

Can SOFC-based CCHP system integrate solar energy and chemical looping hydrogen generation?

Conclusions In this study, a novel SOFC-based CCHP system integrating solar energy and chemical looping hydrogen generation is proposed. The chemical looping hydrogen generation provides the fuel for SOFC and realizes the CO₂ capture. The SOFC exhaust and the CLHG exhaust are greatly mixed by solar PDC.

Does CCHP use full-spectrum solar energy?

Energy input and the primary energy-saving ratio of CCHHP system under various DNI conditions. 4. Conclusions A combined cooling, heating, hydrogen and power multi-generation system that integrates the spectral beam splitting, DRM and CCHP is proposed to make use of the full-spectrum solar energy. The main conclusions are shown below.

How is solar thermal energy used in combined cooling-heat-power (CCHP) systems?

Liu et al. introduced solar thermal energy into a combined cooling-heat-power (CCHP) system by storing and releasing solar thermal energy and excess heat from the flue gas pipeline through a thermal storage unit.

Why do solar panels have high exergy efficiency?

This high exergy efficiency is the result of the realization of full-spectrum solar energy utilization and gradient thermal energy utilization. Nevertheless, the exergy efficiency consistently lags behind the energy efficiency, primarily attributed to the lower quality grade of the system's cooling and heating outputs.

Who supports the study of primary energy in China?

This work was supported by the National Natural Science Foundation of China (No. 51976164). 1. A large amount of primary energy has been consumed with the development of human society, resulting in serious energy crises and environmental pollution. Clean and efficient utilization of energy...

What is a universal heat source?

Three universal heat sources exist in nature: the sun (~6000 K), the ambient air (~300 K), and the outer space (~3 K), which can be used for thermoelectrical power generation. The selective solar absorber (SSA) harvests solar radiation through photothermal effect, which can be used as the heat source during the daytime.

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