

Are heat-resistant energetic materials important?

From the above results, it is clear that lots of efforts have been invested in researching and developing heat-resistant materials during the past few decades. The increasing number of publications related to the study of heat-resistant energetic materials indicates the growing interest and importance of this field.

Do thermal energy storage materials meet high heat capacity?

Thermal energy storage materials have been investigated for many decades with the aim of improving the overall efficiency of energy systems. However, finding solid materials that meet the requirement of high heat capacity has been a grand challenge for material scientists.

Are high-temperature dielectric materials suitable for heat-resistant insulating materials?

This review provides an overview of the currently available high-temperature dielectric materials ($>105\text{ }^\circ\text{C}$) and tries to incorporate them into the grading system of heat-resistant insulating materials, providing convenience for the selection of high-temperature dielectric materials in different application situations.

Can thermal energy storage materials revolutionize the energy storage industry?

Thermal energy storage materials 1,2 in combination with a Carnot battery 3,4,5 could revolutionize the energy storage sector. However, a lack of stable, inexpensive and energy-dense thermal energy storage materials impedes the advancement of this technology.

Why is thermal energy storage important?

Thermal energy storage (TES) is increasingly important due to the demand-supply challenge caused by the intermittency of renewable energy and waste heat dissipation to the environment. This paper discusses the fundamentals and novel applications of TES materials and identifies appropriate TES materials for particular applications.

Which polymer is best for electrostatic energy storage?

Our approach revealed PONB-2Me5Cl, an exceptional polymer for electrostatic energy storage, especially in high-temperature applications such as wind pitch control, hybrid vehicles and rail, and pulsed power systems. A handful of other prospective dielectrics in the polyVERSE database, including some with green profiles, are recommended.

Here, a dual-function strategy composed of radiative cooling and latent heat storage simultaneously enabling the efficient subambient cooling and high-efficiency thermal-shock resistance performance is proposed. The electrospinning and absorption-pressing methods are used to assemble the dual-function cooler. The high sunlight reflectivity and high mid ...

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Based on this, a summary of commonly used and latest research on high-temperature polymers is conducted, and they are classified into different heat-resistant insulation grades, consequently providing a new perspective for high-temperature polymers dielectric research, especially on the selection of them under different occasions.

Here we present a machine learning-driven strategy to rapidly identify high-performance, heat-resistant polymers. A trustworthy feed-forward neural network is trained to predict key proxy...

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This review provides an overview of the currently available high-temperature dielectric materials (>105 °C) and tries to incorporate them into the grading system of heat-resistant insulating materials, providing convenience for the selection of high-temperature dielectric materials in different application situations. Key properties and ...

As one of the most efficient electrochemical energy storage devices, the energy density of lithium-ion batteries (LIBs) has been extensively improved in the past several decades. However, with increased energy density, the safety risk of LIBs becomes higher too. The frequently occurred battery accidents worldwide remind us that safeness is a ...

Thermal energy storage, in which energy is stored as heat in materials such as water, oils, or molten salts, offers a promising alternative. The heat can be collected directly from the sun by concentrating sunlight, or by converting extra wind or solar power using heat pumps. When needed, the heat is released to drive a generator that produces electricity or used ...

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Evaluated herein is one E-TES concept, called Firebrick Resistance-Heated Energy Storage (FIRES), that stores electricity as sensible high-temperature heat (1000-1700 °C) in ceramic firebrick, and discharges it as a hot airstream to either (1) heat industrial plants in place of fossil fuels, or (2) regenerate electricity in a power plant. FIRES storage media and heater ...

Heat-resistant energetic materials [1], a unique branch of energetic materials, possess a high melting point, and

maintain proper sensitivity and higher energy when exposed to a high temperature environment for a long time usually, when the thermal decomposition temperature reaches 250 °C, it can be referred to as heat-resistant energetic material [2] ...

Electrostatic capacitors play a crucial role as energy storage devices in modern electrical systems. Energy density, the figure of merit for electrostatic capacitors, is primarily...

Polyimide (PI) turns out to be a potential dielectric material for capacitor applications at high temperatures. In this review, the key parameters related to high temperature resistance and energy storage characteristics ...

Heat transfer rates for latent heat thermal energy storage applications are slower if phase change materials have low thermal conductivities . Because low thermal conductivity decreases the heat release/absorption rate during the solid-liquid phase transition, it can limit the potential of phase change materials in thermal energy storage applications [75].

energy storage capacitors seems unclear and little attempt has been made to define classification criteria to distinguish various heat-resistant polymers. Hence, based on the new view of heat-resistant material insulation grades of dielectric polymers and practical application temperature, we attempt to summarize common and the latest research

In this review, the physicochemical properties of 20 ultra-high temperature heat-resistant energetic materials have been examined, offering valuable theoretical support for the design of more powerful and insensitive heat-resistant energetic materials.

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