Research on energy storage dehumidification performance

Does a dehumidification system save energy?
HVAC system,equipped with desiccant dehumidification and a high-temperature chiller,is believed to possess a higher potential for energy conservation. A temperature increase of 1 °C in chilled water led to a 3 % rise in COP . 5.3. Economic analysis of dehumidification system

What are the research methodologies for dehumidification-hybrid air conditioning systems?
The research methodologies for dehumidification-hybrid air conditioning systems mainly consist of experimental approaches and simulation techniques. The dehumidification,regeneration,and cooling processes all utilize principles of energy and mass conservation to develop models for heat and mass transfer. 2.1. Dehumidification performance models

Why is dehumidification important in engineering applications?
In engineering applications,it is imperative to not only consider the selection and design of various dehumidification technologies,but also to assess the trade-off between their energy performance and economic viability.

How does humidity regulation affect dehumidification systems?
Analyze energy, economic, and environmental aspects of dehumidification systems. Discuss main future works for deep dehumidification systems. Humidity regulation plays a pivotal role in both residential and industrial environments, significantly impacting comfort, health, and process efficiency.

Do dehumidification systems consume more electricity than air-conditioning systems?
However,in Beijing,a temperate region,and Los Angeles,also a temperate region,researchers observed that the electricity consumption of liquid desiccant dehumidification systems was 20%-30 % higherthan that of air-conditioning systems lacking dehumidifiers.

Are deep dehumidification systems suitable for industries with low humidity levels?
In order to address the demands of industries with low humidity levels, this study offers a comprehensive review of advanced deep dehumidification systems. The study initially delineates the specific ranges for deep dehumidification as outlined in academic research, as well as the humidity levels in low-humidity industries.

Increasing demand for air-conditioning systems has an important influence on global warming. The energy consumption of HVAC systems accounts for about 50% of energy consumption in the building sector [7], and the building energy consumption accounts for about 36% of global energy consumption [8].The vapor-compression air conditioning system is the ...

In this study a hybrid solar dryer has been designed Original Research Article Tossa et al.; Curr. 70 specifically to meet the needs of PME/PMI. The current limits to the ...

dehumidification is possible that limits overcooling and energy use. Recent testing of a new variable capacity system measured indoor humidity reduction of up to 15% RH points ...

Humidity regulation plays a pivotal role in both residential and industrial environments, significantly impacting comfort, health, and process efficiency. The integration of dehumidification systems with air conditioning systems allows for the control of temperature and humidity, resulting in a decrease in carbon dioxide emissions. In order to address the ...

Research on energy storage dehumidification performance In the humidification and dehumidification solar desalination system, the recovery of vapor condensation latent heat is ...

The current work aims to investigate a novel SBH-DH desalination system incorporating PCM-based SAH. Acetamide (PCM) is employed for the purpose of thermal energy storage. The thermal energy and exergy efficiency as performance indices of the PCM-based SBH-DH system is estimated in order to ascertain the feasibility of the system.

The system operated in solar-driven mode for 6 h and in solar-assisted heat pump mode for another 6 h, demonstrating high energy efficiency and dehumidification performance. From 11:00 to 16:00, when operating in solar-only mode (Mode I), the system achieved the highest COP and EUR.

The influences of several factors on the dehumidification performance, including the concentration of MicroPCMs, the inlet temperature of the MPCMS and the falling film plate configuration, were investigated. The results show that, adding MicroPCMs into the liquid desiccant solution is beneficial to the dehumidification performance improvement.

To improve energy utilization and efficiency, a heat pump-driven liquid desiccant dehumidification system is proposed in this research, the surface condenser and liquid ...

Gasification-based cogeneration systems coupled with solid dehumidification of desiccant coated heat exchanger, sensible heat storage, and internal heat recovery, were introduced and comparatively investigated on the energetic and economic performance that embraces the electricity fraction, heat utilization ratio, primary energy saving, overall ...

Zhonghe Han"s 29 research works with 368 citations and 1,063 reads, including: Study on the thermodynamic performance of a coupled compressed air energy storage system in a coal-fired power plant

In industrial production and daily life, energy consumption and carbon emissions have increased sharply. It has been predicted that by 2040, the world primary energy consumption will grow to 5 times that of 1970, and the CO 2 emission will be 1.5 times that of 2017 (2200% than 1900) [1]. As one of the important air

conditioning methods, ...

This study examines the structural dimensions, dehumidification performance, energy performance, economic aspects, and environmental impact of various dehumidification ...

Research on energy storage dehumidification performance drive humidification dehumidification unit.. The thermo-economic analysis is implemented to evaluate the system performance. In this paper, the solid desiccant adsorption packed bed with a ...

The parameters such as energy storage density, temperature for regeneration, boiling point elevation (BPE), availability and cost should be considered while choosing a liquid desiccant. ... four liquid desiccants used to reduce the relative humidity of the air stream from 50 % to 30 % in terms of cost and dehumidification performance and ...

Research on thermodynamic performance of a novel building cooling system integrating dew point evaporative cooling, air-carrying energy radiant air conditioning and vacuum membrane-based dehumidification (DAV-cooling system) ... a higher water flow rate leads to faster cold energy storage and release rates during the respective charging ...

Research suggested a novel hybrid system that integrates an indirect evaporative air cooler with a solar-assisted HDH desalination unit. This system incorporates latent heat ...

Tenured Professor, School of Architecture, Tsinghua University, Beijing, China. Prof. Liu is mainly devoted into three fields: (1) Desiccant dehumidification and heat recovery techiques; (2) Key ...

Performance investigation of a novel frost-free air-source heat pump water heater combined with energy storage and dehumidification. Author links open overlay panel Fenghao Wang a, Zhihua Wang b, Yuxin Zheng b, ... Based on the previous studies, a further analysis and comprehensive research on the novel frost-free ASHPWH system is presented in ...

With lower regeneration temperature (60~90 °C) and a capacity of energy storage, liquid desiccant dehumidification is considered as the development direction of novel dehumidification technology. Liquid desiccants could absorb water vapor from air due to the liquid/air vapor pressure difference.

The oscillating air-conditioning system, with its continuous dehumidification capability and optimised energy efficiency with COP of 3.89 in high-humidity regions, provides ...

Hydrogen energy is recognized as the most promising clean energy source in the 21st century, which possesses the advantages of high energy density, easy storage, and zero carbon emission [1].Green production and efficient use of hydrogen is one of the important ways to achieve the carbon neutrality [2].The traditional

techniques for hydrogen production such as ...

Mechanical energy storage method has geographical constraints such as in the case of Compressed Air Energy Storage systems, whereas electrical and chemical are prone to high losses in large scale ...

Many industrial environments have low-humidity requirements. However, most research focuses on dehumidification systems in civil buildings, while research on industrial low humidity environments is extremely limited. This paper aims to summarize the research of dehumidification systems in low-humidity industrial environments, and provide some ...

The passive ones are operated without energy input, which transferred heat between greenhouse inside air and the storage media [16e18]. The thermal storage materials which are widely used in this ...

Keywords: Sorption, Cooling, Heating, Power Generation, Dehumidification Important note: All contributions to this Research Topic must be within the scope of the section and journal to which they are submitted, as defined in their mission statements. Frontiers reserves the right to guide an out-of-scope manuscript to a more suitable section or journal at any stage of peer review.

Performance investigation of a novel frost-free air-source heat pump water heater combined with energy storage and dehumidification. ... heater performance. Further in-depth research is needed on ...

This research looks at various system performance parameters such as dehumidification rate, cooling capacity, COP, and effectiveness. It is discovered that the ...

Based on exergy balance model, its performance parameters, such as the cooling load, energy consumption and exergy efficiency, were calculated and compared with those of ...

Performance analysis of air curtains on indoor environment and dehumidification energy consumption in a low humidity plant Yubin Tang a School of Mechanical and Energy Engineering, Jimei University, Xiamen, China;b Fujian Province ...

In essence, this study provides a pathway for enterprises to realize tangible energy savings and emission reductions in the wood drying process, showcasing the potential of integrating solar energy, phase-change heat storage, and dehumidification for ...

Waste heat utilization is critical for efficient usage of energy, including waste heat driven heating, cooling, power generation, dehumidification, desalination technologies, etc. Sorption technology is one of the most promising methods to utilize low-grade energy. Recently, the volume of research on sorption systems has been growing rapidly, including new ...

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