

New energy battery heat pipe radiator picture

Does heat pipe cooling plate improve battery life?

With heat pipe cooling plate, for same heat load, temperature difference from cell surface to first interface plate will be $\sim 5.27^{\circ}\text{C}$, which is 3.6 times lower than existing system. Hence, heat pipe system will have superior thermal uniformity at cell and module level thereby improving battery life and vehicle range.

Are heat pipes the new EV battery technology?

Heat pipes are not new; they've been widely used to cool high-performance electronics like computer CPUs and smartphones. Hyundai Mobis has adapted proven technology to meet the unique challenges of EV batteries.

What is a heat pipe based battery thermal management system?

Heat pipe based battery thermal management system assembly. i. Heat extraction module (for cell level thermal control): consists of heat pipe cooling plates (HPCP) to maintain uniform battery cell temperature and transfer heat from between the cells to an external spreader plate.

Can a heat pipe based thermal management system be used in electric vehicles?

Abstract Thermal management of battery systems in electric vehicles is critical for maintaining energy storage capacity, driving range, cell longevity and system safety. In this paper, heat pipe based thermal management system for high power battery, with eight prismatic cells, has been proposed, designed and tested for heat load up to 400W.

What is a heat pipe based cooling system?

Heat pipe based cooling system will help to keep liquid out of the battery enclosure by transferring heat to remotely located cold plate thereby providing safer and reliable system

How do EV battery cooling systems work?

EV battery systems typically include various cooling mechanisms, such as battery management systems (BMS), cooling fans and other components. However, as battery cells generate intense heat during ultra-fast charging, optimising cooling structures at the module level is crucial.

The application of heat pipes in battery thermal management systems (BTMS) is one of the current research highlights. Rao et al. [13] and Behi et al. [14] conducted cooling effect tests by directly attaching flat heat pipes to the battery surface, and the results showed that heat pipes effectively control battery temperature. Liu et al.

temperatures, water heat pipes radiators could be used with an effective area that is ~ 3 times larger ($\sim 600\text{ m}^2$). Such large radiators are a challenge to stow into the bay of the launch vehicle ...

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Hyundai Mobis, a global leader in automotive technology, has unveiled its latest innovation to address one of the most pressing challenges in EV technology: battery overheating during ultra-fast charging.. The company's ...

Compared with the heat pipe radiators in the existing literature, the 3-dimensional enhanced radiator proposed in this paper introduces heat pipe technology in both the base and fin parts, and thus has stronger heat dissipation properties. ... Renewable and Sustainable Energy Reviews, 78(2017) 821-833. Doi: 10.1016/j.rser.2017.04.112 ...

Heat pipe radiators were first utilized in the 1970s to 1990s, when the Soviet Union developed the TOPAZ-II (Voss, 1994) and the United States developed the SPACE-R the above applications, these heat pipe radiators worked by pumping a circuit of sodium-potassium alloy paired with high-temperature alkali metal heat pipes to radiation heat ...

The equivalent thermal conductivity of heat pipe can reach $10^3 \sim 10^4$ times of metal [1][2][3] numerous ways of heat recovery, by the high efficient heat transfer component heat pipe ...

Radiator occupies a large part of the weight of spacecraft, it is the largest component in space nuclear powered spacecraft. The weight of radiator directly affects the launch weight of spacecraft and the feasibility of engineering development [1,2,3,4].Heat pipe is a kind of heat transfer element with high thermal conductivity developed in 1960s [], which has been ...

The heat pipe cooled nuclear reactor (HPR) has great potential in the underwater applications, as a reliable energy system provider, due to its advantages in the passive heat removal capability ...

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Heat pipe, as a key equipment of heat pipe stacks and heat pipe radiators, their performance is crucial for the safe and effective operation of reactors and radiators (Hu et al., 2021, Ma et al., 2020).Therefore, in recent years, they have become a hot research topic for scholars at home and abroad (Guo et al., 2021, Deng et al., 2023).Reference (Ferrandi et al., ...

Abstract. Micro nuclear reactors have been seen as one of the potential nuclear energy solutions to carbon emission reduction due to their compact design, flexibility, and economic merits. Heat-pipe-cooled nuclear reactors (HPR) can achieve attention due to their avoidance of single-point failure, passive core heat removal capability, and modularity. If ...

In order to enhance the safety and service life of automotive 4680 cylindrical batteries during high current discharge state, based on theoretical analysis and numerical simulation, a novel air cooling thermal management system that is integrated with finned heat pipe radiators has been developed and studied in this paper.

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This review collates evidence that heat pipes can meet industry demand if used in EV BTMS; particularly aiming at fast charging applications, coupling heat pipes and liquid ...

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