

The heat pipe and PCM were used for solar thermal electricity production and energy storage [17]. The heat pipes were studied with various angles, wick construction and operational fluid [18,19]

Heat pipes and thermosyphons--devices of high effective thermal conductivity--have been studied for many years for enhancing the performance of solid, liquid and phase change material (PCM) heat stores. However, as the applications of heat storage widen, from micro-electronics thermal control to concentrated solar heat storage and vehicle thermal ...

Thermal energy storage can be accomplished by changing the temperature or phase of a medium to store energy. This allows the generation of energy at a time different from its use to optimize the varying cost of energy based on the time of use rates, demand charges and real-time pricing. Utility incentives could also be available to reduce the ...

Khalifa et al. investigated numerically and experimentally the thermal behaviour of latent heat thermal energy storage systems (LHTES) that utilized heat pipes for solar electric ...

The heat pipe is an efficient transfer element that has been used in battery thermal management [24, 25]. Wang [26] designed a TMS based on heat pipes to realize cooling and heating functions. The experimental results showed that cells can be heated from -15°C and -20°C to 0°C in 1200 and 1500 s, respectively, by using hot fluid with a ...

Using thermochemical reactions in thermal energy storage systems. Marc Linder, in *Advances in Thermal Energy Storage Systems (Second Edition)*, 2021. 16.2.1 Chemical heat pipe. Since both reactors (Exo/Endo, Fig. 16.3) operate at elevated temperatures, the leaving product(s) are hot and contain a certain amount of sensible heat. However, by means of additional heat ...

In various latent heat energy storage designs, the double-pipe system increases the heat transfer area by capitalising on the annular space between two concentric cylinders, thereby achieving higher thermal efficiency. Seddegh et al. [32] conducted a study on the thermal behaviour of vertical and horizontal shell-and-pipe LHTES. The results ...

heat pipe. LCTES. latent cold thermal energy storage. NTU. number of heat transfer unit. PCM. phase change material. TES. thermal energy storage. Symbols A. area (m^2) c p. specific heat capacity ($\text{kJ kg}^{-1} \text{ }^{\circ}\text{C}^{-1}$) d. diameter (m) h. heat transfer coefficient ($\text{W m}^{-2} \text{ K}^{-1}$) k. thermal conductivity ($\text{W m}^{-1} \text{ K}^{-1}$) k eq. effective thermal ...

Heat pipe based cold energy storage systems for datacenter energy conservation. *Energy*, 36 (5) (2011), pp.

2802-2811, 10.1016/j.energy.2011.02.021. View PDF View article View in Scopus Google Scholar [39] Y.H. Zhao, K.R. Zhang, Y.H. Diao. Heat Pipe With Micro-Pore Tubes Array and Making Method Thereof and Heat Exchanging System

heat thermal energy storage systems have the benefit of saving a high amount of thermal energy with a low-temperature swing. Still, they have a low thermal conductivity, which impacts their performance significantly. As a result of these conditions, interest in heat pipe applications on land has grown in recent years. The heat pipe (HP) is an efficient

Heat Pipe (HP), as a high efficient heat transfer device with excellent characteristics such as compact structure, flexible geometry and long service life, has been widely used in thermal energy storage system [27], [28] and electronic thermal management [29].

The thermal energy storage system in this study consists of a square container, finned heat pipes, and potassium nitrate (KNO_3) as the phase change material. The charging process of the same thermal energy storage system was reported in ...

The heat preservation performance of the combined energy storage pipeline was evaluated by numerical simulation. This paper analyses the heat transfer performance of complex energy storage pipes, and considers the influence of natural convection and variable temperature zone on insulation performance. On this basis, the structure design of ...

"Thermal Energy Storage" published in "Solar Thermal Energy" Skip to main content . Advertisement ... This system is called chemical heat pipeline or chemical heat pipe. Thermochemical storage by heterogeneously catalyzed gas phase reactions has been demonstrated for the catalytic dissociation of ammonia in a 15 kW solar reactor by the ...

Thermal energy storage is a distinguishing component of a concentrating solar power (CSP) system, which enables uninterrupted operation of plant during periods of cloudy or intermittent solar availability. Latent thermal energy storage (LTES) which utilizes phase change material (PCM) as a heat storage medium is attractive due to its high energy storage density ...

1. Introduction. As the electronic technology developing rapidly, the miniaturization and integration of electronic parts and components have become irreversible, leading to the continuous increase of power density per unit volume of electronic chips [1], [2]. Particularly, in some extreme situations, such as high-energy equipment, which generates ...

The novel concept of heat pipe based cold energy storage system has been experimentally tested at Fujikura facility located in Aomori in Japan. Fig. 10 (a and b) shows the details of the heat pipe based cold storage module and the experimental test facility at Fujikura. The heat pipe module was made of stainless steel with aluminium fins and ...

Heat pipe energy storage

Heat pipes have been used extensively in a variety of energy storage systems. They are suited to thermal storage systems, in particular, in the role of heat delivery and ...

This paper presents a conceptual design of a mobile nuclear-electric hybrid energy storage system based on the heat pipe-cooled reactor, which is finally applied to a power supply vehicle (PSV) solution. The design is able to meet the self-sustaining movement of the vehicle and can achieve a maximum output power of 350 kWe. The system ...

The cold energy storage power of single heat pipe of the former is more than 53.0% than the latter, the energy storage density and ice packing factor are still higher than 51.8% and 51.1%, respectively, even if its volume flow rate is less than the latter. This is due to the high thermal conductivity performance of the former and the surface ...

Proposed heat pipe-based energy Storage system gave 186% enhancement in melting and solidification time of PCM as compared with solid copper rod. Naghavi et al. [85] designed solar water heating system by combining the heat pipe and PCM. In their setup, heat pipe was used to transfer heat from solar collector to PCM storage unit.

Hybrid HP-PCM behavior has received limited attention. Faghri [31], [32] patented methods to incorporate HPs into PCMs for application in thermal energy storage systems and heat exchangers. Horbaniuc et al. [33] modeled the solidification of a low-melting-temperature PCM surrounding a longitudinally-finned HP. Their analysis considered the two-dimensional ...

The thermal efficiency (η) of such a system is defined as the ratio of heat transfer rate (q) over the product of collector gross area (A_c) and the total global solar radiation (G_t) on the surface of the collectors [28]. The results from experimental work showed an efficiency improvement of 26% for the normal operation and 66% for the stagnation mode compared to ...

Tamuli et al. [176] conducted a numerical study in Silchar for the thermal characteristics of solar water heaters integrated with heat pipes and thermal energy storage materials. Apart from this, an upgraded version of solar applications is a loop heat pipe-based solar water heating system used for conventional solar water heating and ...

Heat pipes and thermosyphons--devices of high effective thermal conductivity--have been studied for many years for enhancing the performance of solid, liquid and phase change material (PCM) heat ...

A finned heat pipe-assisted latent heat thermal energy storage system is studied. The effects of heat pipes spacing and fins geometrical features are investigated. Smaller heat ...

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Heat pipe energy storage

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