Double-layer heat pipe energy storage device

Why are thermal energy storage systems more efficient than other systems?
These systems can store significantly higher amounts of thermal energy in comparison with their alternatives such as sensible or thermochemical thermal energy storage systems of the same size due to the large latent heat of fusionof the phase change materials (PCMs) used in them.

What is latent heat thermal energy storage (lhtes)?
Latent heat thermal energy storage (LHTES) is one of the most effective and promising options to resolve the intermittency problem of concentrated solar power generation systems. They are also widely used in electronics cooling , food drying equipment , cold storage and heating and hot water systems [4, 5, 6, 7, 8].

Which phase change material is used in a thermal storage unit?
The charging and discharging processes of a thermal storage unit with high-temperature PCM embedded in metal foam and assisted by heat pipes are studied numerically in the current study. The phase change material used in this study is potassium nitrate saltwith melting point of 335 °C (608 K) which is embedded in copper foam.

How does thermal resistance affect a pipe embedded layer?
As a result,the heat lost to the outside through the outside surface will increase owing to a reduction in thermal resistance,while the heat injected into the pipe-embedded layer will also increase due to a decrease in wall temperature.

Does heat injection efficiency affect thermal performance of conventional energy-saving walls?
It is known that the thermal performance of conventional energy-saving walls (CnWs) is directly related to their total thermal resistance. Differently, the heat injection efficiency, which is related to the design of the heat injection system and wall structure, is a key variable affecting the performance of CnPWs.

How does copper foam affect thermal characteristics of storage unit?
Copper foam is the porous medium used to enhance the heat transferand is impregnated with the phase change material,potassium nitrate (KNO 3). The effects of the porosity of the metal foam and the quantity of heat pipes on the thermal characteristics of storage unit have been investigated.

The HP-PV/T-PCM setup (as represented in Fig. 1) consists of components including a PV panel to generate electricity, an absorber plate to absorb the wasted heat of the ...

Taghavi et al. [171] proposed a simplified, cost-effective, and efficient design of a plate type thermal energy storage system (Fig. 14 (b)). Compared with normal thermal ...

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The double layer of insulationwas used to reduce the heat losses from the storage unit; the first layer is of a 15 mm thickness of asbestos ropes with thermal conductivity ...

1. Introduction. It is a clean and sustainable heating method to use solar energy for indoor heating purpose [1].However, due to the space-time discontinuity and low energy ...

They also pointed out that the double-layer pipe design could effectively improve the overall performances of CnPWs, but an additional physical thermal insulation layer is suggested to be ...

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