DAFTAR PUSTAKA

Abedin, A. H., & Rosen, M. A. (2011). A Critical Review of Thermochemical Energy Storage Systems. In *The Open Renewable Energy Journal* (Vol. 4).

Adem, J. K., Shimelis, E., Oumer, A., Park, S., Gwon, S., Yang, B., & Kim, G. M. (2025). Application of FTIR, Raman, and TGA in carbonation of cementitious materials: A review. In *Journal of Building Engineering* (Vol. 114). Elsevier Ltd. https://doi.org/10.1016/j.jobe.2025.114228

Altuğ, D. T., Kalaycı, T., Kınaytürk, N. K., & Tunalı, B. (2025). Research in Applications of Eggshell in Different Industries. *Bilecik Şeyh Edebali Üniversitesi Fen Bilimleri Dergisi*, *12*(1), 354–366. https://doi.org/10.35193/bseufbd.1476075

Aneke, M., & Wang, M. (2016). Energy Storage Technologies and Real Life Applications - A state of the art review. *Applied Energy*, *179*, 350–377. https://doi.org/10.1016/j.apenergy.2016.06.097

Araujo, J. A., Cortese, Y. J., Mojicevic, M., Brennan Fournet, M., & Chen, Y. (2021). Composite Films of Thermoplastic Starch and CaCl2 Extracted from Eggshells for Extending Food Shelf-Life. *Polysaccharides*, *2*(3), 677–690. https://doi.org/10.3390/polysaccharides2030041

Awogbemi, O., Von Kallon, D. V., & Aigbodion, V. S. (2022). Pathways for Sustainable Utilization of Waste Chicken Eggshell. In *Journal of Renewable Materials* (Vol. 10, Number 8, pp. 2217–2246). Tech Science Press. https://doi.org/10.32604/jrm.2022.019152

Aydin, D., Casey, S. P., & Riffat, S. (2015). The latest advancements on thermochemical heat storage systems. *Renewable and Sustainable Energy*

Reviews, *41*, 356–367. https://doi.org/https://doi.org/10.1016/j.rser.2014.08.054

Badan Pusat Statistik. (2026, January 27). *Volume Produksi Pertambangan Bahan Galian (M3), 2024*. Badan Pusat Statistik Indonesia. https://www.bps.go.id/id/statistics-table/2/NTEwIzI=/volume-produksi-pertambangan-bahan-galian--m3-.html

Beaupere, N., Soupremanien, U., & Zalewski, L. (2018). Nucleation triggering methods in supercooled phase change materials (PCM), a review. *Thermochimica Acta*, *670*, 184–201. https://doi.org/10.1016/j.tca.2018.10.009ï

Britannica, & The Editors of Encyclopaedia Britannica. (2025, July 26). *energy*. Britannica. https://www.britannica.com/science/energy

Cabeza, L. F., Castell, A., Barreneche, C., Gracia, A. de, & Fernanez, A. I. (2011). Materials used as PCM in thermal energy storage in buildings: A review. *Renewable and Sustainable Energy Reviews*, *15*(3), 1675–1695. https://doi.org/https://doi.org/10.1016/j.rser.2010.11.018

Cao, F., Zheng, Y., Chen, C.-H., & Bonner, R. (2018). *Thermal energy storage with tunable melting point phase change materials*. 16.

Cao, S., Luo, X., Han, X., Lu, X., & Zou, C. (2022). Development of a New Modified CaCl2·6H2O Composite Phase Change Material. *Energies*, *15*(3). https://doi.org/10.3390/en15030824

Carlsson, B. (2009a). Phase change behaviour of some latent heat storage media based on calcium chloride hexahydrate. *Solar Energy*, *83*(4), 485–500. https://doi.org/10.1016/j.solener.2008.09.004

Carlsson, B. (2009b). Phase change behaviour of some latent heat storage media based on calcium chloride hexahydrate. *Solar Energy*, *83*(4), 485–500. https://doi.org/10.1016/j.solener.2008.09.004

Day, Z. (2016). *Preliminary Studies in Using X-Ray Diffraction for Analyzing the Preliminary Studies in Using X-Ray Diffraction for Analyzing the Atomic Structure of Central Plains Tradition Constituents* [Thesis, University of Nebraska]. https://digitalcommons.unl.edu/anthrotheses/42

De Gracia, A., & Cabeza, L. F. (2015). Phase change materials and thermal energy storage for buildings. In *Energy and Buildings* (Vol. 103, pp. 414–419). Elsevier Ltd. https://doi.org/10.1016/j.enbuild.2015.06.007

Desai, F., Jenne, S. P., Muthukumar, P., & Rahman, M. M. (2021). Thermochemical energy storage system for cooling and process heating applications: A review. *Energy Conversion and Management*, *229*(113617). https://doi.org/https://doi.org/10.1016/j.enconman.2020.113617

Diab, E., Motawa, I., & Elshikh, M. (2025). Improving the performance of phase-change microcapsules for application in single spaces in hot climates. *International Journal of Building Pathology and Adaptation*. https://doi.org/10.1108/IJBPA-09-2024-0203

Dincer, I., Dost, S., & Li, X. (1997). Performance analyses of sensible heat storage systems for thermal applications. *International Journal of Energy Research*, *23*(10), 1157–1171.

Direktorat Statistik Peternakan Perikanan dan Kehutanan. (2024). *Peternakan Dalam Angka 2024* (Direktorat Statistik Peternakan Perikanan dan Kehutanan, Ed.; Vol. 9). Badan Pusat Statistik.

Dixit, P., Reddy, V. J., Parvate, S., Balwani, A., Singh, J., Maiti, T. K., Dasari, A., & Chattopadhyay, S. (2022). Salt hydrate phase change materials: Current state of art and the road ahead. *Journal of Energy Storage*, *51*(104360). https://doi.org/https://doi.org/10.1016/j.est.2022.104360

Du, K., Calautit, J., Wang, Z., Wu, Y., & Liu, H. (2018). A review of the applications of phase change materials in cooling, heating and power generation in different temperature ranges. In *Applied Energy* (Vol. 220, pp. 242–273). Elsevier Ltd. https://doi.org/10.1016/j.apenergy.2018.03.005

Dutt Sharma, S., Kitano, H., & Sagara, K. (2004). Phase Change Materials for Low Temperature Solar Thermal Applications. In *Res. Rep. Fac. Eng. Mie Univ* (Vol. 29).

EIA. (2024, December 10). *What is energy?* U.S. Energy Information Administration. https://www.eia.gov/energyexplained/what-is-energy/

Elarem, R., Alqahtani, T., Mellouli, S., Askri, F., Edacherian, A., Vineet, T., Badruddin, I. A., & Abdelmajid, J. (2021). A comprehensive review of heat transfer intensification methods for latent heat storage units. *Energy Storage*, *3*(1). https://doi.org/10.1002/est2.127

Elias, C. N., & Stathopoulos, V. N. (2019a). A comprehensive review of recent advances in materials aspects of phase change materials in thermal energy storage. *Energy Procedia*, *161*, 385–394. https://doi.org/10.1016/j.egypro.2019.02.101

Elias, C. N., & Stathopoulos, V. N. (2019b). A comprehensive review of recent advances in materials aspects of phase change materials in thermal energy storage. *Energy Procedia*, *161*, 385–394. https://doi.org/10.1016/j.egypro.2019.02.101

Ermiş, K., & Findik, F. (2020). Thermal energy storage. In *Energy Storage* (Vol. 2, pp. 66–88). ARDA. https://doi.org/10.37868/sei.v2i2.115

Farid, M. M., Khudhair, A. M., Razack, S. A. K., & Al-Hallaj, S. (2004). A review on phase change storage: materials and applications. *Energy Conversion and Management*, *45*, 1597–1615.

Fatimah, S., Ragadhita, R., Fitria, D., Husaeni, A., Bayu, A., & Nandiyanto, D. (2021). *How to Calculate Crystallite Size from X-Ray Diffraction (XRD) using Scherrer Method*. https://doi.org/10.17509/ijost.v6ix

Garnjanagoonchorn, W., & Changpuak, A. (2007). Preparation and partial characterization of eggshell calcium chloride. *International Journal of Food Properties*, *10*(3), 497–503. https://doi.org/10.1080/10942910600919484

Ge, Z., Li, Y., Li, D., Sun, Z., Jin, Y., Liu, C., Li, C., Leng, G., & Ding, Y. (2014). Thermal energy storage: Challenges and the role of particle technology . *Particuology*, *15*, 2–8. https://doi.org/https://doi.org/10.1016/j.partic.2014.03.003

Hale, D. V, Hoover, M. J., & O'neill, M. J. (1971). *Phase Change Material Handbook*. https://doi.org/http://dx.doi.org/2060/19720012306

Hirschey, J., Gluesenkamp, K. R., Mallow, A., & Graham, S. (2018). Review of Inorganic Salt Hydrates with Phase Change Temperature in Range of 5 to 60°C and Material Cost Comparison with Common Waxes. *International High Performance Building Conference*. https://docs.lib.purdue.edu/ihpbc/320

IEA. (2025a). *Global Energy Review 2025*. https://www.iea.org/reports/global-energy-review-2025

IEA. (2025b). *World Energy Outlook 2025*. https://www.iea.org/reports/world-energy-outlook-2025

IRENA. (2020). *Innovation Outlook: Thermal Energy Storage*. International Renewable Energy Agency. www.irena.org

Jordan, J. (2016, October 27). *What is x-ray diffraction?* https://www.jeremyjordan.me/what-is-x-ray-diffraction/

Josh Charles, Xingchao Wang, Carlos E. Romero, & Sudhakar Neti. (2019). Experimental Characterization of Low-Temperature Inorganic. Phase Change Materials by Differential Scanning Calorimetry. *Journal of Advanced Thermal Science Research*, *6*, 71–84. https://doi.org/10.15377/2409-5826.2019.06.8

Jouhara, H., Żabnieńska-Góra, A., Khordehgah, N., Ahmad, D., & Lipinski, T. (2020a). Latent thermal energy storage technologies and applications: A review. *International Journal of Thermofluids*, *5–6*. https://doi.org/10.1016/j.ijft.2020.100039

Jouhara, H., Żabnieńska-Góra, A., Khordehgah, N., Ahmad, D., & Lipinski, T. (2020b). Latent Thermal Energy Storage Technologies and Applications: A Review. *International Journal of Thermofluids*, *5–6*. https://doi.org/https://doi.org/10.1016/j.ijft.2020.100039

Kamidollayev, T., Trelles, J. P., Thakkar, J., & Kosny, J. (2022). Parametric Study of Panel PCM–Air Heat Exchanger Designs. *Energies*, *15*(15). https://doi.org/10.3390/en15155552

Karunadasa, S. (2019). *Dehydration of Calcium Chloride as Examined by High-temperature X-ray Powder Diffraction*.

Kenisarin, M., & Mahkamov, K. (2016). Salt hydrates as latent heat storage materials:Thermophysical properties and costs. In *Solar Energy Materials and Solar Cells* (Vol. 145, pp. 255–286). Elsevier. https://doi.org/10.1016/j.solmat.2015.10.029

Kinaytürk, N. K., Tunali, B., & Türköz Altuğ, D. (2021). Eggshell as a biomaterial can have a sorption capability on its surface: A spectroscopic research. *Royal Society Open Science*, *8*(6). https://doi.org/10.1098/rsos.210100

Kumar, A., & Shukla, S. K. (2015). A Review on Thermal Energy Storage Unit for Solar Thermal Power Plant Application. *Energy Procedia*, *74*, 462–469. https://doi.org/10.1016/j.egypro.2015.07.728

Leclaire, A., & Borel, M. M. (1977a). Le dichlorure de calcium dihydrate. *Acta Crystallographica, Section B*, *33*, 1608–1610. https://doi.org/https://doi.org/10.1107/S0567740877006645

Leclaire, A., & Borel, M. M. (1977b). Le dichlorure et le dibromure de calcium hexahydrates. *Acta Crystallographica B (24,1968-38,1982)*, *33*, 2938–2940. https://doi.org/https://doi.org/10.1107/S0567740877009881

Leclaire, A., & Borel, M. M. (1979). Liaisons hydrogène et coordination du calcium dans les cristaux de CaCl2.4H2Oα. *Acta Crystallographica, Section B*, *35*, 585–588.

Mazur, N., Blijlevens, M. A. R., Ruliaman, R., Fischer, H., Donkers, P., Meekes, H., Vlieg, E., Adan, O., & Huinink, H. (2023). Revisiting salt hydrate selection for domestic heat storage applications. *Renewable Energy*, *218*. https://doi.org/10.1016/j.renene.2023.119331

Mekuye, B., Mebratie, G., Abera, B., Yibeltal, A., Lake, A., & Tefera, A. (2024). Energy: An Overview of Type, Form, Storage, Advantages, Efficiency, and

Their Impact. In *Energy Science and Engineering* (Vol. 12, Number 12, pp. 5678–5707). John Wiley and Sons Ltd. https://doi.org/10.1002/ese3.1937

Microscopy Australia. (n.d.). *X-Ray Diffaction*. Retrieved December 8, 2025, from https://myscope.training/XRD_Anatomy_of_an_X_ray_diffractometer___Intro

Mudasir, & Wahyuni, T. E. (2023). *Metode Spektrometri* (S. Nurhayati, Ed.). Gadjah Mada University Press.

Murodif, A., Fauzi, A. M., Erizal, & Karlinasari, L. (2025). Environmental Impact of Limestone Mining Using A Life Cycle Assessment Method. *Jurnal Pengelolaan Sumberdaya Alam Dan Lingkungan*, *15*(1), 122–133. https://doi.org/10.29244/jpsl.15.1.122

Nandiyanto, A. B. D., Oktiani, R., & Ragadhita, R. (2019). How to read and interpret ftir spectroscope of organic material. *Indonesian Journal of Science and Technology*, *4*(1), 97–118. https://doi.org/10.17509/ijost.v4i1.15806

Neunzehn, J., Szuwart, T., & Wiesmann, H. P. (2015). Eggshells as natural calcium carbonate source in combination with hyaluronan as beneficial additives for bone graft materials, an in vitro study. *Head and Face Medicine*, *11*(1). https://doi.org/10.1186/s13005-015-0070-0

Pardo, P., Deydier, A., Anxionnaz-Minvielle, Z., Rougé, S., Cabassud, M., & Cognet, P. (2014). A review on high temperature thermochemical heat energy storage. *Renewable and Sustainable Energy Reviews*, *32*, 591–610. https://doi.org/https://doi.org/10.1016/j.rser.2013.12.014

Pereira, J., Souza, R., Oliveira, J., & Moita, A. (2025). Phase Change Materials in Residential Buildings: Challenges, Opportunities, and Performance. *Materials*, *18*(9), 2063. https://doi.org/10.3390/ma18092063

Plav{i}, B., Kobe, S., & Orel, B. (1999). IDENTIFICATION OF CRYSTALLIZATION FORMS OF CaCO 3 WITH FTIR SPECTROSCOPY IDENTIFIKACIJA KRISTALIZACIJSKIH OBLIK CaCO 3 S FTIR SPEKTROSKOPIJO. *Kovine Zlitine Tehnologije*, *33*(6).

Rezk, H., Alhumade, H., Mahmoud, M., Sayed, E. T., Abdelkareem, M. A., & Olabi, A. G. (2025). Energy storage systems: Comparisons, environmental impacts, selection criteria, and bibliometric analysis for large-scale applications. In *Sustainable Horizons* (Vol. 16). Elsevier B.V. https://doi.org/10.1016/j.horiz.2025.100162

Roger-Lund, S., Darkwa, J., Worall, M., Calautit, J., & Boukhanouf, R. (2024). A Review of Thermochemical Energy Storage Systems for District Heating in the UK. In *Energies* (Vol. 17, Number 14). Multidisciplinary Digital Publishing Institute (MDPI). https://doi.org/10.3390/en17143389

Rosen, M. A., Dincer, I., & Pedinelli, N. (2000). Thermodynamic Performance of Ice Thermal Energy Storage Systems . *ASME - Journal of Energy Resources Technology*, *122*(4), 205–211.

Sadeq, A. M. (2025). *Phase Change Materials: Fundamentals and Applications* (1st ed.). Lulu.com. https://doi.org/https://doi.org/10.5281/zenodo.1580773

Sani, R. A. (2019). *Karakterisasi Material* (S. B. Hastuti, Ed.; 1st ed.). PT Bumi Aksara.

Sarbu, I., & Sebarchievici, C. (2018). A comprehensive review of thermal energy storage. *Sustainability (Switzerland)*, *10*(1). https://doi.org/10.3390/su10010191

Schmit, H., Rudaleviciene, D., Rathgeber, C., & Hiebler, S. (2019). Calorimetric Investigation of Two Factors Influencing the Maximum Storage Capacity of

Calcium Chloride Hexahydrate. *IOP Conference Series: Materials Science and Engineering*, *660*(1). https://doi.org/10.1088/1757-899X/660/1/012076

Setianingsih, T., & Sutarno. (2018). *Prinsip Dasar dan Aplikasi Metode Difraksi Sinar-X Untuk Karakterisasi Material* (Masruroh, Ed.; 1st ed.). Tim UB Press.

Sharma, A., Tyagi, V. V., Chen, C. R., & Buddhi, D. (2009). Review on thermal energy storage with phase change materials and applications. *Renewable and Sustainable Energy Reviews*, *13*(2), 318–345.

Spietz, T., Fryza, R., Lasek, J., & Zuwała, J. (2025). Thermochemical Energy Storage Based on Salt Hydrates: A Comprehensive Review. In *Energies* (Vol. 18, Number 10). Multidisciplinary Digital Publishing Institute (MDPI). https://doi.org/10.3390/en18102643

Strelec, I., Ostojčić, M., Brekalo, M., Hajra, S., Kim, H. J., Stanojev, J., Maravić, N., & Budžaki, S. (2023). Transformation of eggshell waste to egg white protein solution, calcium chloride dihydrate, and eggshell membrane powder. *Green Processing and Synthesis*, *12*(1). https://doi.org/10.1515/gps-2022-8151

Sun, X., Lee, K. O., Medina, M. A., Chu, Y., & Li, C. (2018). Melting temperature and enthalpy variations of phase change materials (PCMs): a differential scanning calorimetry (DSC) analysis. *Phase Transitions*, *91*(6), 667–680. https://doi.org/10.1080/01411594.2018.1469019

Tan, P., Lindberg, P., Eichler, K., Löveryd, P., Johansson, P., & Kalagasidis, A. S. (2020). Effect of phase separation and supercooling on the storage capacity in a commercial latent heat thermal energy storage: Experimental cycling of a salt hydrate PCM. *Journal of Energy Storage*, *29*. https://doi.org/10.1016/j.est.2020.101266

Tatzber, M., Stemmer, M., Spiegel, H., Katzlberger, C., Haberhauer, G., & Gerzabek, M. H. (2006). An alternative method to measure carbonate in soils by FT-IR spectroscopy. *Environmental Chemistry Letters*, *5*, 9–12. https://doi.org/https://doi.org/10.1007/s10311-006-0079-5

Thakkar, J., Bowen, N., Chang, A. C., Horwath, P., Sobkowicz, M. J., & Kośny, J. (2022). Optimization of Preparation Method, Nucleating Agent, and Stabilizers for Synthesizing Calcium Chloride Hexahydrate (CaCl2.6H2O) Phase Change Material. *Buildings*, *12*(10). https://doi.org/10.3390/buildings12101762

Thermtest Instruments. (2024, December 13). *Understanding Phase Change Materials (PCM)*. https://thermtest.com/phase-change-material-pcm

Umar, H. (2020). Penggunaan material berubah fasa sebagai penyimpan energi termal pada bangunan gedung. In *Jurnal Polimesin* (Vol. 18, Number 2).

Vilarinho, I. S., Filippi, E., & Seabra, M. P. (2022). Development of eco-ceramic wall tiles with bio-CaCO3 from eggshells waste. *Open Ceramics*, *9*. https://doi.org/10.1016/j.oceram.2022.100220

Wang, S., Stahlbuhk, A., & Steiger, M. (2024). Hydration and deliquescence behavior of calcium chloride hydrates. *Fluid Phase Equilibria*, *585*. https://doi.org/10.1016/j.fluid.2024.114171

Wikipedia. (n.d.). *Eggshell*. Retrieved December 25, 2025, from https://en.wikipedia.org/wiki/Eggshell

Wing-Pinto, L.-S., Milian, Y., & Ushak, S. (2020). Progress on use of nanoparticles in salt hydrates as phase change materials. *Renewable and Sustainable Energy Reviews*, *122*(109727). https://doi.org/https://doi.org/10.1016/j.rser.2020.109727

Wykoff, R. W. G. (1920). The Crystal Structure of some Carbonates of the Calcite Group. *American Journal of Science, Serie 4(-1920)*, *50*(299), 317–360. https://doi.org/https://doi.org/10.2475/ajs.s4-50.299.317

Xie, N., Huang, Z., Luo, Z., Gao, X., Fang, Y., & Zhang, Z. (2017). Inorganic salt hydrate for thermal energy storage. In *Applied Sciences (Switzerland)* (Vol. 7, Number 12). MDPI AG. https://doi.org/10.3390/app7121317

Xu, X., Dong, Z., Memon, S. A., Bao, X., & Cui, H. (2017). Preparation and supercooling modification of salt hydrate phase change materials based on CaCl2·2H2O/CaCl2. *Materials*, *10*(7). https://doi.org/10.3390/ma10070691

Yang, H., Zou, Y., & Cui, H. (2024). Advancements and challenges in enhancing salt hydrate phase change materials for building energy storage: Optimization methodologies and mechanisms. *National Science Open*, *3*(3), 20230056. https://doi.org/10.1360/nso/20230056

Zhang, X., Li, X., Zhou, Y., Hai, C., Shen, Y., Ren, X., & Zeng, J. (2018). Calcium Chloride Hexahydrate/Diatomite/Paraffin as Composite Shape-Stabilized Phase-Change Material for Thermal Energy Storage. *Energy and Fuels*, *32*(1), 916–921. https://doi.org/10.1021/acs.energyfuels.7b02866

Zou, T., Fu, W., Liang, X., Wang, S., Gao, X., Zhang, Z., & Fang, Y. (2018). Preparation and performance of modified calcium chloride hexahydrate composite phase change material for air-conditioning cold storage. *International Journal of Refrigeration*, *95*, 175–181. https://doi.org/10.1016/j.ijrefrig.2018.08.001