

New intelligent phase change energy storage system

Can artificial intelligence be used in phase change material energy storage?

This study provides a comprehensive review of the utilization of artificial intelligence (AI) technology in phase change material (PCM) energy storage. The review primarily focuses on its application in solar thermal utilization systems, electric vehicle/electronic device thermal management systems, and building energy efficiency systems.

Can phase change materials be used in thermal energy storage systems?

Scientific Reports 15, Article number: 24290 (2025) Cite this article The incorporation of phase change materials (PCMs) within thermal energy storage (TES) systems represents a pivotal advancement in materials science, enabling the efficient harnessing and deployment of solar energy and waste heat.

What are phase change energy storage materials (pcesm)?

1. Introduction Phase change energy storage materials (PCESM) refer to compounds capable of efficiently storing and releasing a substantial quantity of thermal energy during the phase transition process.

What is phase change materials (PCMs) in thermal energy storage?

Provided by the Springer Nature SharedIt content-sharing initiative The incorporation of phase change materials (PCMs) within thermal energy storage (TES) systems represents a pivotal advancement in materials science, enabling the efficient harnessing and deployment of solar energy and waste heat.

What are the applications of phase change materials (PCMs)?

Due to high potential of phase change materials (PCMs) for temperature regulation and heat storage, PCM play an important role in various application fields such as thermal energy storage, solar energy, technical textiles, smart materials, non-volatile memories and greenhouses 7, 8.

Are phase change thermal storage systems better than sensible heat storage methods?

Phase change thermal storage systems offer distinct advantages compared to sensible heat storage methods. An area that is now being extensively studied is the improvement of heat transmission in thermal storage systems that involve phase shift. Phase shift energy storage technology enhances energy efficiency by using RESs.

What is phase change energy storage? Phase change energy storage-wind and solar hybrid system. The application of phase change energy storage technology in the utilization of new ...

Can phase change materials be used for solar energy storage? Nowadays, a wide variety of applications deal with energy storage. Due to the intermittent nature of solar radiation, phase ...

In a recent issue of Angewandte Chemie, Chen et al. proposed a new concept of spatiotemporal phase change



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materials with high super-cooling to realize long-duration storage and intelligent ...

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