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Special Issue Reprint

Advanced Technology for Solar Thermal Cooling, Heating, and Energy Storage

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The Special Issue *"Advanced Technology for Solar Thermal Cooling, Heating, and Energy Storage"* highlights recent advances that expand the role of solar energy in meeting cooling, heating, and storage demands. Published contributions focus on innovative approaches to overcome the variability of solar resources while improving system efficiency and integration. The main topics include the development of advanced storage methods such as sorption, thermochemical, and phase change materials, which enable solar energy to be stored and released on demand. Several papers present hybrid configurations that combine thermal and electrical systems or integrate solar cooling with heating and power generation for multi-use applications. Other studies emphasize the optimization of heat transfer processes, the design of nanoparticle-enhanced materials, and the use of simulation tools and control strategies to improve system reliability. Case studies and experimental validations provide evidence of how these concepts perform under real conditions. Taken together, these studies highlight the advancing maturity of solar thermal technologies and their promise in delivering efficient, resilient, and sustainable energy systems of the future.

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