1. Record Nr. UNINA9911019094903321

| | |
|---|---|
| Autore | Odru Pierre |
| Titolo | Heat and Cold Storage, Volume 1 : Sensible and Latent Storage |
| Pubbl/distr/stampa | Newark : , : John Wiley & Sons, Incorporated, , 2024<br>©2024 |
| ISBN | 9781394312528<br>1394312520<br>9781394312511<br>1394312512<br>9781394312504<br>1394312504 |
| Edizione | [1st ed.] |
| Descrizione fisica | 1 online resource (296 pages) |
| Collana | ISTE Consignment Series |
| Altri autori (Persone) | Palomo Del BarrioElena |
| Soggetti | Heat storage<br>Cold storage |
| Lingua di pubblicazione | Inglese |
| Formato | Materiale a stampa |
| Livello bibliografico | Monografia |
| Nota di contenuto | Cover -- Title Page -- Copyright Page -- Contents -- Foreword -- Chapter 1. Sensible Heat Storage: Overview -- 1.1. Introduction -- 1.2. General principles -- 1.3. Storage configurations -- 1.4. Modeling of thermocline storage -- 1.5. References -- Chapter 2. Low-Temperature Sensible Heat Storage -- 2.1. Sensible heat storage associated with buildings -- 2.1.1. Short duration storage -- 2.1.2. Long duration (seasonal) solar heat storage -- 2.1.3. The stratification problem -- 2.2. Underground thermal energy storage -- 2.2.1. Principle of the aquifer thermal energy storage -- 2.2.2. Borehole thermal energy storage -- 2.2.3. Other types of underground storage -- 2.3. References -- Chapter 3. High-Temperature Heat Storage for Electricity -- 3.1. Heat storage associated with compressed air electricity storage -- 3.1.1. Adiabatic CAES -- 3.1.2. Thermal energy storage -- 3.1.3. Search project -- 3.1.4. SACRE project -- 3.2. Electricity storage by Carnot batteries -- 3.2.1. Modified Brayton cycle: operating principle -- 3.2.2. Modified Brayton cycle: energy balance -- 3.2.3. Feasibility -- 3.2.4. Potential characteristics of a thermal pumping system -- 3.2.5. |

Brayton cycle variant -- 3.2.6. Phase change cycle -- 3.3. References -- Chapter 4. Latent Heat Storage: Fundamentals and Most Widely Used Phase Change Materials -- 4.1. Fundamentals of latent heat storage -- 4.2. Phase change materials classification and criteria for selection -- 4.3. Commonly used PCMs -- 4.4. Tecno-economic evaluation -- 4.5. Emerging alternative materials -- 4.6. References -- Chapter 5. Engineering Phase Change Materials to Improve Their Properties and Broaden Applications -- 5.1. Introduction -- 5.2. Micro-/nanoencapsulated PCMs -- 5.2.1. Shell materials and encapsulation methods -- 5.2.2. Micro-/nanoencapsulated PCMs -- 5.2.3. Innovative designs for versatile applications.
5.3. Shape-stabilized PCMs -- 5.3.1. Overview of porous supports and preparation methods -- 5.3.2. Porous carbon-based SS-PCMs -- 5.3.3. Porous oxide-based SS-PCMs -- 5.3.4. Summary of porous supports and perspectives -- 5.4. Conclusion -- 5.5. References -- Chapter 6. Latent Heat Storage Systems: Concepts and Applications -- 6.1. Introduction -- 6.2. Types of systems and main components -- 6.2.1. LH-TESS classification -- 6.2.2. Materials -- 6.3. Cold storage -- 6.3.1. "Ice-on-tube" cold storage systems -- 6.3.2. Cold storage systems with encapsulated PCM -- 6.3.3. Cold storage systems with ice slurry -- 6.3.4. Cold storage systems with ice recovery -- 6.4. Applications in the building sector -- 6.4.1. Passive systems -- 6.4.2. Active use of PCM in buildings -- 6.5. Applications in industry -- 6.6. Concentrated solar power plants -- 6.7. Other domains -- 6.8. Conclusion -- 6.9. References -- Chapter 7. Use of Hydrates for Cold Storage and Distribution in Refrigeration and Air-Conditioning Applications -- 7.1. Introduction -- 7.2. Hydrate definition and properties -- 7.2.1. Definition of gas hydrates -- 7.2.2. Clathrate hydrate structures -- 7.2.3. Semiclathrate structures -- 7.2.4. Hydration number -- 7.2.5. Phase diagram of water-CO2 mixtures including CO2 hydrates -- 7.3. Hydrate systems for cold storage and distribution -- 7.3.1. Refrigerant gas hydrate applied to cold storage -- 7.3.2. CO2 hydrates applied to cold storage and distribution -- 7.3.3. Quaternary salt hydrates for cold storage and distribution -- 7.3.4. Other hydrates applied to cold storage and distribution -- 7.3.5. Mixed gas-salt/THF hydrates for cold storage and distribution -- 7.4. Criteria for use of hydrates in refrigeration -- 7.4.1. Thermodynamic criterion -- 7.4.2. Flow criterion -- 7.4.3. Thermal criterion -- 7.4.4. Kinetic criterion.
7.4.5. Energy and environment criterion -- 7.5. Hydrate applications in refrigeration and air-conditioning -- 7.5.1. Slurry generation methods -- 7.5.2. Examples of hydrate-based refrigeration systems -- 7.6. Conclusion -- 7.7. References -- Chapter 8. Concentrated Solar Power Plants and Storage -- 8.1. Introduction -- 8.2. Concentrated solar power plants and storage -- 8.2.1. General principles -- 8.2.2. Objectives and strategy -- 8.2.3. Global performances and efficiency -- 8.3. Storage types -- 8.3.1. Sensible heat storage -- 8.3.2. Latent heat storage -- 8.3.3. Thermochemical storage -- 8.3.4. Materials and fluids -- 8.3.5. Other components -- 8.4. Analysis of systems -- 8.4.1. Active systems -- 8.4.2. Passive systems -- 8.4.3. Technical-economic analysis -- 8.4.4. Life cycle analysis, efficiency, concentration and eco-design -- 8.5. References -- List of Authors -- Index -- Summary of Volume 2 -- EULA.

Sommario/riassunto

This book explores the principles and applications of heat and cold storage, focusing on both sensible and latent storage methods. It addresses various storage configurations, modeling, and the role of heat storage in electricity systems. The work also delves into the use of phase change materials (PCMs), discussing their properties, selection criteria, and technological advancements. With contributions from

experts in the field, the book provides insights into engineering solutions for improving PCM properties and extending their applications. The intended audience includes researchers, engineers, and professionals in the energy sector seeking to enhance their understanding of thermal energy storage technologies.