

Storage and dissipation of heat at a faster rate has become a mandatory requirement in such equipment. Small and smart equipment that uses compact devices, consume high ... The experimental set-up consists of a copper-water heat pipe, a heat sink, an energy storage tank, cooling fan, heater, power supply, computer, and a data logger (Agilent ...

Heat pipes have been widely used in heat dissipation of electronic components [38] and in thermal energy storage systems [39, 40] due to their excellent thermal conductivity, compact structure ...

The air conditioning demand varies significantly in the hot and desert climates of the UAE due to diurnal temperature variation, seasonal shifts, and occupancy patterns. One of the challenges faced by the relatively higher energy-consuming UAE building stock is to optimize cooling capacity utilization and prevent excessive energy loss due to undesired cooling. A ...

Various forms of heat pipes, such as conventional heat pipes, flat heat pipes, and oscillating heat pipes, can also be used to provide relatively high heat load and flux transport across SmallSats. Brouwer. 5. studied the use of water heat pipes for SmallSat applications and the effects of bending on performance. In general, thermal

Heat absorption and heat dissipation of a heat pipe. The heat pipe has a high thermal conductivity, because its operation is based on the phase change of the working fluid. ... Numerical melting performance analysis of a cylindrical thermal energy storage unit using nano-enhanced PCM and multiple horizontal fins. Numer. Heat Transf., Part A, 75 ...

Heat pipe utilizes latent heat of vaporization of the fluid for heat transfer. It is considered an efficient mean of heat removal as it transfers several times more heat compared to metal rod [] is two-phase heat transfer devices [5, 6]. Heat pipes are being used since decades because of their ability to dissipate large amount of heat in a limited temperature difference [7, 8].

The lithium-ion battery has become a popular choice used in mobile phones, cars and energy storage plants owing to its long operating life, ... To accelerate the heat dissipation of the heat pipe's condensation section, it is combined with the composite fin shown in Fig. 1 (b). The fin teeth are filled with PCM, and fin base is a hollow ...

The heat pipe is an efficient transfer element that has been used in battery thermal ... the heat dissipation effect in the heat management system of the integrated battery pack with heating and heat dissipation is enhanced due to the heat exchange of the heating part. ... J. Energy Storage, 27 (Feb) (2020), 10.1016/j.est.2019.101059. 101059.1 ...

Heat dissipation issues become more significant when miniaturization in electronics increases. More effective

TM often results in enhanced reliability as well as a longer life expectancy for devices. ... and pin-fin heat pipes (HPs). ... Buddhi D (2009) Review on thermal energy storage with phase change materials and applications. Renew Sustain ...

For the thermal performance enhancement of electronic components under intermittent high heat load, this paper proposes a gravity heat pipe with heat storage (GHPHS) ...

The optimum combination of factors affecting the cooling effect of gravity heat pipes in coal storage piles was experimentally derived. ... the combination of heat pipe heat dissipation technology and temperature difference power generation technology can be used to convert the waste heat of coal pile into electric energy, but the conversion ...

Pulsating Heat Pipe (PHP) is an emerging efficient heat transfer device, that transfers heat passively through oscillating motions of liquid slugs and vapor plugs within the ...

The thermal management of battery systems is critical for maintaining the energy storage capacity, life span, and thermal safety of batteries used in electric vehicles, because the operating temperature is a key factor affecting battery performance. Excessive temperature rises and large temperature differences accelerate the degradation rate of such ...

Simulation results showed that heat dissipation components will negatively affect the temperature rise at low temperatures and heating components will enhance the high-temperature heat dissipation effect of the battery pack. ... Heat pipes are currently attracting increasing interest in thermal management of Electric vehicle (EV) and Hybrid ...

The study revealed that the rate of evaporation in this mode of operation is superior to that of a system without any thermal energy storage device. An efficiency of 48.5% was reported, compared to the 23.7% efficiency of conventional solar stills. ... Chen G (2016) Review of the development of pulsating heat pipe for heat dissipation. Renew ...

Thermal energy storage (TES) is increasingly important due to the demand-supply challenge caused by the intermittency of renewable energy and waste heat dissipation to the environment. This paper discusses the fundamentals and novel applications of TES materials and identifies appropriate TES materials for particular applications.

The heat dissipation of the heat pipe will reduce the phase transition rate of PCM but have less effect on the heat transfer between the battery and PCM. Thus, the battery ... Characterization and stability study of a form-stable erythritol/expanded graphite composite phase change material for thermal energy storage. Renew Energ, 136 (2019 ...

Most of the reviews carried out by earlier researchers were limited to a specific application of heat pipe either

in the field of electronic cooling [1,2,6,7,33] or battery thermal management [166 ...

Heat pipes have been expansively used in various energy storage systems due to their suitability in the role of heat delivery and passive operation [28]. As a member of the heat pipe family, Oscillating heat pipe (OHP) invented by Akachi in the middle of 1990s has great potential in cooling and thermal management of high power equipments [29]. ...

This paper experimentally investigates heat dissipation of a heat pipe with phase change materials (PCMs) cooling in a multiple heat source system. Two heat sources are fixed at one ...

Determine the specific shape of the heat pipe. Different heat transfer temperatures are set for the evaporation section and the condensation section of the HP and the heat dissipation volume solved numerically with different temperature differences in the heat transfer is fitted with regression equations as an internal heat source coupled to ...

A numerical study of viscous dissipation effects on heat transfer, thermal energy storage by sensible heat and entropy generation within a porous channel with insulated walls was carried out in a ...

For the second section, thermal energy storage performance of a novel LHTES unit based on 3D-OHP was studied and compared with a LHTES unit assisted by CHP. The thermal physical properties including thermal conductivity, melting temperature and latent heat of the composite PCMs were tested. ... Numerical study of finned heat pipe-assisted ...

Passive and low-energy cooling alternatives based on solar protection, heat dissipation, heat modulation and heat prevention have enormous potential to reduce heat's impact on the built environment [[13], [14], [15]]. Moreover, they can be explicitly integrated to benefit from local resources and improve their performance according to specific constraints, such as power ...

This paper experimentally investigates heat dissipation of a heat pipe with phase change materials (PCMs) cooling in a multiple heat source system. Two heat sources are fixed at one end of the heat pipe. ... An investigation of the melting process of RT-35 filled circular thermal energy storage system, Open Phys., 2018, 16, 574-580. 10.1515 ...

Request PDF | Energy saving potential of using heat pipes for CPU cooling | Air cooling is the most common cooling solution for central processing units (CPUs). However, the heat dissipation ...

Thermal management technology based on loop heat pipes (LHPs) has broad application prospects in heat transfer control for aerospace and new energy vehicles. LHPs offer excellent heat transfer performance, reliability, and flexibility, making them suitable for high-heat flux density, high-power heat dissipation, and complex thermal management scenarios. ...

Flat heat pipe (FHP) is a relatively new type of battery thermal management technology, which can effectively maintain the temperature uniformity of the battery pack. We have constructed a resistance-based ...

The heat pipe is among thermal physics" greatest accomplishments and the thermal transmission technology of this century owing to its different capacity for transporting heat from broad distance eliminating any loss. The core uses of heat pipes tackle environmental problems, energy management and fuel performance.

Flat heat pipe (FHP) is a relatively new type of battery thermal management technology, which can effectively maintain the temperature uniformity of the battery pack. We have constructed a resistance-based thermal model of the batteries considering the impact of the state of charge (SOC), battery temperature, and current on the battery heat ...

In the present study, the thermal characteristics of a finned heat pipe-assisted latent heat thermal energy storage system are investigated numerically. A transient two-dimensional finite volume based model employing enthalpy-porosity technique is implemented to analyze the performance of a thermal energy storage unit with square container and ...

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