Revised on April 14, 2026

DING Zhixiong (丁志雄)

Institute: Shenzhen University **Position:** Distinguished Professor

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Academic index: h-index: 21; i10-index: 29

National Excellent Young Scientists (Overseas)

National Registered Utility Engineer (HVAC)

Employment Experience

2026/03-present - Professor

College of Civil and Transportation Engineering, Shenzhen University

2024/09-2026/03 - Postdoc

School of Energy and Environment, City University of Hong Kong

2019/03-2020/08 - Research Assistant

School of Energy and Environment, City University of Hong Kong

2016/07-2019/02 - Engineer (HVAC)

Shanghai Municipal Engineering Design Institute (Group) Co., Ltd.

Education Experience

2020/09-2024/08 - PhD Degree in Energy @ Prof. Wu Wei's Group

School of Energy and Environment, City University of Hong Kong

2013/09-2016/06 - Master's Degree in HVAC @ Prof. Chen Youming's Group

College of Civil Engineering, Hunan University

2009/09-2013/06 - Bachelor's Degree in HVAC

College of Civil Engineering, Hunan University

Main research achievements

The main research direction is the efficient utilization of renewable energy, focusing on absorption thermal battery toward carbon neutrality. Published/accepted more than 50 academic papers, 35 SCI listed, including **17 first-author SCI papers (average IF=11.3, JCR Q1=15)**; published a book by Elsevier; received more than 1400 total citations, h-index=21; authorized **3 Chinese and 3 US patents**, applied for other 1 Chinese and 1 US patents; obtained qualifications certificate of National Registered Utility Engineer (HVAC) and HVAC and Power Design Engineer; participated in more than 20 HVAC engineering projects and 1 technical guideline; invited as **guest editor** of SCI Journals (Sustainability, Energies, Symmetry), **session chair** at the International Conference on Energy Engineering 2024, **reviewers of more than 10 SCI journals** (Renewable and Sustainable Energy Reviews, Applied Energy, Energy Conversion and Managment, Renewable Energy, Energy, etc.)

Awards

- Best Paper Award at the International Conference on Sustainable Energy Development, 2025.
- Best Poster at the International Conference for Global Chinese Academia on Energy and Artificial Environments, 2025
- **Silver Medal at the International Exhibition of Inventions Geneva, 2025.**
- **Gold Medals at the China International Invention and Innovation Exhibition, 2025.**
- Best Oral presentation on International Conference on Energy Engineering, 2024
- **Distinguished PhD Candidate in 2023 for Energy and Built Environment Journal, 2023 (**3 from all over the world every 2 years**)**
- **Gold Award on Asia International Innovative Invention Exhibition, 2023**
- Research Tuition Scholarship (10%), City University of Hong Kong, 2021,2022 &2023 (3 times)
- Outstanding Academic Performance Award for Research Degree Students (15%), City University of Hong Kong, 2021,2022 &2023 (3 times)
- Excellent Volunteer, Applied Energy Innovation Institute, 2020&2021
- Environmental Paper Award of 2020/2021. The Hong Kong Institution of Engineers (HKIE) (first author), 2021
- Excellent Volunteer of the 12th International Conference on Applied Energy, 2020
- Research Studentship, University Grants Committee of Hong Kong, 2020~2024
- Outstanding scholar of Urban Transportation & Underground Space Design Institute, 2017
- Full scholarship for master's degree from Hunan University, 2013~2016
- Individual scholarships of Hunan University, 2012
- Excellent Psychology Committee, Hunan University, 2011
- Individual scholarships of Hunan University, 2011
- Outstanding Club Cadre of Hunan University, 2010

Hosted Projects

[1] National Natural Science Fund for Excellent Young Scientists Fund Program(Overseas), Absorption thermochemical energy storage for buildings, 2026-2029, Person in Charge

[2] City University of Hong Kong/HKSTP, HK Tech 300 Seed Fund, SF202309368, Advanced solar-driven absorption thermal batteries for cooling and heating, 2023/11-2024/11, 200,000 HKD, Person in Charge

Involved Projects

[1] General Research Fund (GRF): Ternary deep-eutectic-solvents tuned by carbon-quantum-dot for large-concentration-glide and highly-stable membrane-mediated microchannel absorption thermal battery with swirling enhancement. (01/01/2026-31/12/2028)

[2] General Research Fund (GRF): Membrane-based Moisture Desorption-Absorption with Carbon Quantum Dot-enhanced Ionic Liquid for High-flux Passive PV Cooling and Water Harvesting. (01/01/2023-31/12/2025)

[3] General Research Fund (GRF): Microchannel Membrane-based IoNanofluid Reactor with

Machine-learning Optimization for High-density and Low-temperature Absorption Thermal Energy Storage. (01/01/2022-31/12/2024)

[4] General Research Fund (GRF): Microchannel Membrane-based Absorbers using Surfactant-modified Ionic Liquids for Heat/Mass Transfer Enhancement towards Compact and Crystallization-free Absorption Heat Pumps. (01/09/2020-31/08/2023)

[5] Early Career Scheme (ECS): Development of a Hybrid Absorption Thermal Energy Storage Technology with Higher Storage Density, Higher Storage Efficiency and Lower Charging Temperatures. (01/08/2019-31/01/2023)

[6] Environment and Conservation Fund (ECF): Versatile PV Technology Using Super-hygroscopic Hydrogel Membrane for Synergetic Power Generation, Water Harvesting, and Dehumidification in Hong Kong. (01/01/2024-31/12/2025)

[7] Guangdong Natural Science Foundation: Research on the Enhancement Mechanism and Matching Optimization of Solar Double-effect Compression-assisted Absorption Thermochemical Energy Storage. (01/01/2022-31/12/2024)

[8] Sichuan Natural Science Foundation: Cycle mechanism and matching optimization of integrated ionic liquid absorption and phase change material energy storage. (01/01/2022-31/12/2023)

[9] Shenzhen Science and Technology Innovation Committee: Cycle mechanism and fluid screening of high-performance absorption Carnot battery. (01/11/2024-31/10/2027)

[10] Shenzhen Science and Technology Innovation Committee: Solar thermochemical energy storage mechanism and machine learning optimization of carbon quantum dot-ionic liquid. (24/11/2023-30/11/2026)

[11] Shenzhen Science and Technology Innovation Committee: Mechanism of Efficiency-enhancement and Frost-inhibition of Super-hydrophobic Nano-coated Microchannels for Electric Vehicle Heat Pumps. (01/09/2021-31/08/2023)

[12] Shenzhen Science and Technology Innovation Committee: Research and Development of Key Technologies of High-efficiency Cooling/Heating Systems for Electric Vehicles. (16/09/2020-16/09/2022)

[13] Industrial collaboration project with Towngas: Comprehensive comparisons of HVAC systems with and without desiccant dehumidifier. (01/02/2019-31/01/2020)

Book

[1] Wei Wu, ***Zhixiong Ding***, Yunren Sui. Absorption Thermal Energy Storage: Fundamentals and Advances. Elsevier, 2026.

Publications

✧ **First author：**

[1] **Ding, Z.**, Sui, Y., Sui, Z., Lin, H., Li, F., & Wu, W. (2025). Solar-driven hygroscopic-material-based absorption thermal battery for global heating decarbonization. ***Energy Storage Materials***, 77, 104184. (SCI JCR Q1, IF=20.2)

[2] **Ding, Z.**, & Wu, W. (2025). Large-temperature-lift energy storage heat transformer for deep thermal energy utilization. ***Applied Energy***, 384, 125481. (SCI JCR Q1, IF=11)

[3] **Ding, Z.**, & Wu, W. (2024). Dynamic characteristics and performance enhancement of two-stage absorption thermal battery for long-term renewable energy storage. ***Applied Energy***, 377, 124752. (SCI JCR Q1, IF=11)

[4] **Ding, Z.**, & Wu, W. (2024). Simulation of a multi-level absorption thermal battery with variable solution flow rate for adjustable cooling capacity. ***Energy***, 301, 131691. (SCI SCI JCR Q1, IF=9.4)

[5] **Ding, Z.**, Wu, W. (2024). A phase-change-material-assisted absorption thermal battery for space heating under low ambient temperatures. ***Energy***, 131407. (SCI JCR Q1, IF=9.4)

[6] **Ding, Z.**, Sui, Y., Lin, H., Luo, X., Wang, H., Chen Y., Liang Y., & Wu, W. (2023). Experimental study on a two-stage absorption thermal battery with absorption-enhanced generation for high storage density and extremely low charging temperature (~50 ºC). ***Applied Energy***, 363, 123050. (SCI JCR Q1, IF=11)

[7] **Ding, Z.**, Sui, Y., Zhai, C., Sui, Z., Lin, H., Li, F., & Wu, W. (2023). Transient supply-demand matching and numerical parametric study of solar absorption thermal battery for space cooling. ***Energy Conversion and Management***, 288, 117177. (SCI JCR Q1, IF=10.9)

[8] **Ding, Z.**, Wu, W., Huang, S. M., Huang, H., Bai, Y., & He, Z. (2023). A novel compression-assisted energy storage heat transformer for low-grade renewable energy utilization. ***Energy***, 263, 125681. (SCI JCR Q1, IF=9.4)

[9] **Ding, Z.**, Wu, W. (2022). Type II absorption thermal battery for temperature upgrading: Energy storage heat transformer. ***Applied Energy***, 342, 119748. (SCI JCR Q1, IF=11)

[10] **Ding, Z.**, Wu, W., & Leung, M. K. (2022). On the rational development of advanced thermochemical thermal batteries for short-term and long-term energy storage. ***Renewable and Sustainable Energy Reviews***, 164, 112557. (SCI JCR Q1, IF=16.3)

[11] **Ding, Z.**, & Wu, W. (2022). A novel double-effect compression-assisted absorption thermal battery with high storage performance for thermal energy storage. ***Renewable Energy***, 191, 902-918. (SCI JCR Q1, IF=9.1)

[12] **Ding, Z.**, Yu, X., Ma, Z., Wu, W., Zhang, L., Denis, Y. W., & Cheng, D. H. (2022). On-site measurement and simulation investigation on condensation dehumidification and desiccant dehumidification in Hong Kong. ***Energy and Buildings***, 254, 111560. (SCI JCR Q1, IF=7.1)

[13] **Ding, Z.**, Wu, W., & Leung, M. (2021). Advanced/hybrid thermal energy storage technology: material, cycle, system and perspective. ***Renewable and Sustainable Energy Reviews***, 145, 111088. (SCI JCR Q1, IF=16.3)

[14] **Ding, Z.**, & Wu, W. (2021). A hybrid compression-assisted absorption thermal battery with high energy storage density/efficiency and low charging temperature. ***Applied Energy***, 282, 116068. (SCI JCR Q1, IF=11)

[15] **Ding, Z.**, Wu, W., Chen, Y., & Li, Y. (2020). Dynamic simulation and parametric study of solar water heating system with phase change materials in different climate zones. ***Solar***

Energy, 205, 399-408. (SCI JCR Q2, IF=6.6)

[16] **Ding, Z.**, Wu, W., Chen, Y., & Leung, M. (2020). Dynamic characteristics and performance improvement of a high-efficiency double-effect thermal battery for cooling and heating. ***Applied Energy***, 264, 114768. (SCI JCR Q1, IF=11)

[17] **Ding, Z.**, Wu, W. (2022). Dynamic discharging characteristics of absorption thermal battery under different capacity regulation strategies. ***Energy and Built Environment***, 4 (3), 341-353. (SCI)

[18] **Ding, Z.**[#], Sui, Y.[#], Wu, W. (2025). Absorption Thermal Battery: A Rising Frontier for Efficient Thermal Utilization and Renewable Integration. ***Energy Use***, 1 (1), 100002.

[19] **Ding, Z.**, Sui, Y., Wu, W. (2026). Unlocking Solar Cooling Potential with Absorption Thermal Battery. ***The Innovation Energy***. (Accepted)

[20] **Ding, Z.**, Wu, W. (2026). "Solution" for future heating and cooling towards carbon neutrality. ***Energy Reviews***. (Accepted)

[21] Ding, Z., Wu, W. (2025). Experimental investigation on solar-driven absorption thermal battery for space cooling. ***International Conference on Energy Engineering 2025*** (**Invited Presented**)

[22] **Ding, Z.**, Wu, W. (2024). A novel low-grade two-stage absorption thermal battery for high temperature upgrading. ***International Conference on Energy Engineering 2024*** (Presented)

[23] **Ding, Z.**, Wu, W. (2024). Experimental investigation on solar-driven absorption thermal battery with condensation heat recovery for space heating. ***International Sorption Heat Pump Conference 2024*** (Presented)

[24] **Ding, Z.**, Wu, W. (2024). Dynamic characteristics and performance enhancement of two-stage absorption thermal battery for long-term renewable energy storage. ***China Heat Pump Conference 2024*** (Presented)

[25] **Ding, Z.**, Wang, Z., Wu, W. (2023). A novel multi-level absorption thermal battery with variable solution flow rate for adjustable output capacity. ***International Conference on Polygeneration 2023*** (Presented)

[26] **Ding, Z.**, Wu, W., Huang S. (2021). A novel compression-assisted absorption thermal energy storage heat transformer for low-grade energy utilization. ***International Conference on Polygeneration 2021*** (Presented)

[27] **Ding, Z.**, Wu, W., & Leung, M. (2020). Optimization of the compressor displacement for compression-assisted absorption thermal battery. ***International Conference on Applied Energy 2020*** (Presented)

[28] **Ding, Z.**[#], Sui, Y.[#], & Wu, W. (2025). Research Progress in Absorption Thermal Energy Storage. ***Journal of Refrigeration.*** 46 (3), 11-23. (in Chinese)

[29] **Ding Z.** Simulation and Influencing Factors Analysis of Multi-Couple Unit System Performance Evaluation Index (APF). ***Contamination Control & Air-Conditioning Technology***, 2018; 2: 5-8. (in Chinese)

[30] **Ding Z.**, Chen Y. Energy Saving Analysis of Gravity Vapor Chamber Roof Used in

Communication Base Station. ***Building Science***, 2016; 32(4): 102-107. (in Chinese)

[31] **Ding Z.**, Chen Y. Study on the Application of Phase Change Energy Storage in Solar Water Heater System. ***Science Technology and Engineering***, 2015; 15(34): 45-49. (in Chinese, EI)

✧ **Co-author：**

[1] Sui, Y., **Ding, Z.**, Sui, Z., Li, F., Lin, H., & Wu, W. (2026). A flexible hybrid-energy heat pump using efficient ionic liquids for sustainable solar cooling. ***Applied Energy***. 408, 127372. (SCI, JCR Q1, IF=11)

[2] Yan, P., **Ding, Z.**, & Wu, W. (2025). Cost strategy-integrated geometry selection of phase change material macro-capsule for latent thermal energy storage. ***Applied Energy***. 402, 126883. (SCI, JCR Q1, IF=11)

[3] Lin, H.[#], Song, Y.[#], **Ding, Z.**, Sui, Y., Sui, Z., Li, F., Zhu, J, Wu, W. (2025). Multi-stage power-to-water battery synergizes flexible energy storage and efficient atmospheric water harvesting. ***Nature Communications***. 16 (1), 11098. (SCI, JCR Q1, IF=15.7)

[4] Sui, Z., Lin, H., Sui, Y., **Ding, Z.**, Zeng, W., Wu, W. (2025). Research and Application Progress of Sorption-Based Energy and Water Saving Technologies in Data Centers. ***Journal of Refrigeration.*** 1-14. (in Chinese)

[5] Sui, Y., **Ding, Z.**, Sui, Z., Lin, H., Li, F., & Wu, W. (2025). Seasonal thermochemical energy storage with affordable and high-energy-density deep eutectic solvents. ***Applied Energy***. 386, 125577. (JCR Q1, IF=10.1)

[6] Li, F., Sui, Y., Lin, H., Sui, Z., Lee, K., Xie, S., Zeng, W., **Ding, Z.**, Yip, H., Wu,W. (2024). Self-adaptive interfacial evaporation for high-efficiency photovoltaic panel cooling. ***Device***, 3(2), 100569. (**A sister journal to *Cell***)

[7] Sui, Z., Sui, Y., **Ding, Z.**, Lin, H., Li, F., Yang R., Wu, W. (2024). A protocol of moisture-desorptive passive cooling for electronics thermal management. ***STAR Protocols***. 5(2), 103033. (**Cell press**)

[8] Sui, Y., Lin, H., **Ding, Z.**, Li, F., Sui, Z., & Wu, W. (2024). Compact, Efficient, and Affordable Absorption Carnot Battery for Long-term Renewable Energy Storage. ***Applied Energy***. 357, 122504. (JCR Q1, IF=10.1)

[9] Sui, Z., Sui, Y., **Ding, Z.**, Lin, H., Li, F., Yang, R., & Wu, W. (2023). Membrane-encapsulated, moisture-desorptive passive cooling for high-performance, ultra-low-cost, and long-duration electronics thermal management. ***Device***, 1(6). (**A sister journal to *Cell***)

[10] Lin, H., Li, F., Sui, Y., Sui, Z., **Ding, Z.**, Xie, S., Zhai, C., & Wu, W. (2023). Versatile Power-to-Water Battery for Energy Storage, Atmospheric Water Harvesting, and Humidity Control. ***ACS Applied Materials & Interfaces***. 15, 30, 36107–36116 (JCR Q1, IF=8.3)

[11] Sui, Y., **Ding, Z.**, Zhai, C., Lin, H., & Wu, W. (2023). Crystallization-free and low-cost deep eutectic solvents for absorption thermal battery utilizing ultra-low-grade energy. ***Energy Conversion and Management***, 284, 116984. (JCR Q1, IF=9.9)

[12] Wu, W., Zhai, C., Huang, S. M., Sui, Y., Sui, Z., & **Ding, Z.** (2022). A hybrid H_2O/IL absorption and CO2 compression air-source heat pump for ultra-low ambient

temperatures. ***Energy***, 239, 122180. (JCR Q1, IF=9.0)

[13] Wu, W., **Ding, Z.**, Sui, Y., & Leung, M. (2021). Comparative dynamic performance of hybrid absorption thermal batteries using H2O/1, 3-dimethylimidazolium dimethylphosphate. ***Energy Conversion and Management***, 228, 113690. (JCR Q1, IF= 9.9)

[14] Li, Y., **Ding, Z.**, & Du, Y. (2020). Techno-economic optimization of open-air swimming pool heating system with PCM storage tank for winter applications. ***Renewable Energy***, 150, 878-890. (JCR Q1, IF=9.0)

[15] Li, Y., **Ding, Z.**, Shakerin, M., & Zhang, N. (2020). A multi-objective optimal design method for thermal energy storage systems with PCM: A case study for outdoor swimming pool heating application. ***Journal of Energy Storage***, 29, 101371. (JCR Q1, IF=8.9)

[16] Zhou, Y., Zheng, S., Liu, Z., Wen, T., **Ding, Z.**, Yan, J., & Zhang, G. (2020). Passive and active phase change materials integrated building energy systems with advanced machine-learning based climate-adaptive designs, intelligent operations, uncertainty-based analysis and optimisations: A state-of-the-art review. ***Renewable and Sustainable Energy Reviews***, 130, 109889. (JCR Q1, IF=16.3)

[17] Wu, W., Leung, M., **Ding, Z.**, Huang, H., Bai, Y., & Deng, L. (2020). Comparative analysis of conventional and low-GWP refrigerants with ionic liquid used for compression-assisted absorption cooling cycles. ***Applied Thermal Engineering***, 115145. (JCR Q1, IF=6.1)

[18] Li, Y., Zhang, N., & **Ding, Z.** (2020). Investigation on the energy performance of using air-source heat pump to charge PCM storage tank. ***Journal of Energy Storage***, 28, 101270. (SCI, IF=9.4, Q1)

[19] Wu, W., Bai, Y., Huang, H., **Ding, Z.**, & Deng, L. (2019). Charging and discharging characteristics of absorption thermal energy storage using ionic-liquid-based working fluids. ***Energy***, 189, 116126. (JCR Q1, IF=9.0)

[20] Sui, Y., **Ding, Z.**, & Wu, W. (2025). Research on Absorption Thermochemical Energy Storage Working Fluids. ***The 4th International Conference on Sustainable Energy Development***

[21] Liang, G., Lin, L., **Ding, Z.**, Zeng, W., Li, F., Yao, S., & Wu, W. (2025). Optimization of thermal flux decoupling via spectral splitting in hybrid PV-desalination systems. ***CUE2025 Conference***

[22] Wu W., Luo X., **Ding Z.**, Yang Z., &Chen Y. (2019). Hybrid compression-assisted absorption thermal energy storage. ***18th International Conference on Sustainable Energy Technologies***

[23] Jiang H., Chen Y., Liu J., **Ding Z.**, Fu Q., Jiang C. (2014). Self-adaptive control to improve energy efficiency and thermal comfort for variable air volume system. 13th International Conference on Indoor Air Quality and Climate, ***Indoor Air 2014***

Patents

[1] Chen Youming, **Ding Zhixiong**. An energy-saving roof and its production method. ZL 201410676007.5 (Granted)

[2] Wu Wei, **Ding Zhixiong**. A two-stage absorption thermal energy storage device and its operating method. ZL 202210568073.5 (Granted)

[3] Wu Wei, **Ding Zhixiong**. Compression-assisted multi-effect absorption thermal energy storage device and its operating method. ZL 202110264796.1 (Granted)

[4] Wu Wei, **Ding Zhixiong**, Sui Yunren, Zhai Chong, Sui Zengguang. A compact membrane-based thermochemical energy storage system. US. No. 11,988,454 (Granted)

[5] Wu Wei, Zhai Chong, Sui Zengguang, Sui Yunren, **Ding Zhixiong**. A compact membrane-based absorption heat pump. US. No. 12,000,630 (Granted)

[6] Wu Wei, Sui Yunren, Lin Haosheng, **Ding Zhixiong**. Absorption Carnot Battery. US. No. 12,168,944 (Granted)

[7] Wu Wei, **Ding Zhixiong**, Sui Yunren. A hybrid thermal energy storage device combining absorption cycle and latent thermal phase change and its multi-level operation method. CN (In application)

[8] Wu Wei, Li Fuxiang, Sui Zengguang, **Ding Zhixiong**, Sui Yunren, Zhai Chong, Lin Haosheng. Membrane-based desorption cooling method for passive thermal management. US (In application)