Material scheme for battery cooling plate

What is the design of a battery cooling plate?
Initial design of cooling plate. CATIA was employed to build the 3-dimensional battery module. The module had fifteen lithium batteries arranged in the form of a 1 × 15, as shown in Figure 7. The batteries were connected in series, and the total voltage of the module was 48 V. Cooling plates were placed on the top and bottom sides of the battery.

What is a cooling plate?
A look at cooling plate design and some of the example designs, circuits and hopefully some posts looking at the CFD. An encapsulated cooling fluid that is circulated to the battery where heat is transfered to and from the fluid. Heat is removed and added to this fluid away from the battery pack using a radiator and/or heat exchanger.

What is the temperature difference between a battery and a cooling plate?
The minimum temperature was located on the surface of the battery near the inlet of the cooling plate and the battery temperature difference was 5.9 °C. Figure 12. Temperature distribution on battery surface. The pressure distribution of the cooling plate was shown in Figure 13.

What is the heat flux between two batteries on the cooling plate?
The heat flux between two batteries on the cooling plate was set to a constant value of 300 W/m 2. The simplified cooling plate was imported into workbench and the parameters were set. The maximum temperature on the surface of the cooling plate and the pressure drop of the cooling plate were taken as the output parameters.

How a cooling plate is redesigned in a module thermal model?
With the optimized geometry, the cooling plate was rebuilt in the module thermal model for the analysis. The comparison showed that the maximum and minimum temperature difference in the cooling plate was reduced by 5.24% and the pressure drop was reduced by 16.88%.

What is the natural cooling process of a lithium battery?
In the analysis, the natural cooling process of the lithium battery was simulated at 2C discharge rate for a period of 1800 s. The temperature evolution was monitored and outputted at the end of each time step. The results of the cell surface temperature after 1800 s at 25 °C are shown in Figure 2.

Phase-change materials (PCM) cooling plates: Incorporate materials that change phase (e.g., from solid to liquid) to absorb large amounts of heat. The choice of material for battery cooling plates is crucial for their effectiveness. Common materials include: Metals (e.g., aluminum, copper): Known for their excellent thermal conductivity.

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WHY IS A COOLING PLATE DESIGN FOR BATTERY SYSTEMS IMPORTANT? Source: ; Picture ID: DB2018AU00146 o Battery temperature is the ...

mature cooling schemes that have been ... Among all these materials, solid-liquid PCM have the advantages . of large latent heat, small volume change and the needed materials are easy to obtain ...

In this article, a lithium iron phosphate battery was used to design a standard module including two cooling plates. A single battery numerical model was first created and verified as the...

The liquid cooling has been increasingly used instead of other cooling methods, such as air cooling and phase change material cooling. In this article, a lithium iron phosphate battery was used to design a standard module including two cooling plates. A single battery numerical model was first created and verified as the basis of the module heat transfer model. Orthogonal ...

battery is cooled by coolant passing by in channels insider the cooling plate. Coolant mixture also absorbs the heat at the cooling plate and other components that require cooling and then it releases the heat at the mixing tank or in close system in radiator part. Figure 6 shows ethylene glycol 50-50 material properties. The coolant usually ...

In this paper, a lithium iron phosphate battery was used to design a standard module which can be quickly interchanged by EV, and then the liquid cooling plate for the module was analyzed ...

Augmenting heat transfer using passive heat transfer methods is of great importance in different thermal systems. Therefore, many techniques have been used to improve the performance of the heat exchangers [[39], [40], [41]] and cooling channels [42, 43], as well as to upgrade the characteristics of the heat sinks [[44], [45], [46]]. ...

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