

BAB 5

KESIMPULAN DAN SARAN

5.1. Kesimpulan

1. Simulasi siklus *desiccant cooling* dengan mode ventilasi dapat dilakukan dengan bantuan *software Aspen Plus v8.8* namun memerlukan data dari kinerja alat *desiccant wheel* untuk tiap variasi kondisi masukan udaranya
2. Laju alir udara dan RH rendah meningkatkan nilai COP

5.2. Saran

1. Perlu melakukan *modelling* untuk unit *desiccant wheel* agar tidak harus mengandalkan data dari literatur
2. Mempelajari pengaruh dari variasi temperatur udara masukkan terhadap performa siklus
3. *Modelling* untuk memperoleh peningkatan suhu dan perubahan kelembaban udara setelah udara disuplai ke ruangan yang didinginkan perlu dilakukan dengan lebih baik agar dapat memperoleh titik 5 yang sesuai dan dapat memvariasikan jenis ruangan.
4. Mempelajari cara modifikasi dan kontrol dari siklus pendinginan ini untuk menyesuaikan dengan berbagai kondisi udara *ambient* di Indonesia.

DAFTAR PUSTAKA

- Al-malah, Kamal. 2016. Aspen Plus: Chemical Engineering Applications. John Wiley & Sons, Inc.
- Alahmer, Ali. 2016. "Thermal Analysis of a Direct Evaporative Cooling System Enhancement with Desiccant Dehumidification for Vehicular Air Conditioning." *Applied Thermal Engineering* 98:1273–85. doi: 10.1016/j.applthermaleng.2015.12.059.
- Alahmer, Ali, Sameh Alsaqoor, dan Gabriel Borowski. 2019. "Effect of Parameters on Moisture Removal Capacity in the Desiccant Cooling Systems." *Case Studies in Thermal Engineering* 13. doi: 10.1016/j.csite.2018.11.015.
- Barlow, Robert S. 1982. "Analysis of the Adsorption Process and of Desiccant Cooling Systems A Pseudo-Steady-State Model for Coupled Heat and Mass Transfer." *Solar Energy Research Institute*.
- BMKG Stasiun Bandung. 2019. Kelembaban Udara kota Bandung 2019. <https://bandungkota.bps.go.id/indicator/151/190/1/kelembaban-udara.html>, diakses April 2021
- Brown, G. G., Foust, A.S., Katz, D.L., Schneidewind, R., White, R.R., Wood, W.P., Brown, G.M., Brownell, L.E., Martin, J.J., Williams, G.B., Banchero, J.T., York, J.L. 1950. Unit Operations. CBS Publishers.
- Camuffo, Dario. 2014. "Theoretical Grounds for Humidity." *Microclimate for Cultural Heritage* 49–76.
- Davanagere BS, Sherif SA, Goswami DY. 1999. "A feasibility study of a solar desiccant air-conditioning system – part I". *International Journal of Energy Research* 1999;23:7–21
- Geankoplis, C.J. 1993. Transport Processes and Unit Operations. 3rd Edition. Prentice Hall.
- Goodarzia, Gholamreza, Neelesh Thirukonda, Shahin Heidari, Aliakbar Akbarzadeh, and Abhijit Date. 2017. "Performance Evaluation of Solid Desiccant Wheel Regenerated by Waste Heat or Renewable Energy." *Energy Procedia* 110(December 2016):434–39. doi: 10.1016/j.egypro.2017.03.165.
- He, Zhilong, Xiaolin Wang, dan Hui Tong Chua. 2015. "Performance Study of a Four-Bed Silica Gel-Water Adsorption Chiller with the Passive Heat Recovery Scheme." *Mathematical Problems in Engineering* 2015.
- Jani, D. B., Manish Mishra, and P.K. Sahoo. 2013. "Simulation of Desiccant Cooling Systems Using TRNSYS." (April).
- Jani, D. B., Manish Mishra, dan P. K. Sahoo. 2016. "Solid Desiccant Air Conditioning - A State of the Art Review." *Renewable and Sustainable Energy Reviews* 60:1451–69. doi: 10.1016/j.rser.2016.03.031.
- Ji, Xiaoyan. 2006. Thermodynamic Properties of Humid Air and Their Application in Advanced Power Generation Cycles.
- Kang, T. S., dan I. L. MacLaine-Cross. 1989. "High Performance, Solid Desiccant Open Cooling Cycles." *Journal of Solar Energy Engineering, Transactions of the ASME* 111(2):176–83. doi: 10.1115/1.3268304.
- La, D., Y. J. Dai, Y. Li, R.Z. Wang, dan T. S. Ge. 2010. "Technical Development of Rotary Desiccant Dehumidification and Air Conditioning: A Review." *Renewable and Sustainable Energy Reviews* 14(1):130–47. doi: 10.1016/j.rser.2009.07.016.
- MacLaine-cross, I. L. 1985. "High-Performance Adiabatic Desiccant Open-Cooling Cycles." *Solar Energy Engineering* 107(February 1985):102–4. doi: 10.1016/B978-0-12-374501-9.X0001-5.

- Nelson, JS, Beckmann WA, Mitchell JW, Close DJ. 1978. "Simulations of the performance of open cycle desiccant air-conditioning systems using solar energy". *Solar Energy* 1978;21:273–8
- Neti, S., dan E. I. Wolfe. 2000. "Measurements of Effectiveness in a Silica Gel Rotary Exchanger." *Applied Thermal Engineering* 20(4):309–22. doi: 10.1016/S1359-4311(99)00031-9.
- Panaras, G., E. Mathioulakis, and V. Belessiotis. 2011. "Solid Desiccant Air-Conditioning Systems - Design Parameters." *Energy* 36(5):2399–2406. doi: 10.1016/j.energy.2011.01.022.
- Parkash, Surinder. 2003. "Refinery Water Systems." *Refining Processes Handbook* 242–69. doi: 10.1016/b978-075067721-9/50009-8.
- Parker, D., Sherwin, J., Raustad, R., Shirey, D., 1997, "Impact of Evaporator Coil Air Flow in Residential Air Conditioning Systems," Presented at the 1997 ASHRAE Annual Meeting, June 28-July 2, Boston, MA.
- Pesaran, Ahrnad A., Terry R. Penney, dan W. Czanderna. 1992. "Desiccant Cooli : State-of-the-Art ;Sessment." 11.
- Queiroz, João A., Vitor M. S. Rodrigues, Henrique A. Matos, dan F. G. Martins. 2012. "Modeling of Existing Cooling Towers in ASPEN PLUS Using an Equilibrium Stage Method." *Energy Conversion and Management* 64:473–81. doi: 10.1016/j.enconman.2012.03.030.
- Rafique, M. Mujahid, Shafiqur Rehman, Luai M. Alhems, dan Muhammad Ali Shakir. 2018. "A Liquid Desiccant Enhanced Two Stage Evaporative Cooling System-Development and Performance Evaluation of a Test Rig." *Energies* 11(1):1–17. doi: 10.3390/en11010072.
- Sahlot, Minaal, dan Saffa B. Riffat. 2016. "Desiccant Cooling Systems: A Review." *International Journal of Low-Carbon Technologies* 11(4):489–505. doi: 10.1093/ijlct/ctv032.
- Smith, J. M., Hendrick C. Van Ness, Michael Abbott, M.T. Swihart. 2018. *Introduction to Chemical Engineering Thermodynamics*. Edisi 8.
- Treybal, R. E. 1981. "Mass Transfer Operations". McGraw-Hill. Edisi 3
- Wang, R.Z., Wang, L., & Wu, J. 2014. *Adsorption Refrigeration Technology: Theory and Application*. *Adsorption Refrigeration Technology: Theory and Application*. Wiley.
- Wang, R. Z., Z. Y. Xu, dan T. S. Ge. 2016a. "Introduction to Solar Heating Andcooling Systems." Pp. 3–12 in *Advances in Solar Heating and Cooling*.
- Wang, R. Z., Q. W. Pan, dan Z. Y. Xu. 2016b. "Solar-Powered Adsorption Cooling Systems." *Advances in Solar Heating and Cooling* 299–328. doi: 10.1016/B978-0-08-100301-5.00012-6.
- Yang, Zhiyao. 2015. "Development of Simulation Modules for Liquid Desiccant Systems in SorpSim."