Bio-based energy storage materials

This review systematically examines recent advances (2022-2025) in bio-based phase change materials (PCMs) for thermal energy storage (TES). Emphasis is placed on renewable PCMs ...

Bio-aerogels have emerged as promising materials for energy storage, providing a sustainable alternative to conventional aerogels. This review addresses their syntheses, properties, and characterization ...

Of interest to this program, the hydration-based storage capacity of the squid ring teeth (SRT) derived protein-based PCM allows for an incredibly unique thermal storage ...

In light of this fact and with an eye toward achieving sustainable development, bio-based phase change materials (BPCMs) are a practical replacement for PCM in the case ...

Such bio-based composites provide a promising path toward the development of eco-friendly, efficient energy storage solutions that align with the increasing demand for renewable, bio ...

The topics are limited to bio-based phase change materials and their utilization in thermal energy storage systems with respect to the building energy efficiency, which will be ...

The main biobased materials investigated for their potential in energy storage applications have been summarized in this comprehensive review. Different classifications of ...

Thermal energy storage (TES) plays a vital role in advancing energy efficiency and sustainability, with phase change materials (PCMs) receiving significant attention due to their high latent heat storage ...

Challenges, opportunities, and future outlooks of biobased nanofiber platforms. In the context of carbon neutrality, bio-based and biodegradable materials have attracted ...

Biomass not only provides high energy density for various energy storage applications but also serves as a basis for different forms of energy storage materials, including ...

This paper reports the results of an experimental program on sustainable cementitious composites made with recycled wood aggregates (RWAs) filled with bio-based ...

Thermochemical storage materials use reversible endothermic reactions to convert thermal energy into chemical energy, which is then released in the form of thermal ...

Biopolymers are an emerging class of novel materials with diverse applications and properties such as superior

sustainability and tunability. Here, applications of biopolymers are described in the context of ...

In recent years intensive research has been conducted on phase change materials (PCMs) for both energy storage and thermal regulation of equipment and buildings. ...

These naturally occurring materials are used as a template to develop newer advanced materials via biomimicry principles and have been implemented into various energy ...

This paper focused on the development MicroPCM/WFC material as novel bio-based energy storage material that can store thermal energy, further enhancing its potential for ...

Bio-based materials are emerging as a promising frontier in energy storage, offering sustainable and high-performing alternatives to conventional materials derived from fossil fuels or mined ...

Project Outcome: Assess feasibility of a new room temperature bio-based phase change material to establish a new SOA for energy storage density at room temperature, while also providing ...

The increasing global population has intensified the demand for energy and food, leading to significant greenhouse gas (GHG) emissions from both sectors. To mitigate these impacts and achieve ...

Sustainable battery biomaterials are critical for eco-friendly energy storage. This Perspective highlights advances in biopolymers, bioinspired redox molecules, and bio-gels from natural sources, offering ...

As an example, the aniosotropic nature of wood may be useful for developing materials with different properties depending on the direction of the grains when processed. Converting biomass to bioderived ...

This study focuses on developing bio-based thermal energy storage microcapsules (MCs) by spray drying. New MCs were successfully prepared using ethyl ...

Due to growing consciousness regarding the environmental impact of fossil-based and non-sustainable materials in construction and building applications, there have been an increasing interest in bio-based ...

MXene-wrapped bio-based pomelo peel foam/polyethylene glycol composite phase change material with enhanced light-to-thermal conversion efficiency, thermal energy ...

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