Current status of solar thermal storage research

For regions with an abundance of solar energy, solar thermal energy storage technology offers tremendous potential for ensuring energy security, minimizing carbon footprints, and reaching sustainable development goals. Global energy demand soared because of the economy"s recovery from the COVID-19 pandemic. By mitigating the adverse effects ...

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This Research Topic aims to present new research findings as well as reviews of significant work in the field of solar thermal energy systems, electrical energy storage, thermal energy storage, solar photovoltaic thermal systems (PVT), and hybrid solar systems.

Renewables, majorly solar PV and wind power are accounted for around 10 % of the global power production in 2020. In this context, concentrated solar power (CSP) technologies are seen to be one...

This article provides an overview of emerging solar-energy technologies with significant development potential. In this sense, the authors have selected PV/T [2], building-integrated PV/T [3], concentrating solar power [4], solar thermochemistry [5], solar-driven water distillation [6], solar thermal energy storage [7], and solar-assisted heat pump technologies [8].

purpose of this review is to describe the current status and challenges of MOST-based devices with regard to energy cap-ture, storage, and release based on different molecular systems. MOST devices can be divided into three different types: (i) charging, (ii) ...

By sorting out the current status of the application of SPCS technology in solar thermal/photovoltaic, aerospace, buildings, textile, and other industries, this analysis clarifies the requirements for various latent heat, phase change temperature, and other properties under different environmental conditions. Through a comprehensive ...

This review paper attempts to highlight the gap between academic energy research and its ultimate observable impact on the energy industry of nations. For each country, a comprehensive effort is made to define the current operational solar power status and its corresponding academic solar energy research. The presented information can help ...

Progress in Research and Development of Phase Change Materials for Thermal Energy Storage in

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Concentrated Solar Power. October 2022 ; Applied Thermal Engineering 219(1):119546; DOI:10.1016/j ...

This review highlights the latest advancements in thermal energy storage systems for renewable energy, examining key technological breakthroughs in phase change materials (PCMs), sensible thermal storage, and hybrid storage systems. Practical applications in managing solar and wind energy in residential and industrial settings are analyzed ...

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Based on its more efficient thermal storage system compared to solar PV, ...

Multistage solar membrane distillation is facing challenges with current system designs due to constrained temperature and vapor pressure gradients. Here, the authors propose a stage...

Molecular solar thermal energy storage systems (MOST) offer emission-free energy storage where solar power is stored via valence isomerization in molecular photoswitches. These photoswitchable ...

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Based on its more efficient thermal storage system compared to solar PV, which incorporates electrical storage, CSP is now recognized as the most developed solar technology for commercial use [7]. The International Renewable Energy Agency (IRENA) reports in its report from 2019 that the total installed capacity of CSP reached about 5 ...

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