



一种新型储能装置充冷过程的实验及分析

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Experiment and analysis for cold charging process of new energy storage device

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摘要

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摘要 近年来,泡沫金属作为填充材料在强化传热方面的功效已被越来越多的研究证实.采用泡沫铜和水构成新型复合相变材料,制成一种高效储能装置,通过模拟实验研究,测试了这种储能装置在冷藏装备上的保温效果.进而采用准稳态法建立了复合相变材料的数学模型并进行了数值仿真计算,计算结果与实验测试结果相符.实验和数值仿真结果都表明,相对传统储能装置,新型储能装置充冷迅速而充分,整体的传热速率和储能效率得到了显著提高,在冷藏运输中有非常好的应用前景.

关键词: 传热 相变材料 泡沫铜 储冷 冷藏运输车

Abstract: The heat transfer enhancement effect of the metal foam has been verified by dozens of researches. In order to test the cold charging effect, a new type of high-efficiency energy storage devices was made up by composite phase change material(PCM), which was consisted of copper foam (the heat transfer enhancement) and water. Via experimental study, the heat preservation effect of the devices in the refrigeration equipments was simulated. The model was set up and calculated through quasi-stable state method, and the results meet the test results very well. The cold charging process of the new type energy storage devices was approved to be faster and more adequate compared to the traditional energy storage devices. The entire heat transfer velocity and energy storage efficiency are obviously improved, which promises a good prospect in the refrigerated transportation.

Keywords: heat transfer phase change materials(PCM) copper foam cold storage refrigerated containers

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