

The role of the aluminum plate for heat dissipation of energy storage charging piles

Can UTHPs be used to heat dissipate DC EV charging piles?

The UTHP was especially suitable for the heat dissipation of electronic equipment in narrow space. Thus it could be directly attached to the surface of the electronic components to cool the heat source. However, few researches reported on the application of UTHPs to the heat dissipation of the DC EV charging piles. Fig. 1.

Can ultra-thin heat pipes reduce the operation temperature of a charging pile?

In order to reduce the operation temperature of the charging pile, this paper proposed a fin and ultra-thin heat pipes (UTHPs) hybrid heat dissipation system for the direct-current (DC) charging pile. The L-shaped ultra-thin flattened heat pipe with ultra-high thermal conductivity was adopted to reduce the spreading thermal resistance.

Does graphene improve the thermal conductivity of aluminum plates?

Thermal conductivity of the aluminum plates with or without coating *. In this study, the epoxy powder was blended with graphene to improve its thermal conductivity and heat dissipation efficiency. The thermal conductivity of the graphene-loaded coating was increased by 167 folds. In addition, the emissivity of the graphene-loaded coating was 0.88.

What is thermochemical heat storage?

Thermochemical heat storage is a technology under development with potentially high-energy densities. The binding energy of a working pair, for example, a hydrating salt and water, is used for thermal energy storage in different variants (liquid/solid, open/closed) with strong technological links to adsorption and absorption chillers.

Can ultra-thin heat pipes be used to simulate heat dissipation performance?

In this paper, a numerical model was built to simulate the heat dissipation performance of the charging module with ultra-thin heat pipes integrated. The simulation model was validated by the experimental results of a product with the conventional thermal design.

How to choose a PCM for a heat recovery system?

In terms of the applications in different heat recovery systems, the first core problem is to select the PCM with proper melting temperature according to the objective application. In addition, packaging the PCM requires balancing a number of potentially conflicting factors.

Many researchers study the thermal behavior of the energy storage systems. The impacts of an aluminum honeycomb (AH) design module for a battery thermal management module are experimentally explored utilizing an infrared imager by Weng et al. [46]. The findings revealed that AH increased heat dissipation and

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thereby prevented thermal runaway ...

With the rapid development of electronic technologies towards high integration, high power and miniaturization, thermal management has become an increasingly important issue to guarantee the reliability and service life of electronic devices. The oscillating heat pipe (OHP), which was governed by thermally excited oscillating motion, was considered as a promising ...

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Abstract. Effect of anodization on the thermal performance of naturally cooled heat sinks in power electronic devices made of die-cast aluminum alloy A380 and machined aluminum alloy 6061 was investigated experimentally and numerically. Various types of anodization were examined with different thickness of anodic aluminum oxide layer (AAO), ...

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Here, an auxiliary passive cooling approach by the aid of a flat plate (aluminum-magnesium alloy) is investigated to accommodate heat dissipation in a narrow ...

Most of the power-to-heat and thermal energy storage technologies are mature and impact the European energy transition. However, detailed models of these technologies are usually very complex, making it challenging to implement them in large-scale energy models, where simplicity, e.g., linearity and appropriate accuracy, are desirable due to computational ...

The results show that the new heat dissipation system has excellent heat dissipation capability and makes the internal temperature field of the charging pile evenly distributed. Sun et al. [25] designed a novel self-propelled liquid metal cooling method for high power charging to reduce the charging time of electric vehicles.

While collecting solar energy, PV panels are very sensitive to temperature changes, and thus effective heat dissipation is a bottleneck that limits the development of this technology (Zhan et al., 2021). Application-specific cooling technologies can reduce the operating temperature of PV panels by removing excess heat from the panels (Grubisic-Cabo et al., ...

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Efficient utilization of solar energy is crucial under the strategic goals of achieving carbon peak and carbon neutrality [1, 2]. However, significant challenges persist in harnessing solar energy efficiently, primarily stemming from its low energy flux and inherent characteristics of intermittency and instability [3, 4]. The solar thermal storage system plays a ...

In this work, a composite heat dissipation structure of battery module with phase change material (PCM)-aluminum plate-fin is proposed. Meanwhile, the transient effects of different discharge ...

In the contemporary landscape of the energy and technology industry, the pursuit of efficiency, sustainability, and innovation remains paramount. Among the myriad components that play a critical role in these domains, heat plates have emerged as a significant focal point. These devices, designed to transfer thermal energy in an effective and controlled manner, are ...

The results showed that the optimized attached aluminum belt could reduce the thermal resistance by 17.1 % at most. Peng et al. [10] studied the pin-fin radiator and explored the heat dissipation capacity of the fin with the rectangle, triangle, and trapezoid sections. The results showed that the structure with a triangular section provided the best heat dissipation ...

Specifically, for power-intensive energy components of titanium or titanium-based composites [3], such as heat pumps, boilers or heat exchanger for aircraft and aerospace etc., radiative passive ...

Compared with sensible heat energy storage and thermochemical energy storage, phase change energy storage has more advantages in practical applications: (1) Higher heat storage density (about 5-10 times that of sensible heat storage), which means a smaller heat storage system volume [1]. (2) The temperature remains almost unchanged during the phase ...

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