of various fluids, including water, air, organic and inorganic oils, ...

Abstract. Phase change materials (PCMs) are promising for storing thermal energy as latent heat, addressing power shortages. Growing demand for concentrated solar power systems has spurred the development of latent thermal energy storage, offering steady temperature release and compact heat exchanger designs. This study explores melting and ...

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