



## DAFTAR PUSTAKA

- Agwuncha, S. C., Owonubi, S., Fapujuwo, D. P., Abdulkarim, A., Okonkwo, T. P., & Makhatha, E. M. (2021). Evaluation of mercerization treatment conditions on extracted cellulose from shea nut shell using FTIR and thermogravimetric analysis. *Materials Today: Proceedings*, 38, 958-963. <https://doi.org/10.1016/j.matpr.2020.05.473>
- Babu, B. V. (2008). Biomass pyrolysis: a state-of-the-art review. *Biofuels, Bioproducts and Biorefining*, 2(5), 393-414. <https://doi.org/10.1002/bbb.92>
- Cai, J., Jin, C., Yang, S., & Chen, Y. (2011). Logistic distributed activation energy model--Part 1: Derivation and numerical parametric study. *Bioresour Technol*, 102(2), 1556-1561. <https://doi.org/10.1016/j.biortech.2010.08.079>
- Cai, J., Wu, W., Liu, R., & Huber, G. W. (2013). A distributed activation energy model for the pyrolysis of lignocellulosic biomass. *Green Chemistry*, 15(5). <https://doi.org/10.1039/c3gc36958g>
- Cai, J., Yang, S., & Li, T. (2011). Logistic distributed activation energy model--part 2: application to cellulose pyrolysis. *Bioresour Technol*, 102(3), 3642-3644. <https://doi.org/10.1016/j.biortech.2010.11.073>
- Cai, W., & Liu, R. (2016). Performance of a commercial-scale biomass fast pyrolysis plant for bio-oil production. *Fuel*, 182, 677-686. <https://doi.org/10.1016/j.fuel.2016.06.030>
- Chen, D., Zhou, J., & Zhang, Q. (2014). Effects of heating rate on slow pyrolysis behavior, kinetic parameters and products properties of moso bamboo. *Bioresour Technol*, 169, 313-319. <https://doi.org/10.1016/j.biortech.2014.07.009>
- Chen, T., Wu, J., Zhang, J., Wu, J., & Sun, L. (2014). Gasification kinetic analysis of the three pseudocomponents of biomass-cellulose, semicellulose and lignin. *Bioresour Technol*, 153, 223-229. <https://doi.org/10.1016/j.biortech.2013.12.021>
- Chen, W.-H., Eng, C. F., Lin, Y.-Y., & Bach, Q.-V. (2020). Independent parallel pyrolysis kinetics of cellulose, hemicelluloses and lignin at various heating rates analyzed by evolutionary computation. *Energy Conversion and Management*, 221. <https://doi.org/10.1016/j.enconman.2020.113165>
- Chen, Y. W., Lee, H. V., Juan, J. C., & Phang, S. M. (2016). Production of new cellulose nanomaterial from red algae marine biomass *Gelidium elegans*. *Carbohydr Polym*, 151, 1210-1219. <https://doi.org/10.1016/j.carbpol.2016.06.083>



- Collard, F.-X., Bensakhria, A., Drobek, M., Volle, G., & Blin, J. (2015). Influence of impregnated iron and nickel on the pyrolysis of cellulose. *Biomass and Bioenergy*, 80, 52-62. <https://doi.org/10.1016/j.biombioe.2015.04.032>
- Ding, J., Chen, L., Xu, Q., Yang, S., Jiang, J., & Ye, S. (2020). Differential isoconversional kinetic approach for accelerating rate calorimetry. *Thermochimica Acta*, 689. <https://doi.org/10.1016/j.tca.2020.178607>
- Eibner, S., Broust, F., Blin, J., & Julbe, A. (2015). Catalytic effect of metal nitrate salts during pyrolysis of impregnated biomass. *Journal of Analytical and Applied Pyrolysis*, 113, 143-152. <https://doi.org/10.1016/j.jaap.2014.11.024>
- Fiori, L., Valbusa, M., Lorenzi, D., & Fambri, L. (2012). Modeling of the devolatilization kinetics during pyrolysis of grape residues. *Bioresour Technol*, 103(1), 389-397. <https://doi.org/10.1016/j.biortech.2011.09.113>
- Galiwango, E., Abdel Rahman, N. S., Al-Marzouqi, A. H., Abu-Omar, M. M., & Khaleel, A. A. (2019). Isolation and characterization of cellulose and alpha-cellulose from date palm biomass waste. *Heliyon*, 5(12), e02937. <https://doi.org/10.1016/j.heliyon.2019.e02937>
- Gamliel, D. P., Du, S., Bollas, G. M., & Valla, J. A. (2015). Investigation of in situ and ex situ catalytic pyrolysis of miscanthus x giganteus using a PyGC-MS microsystem and comparison with a bench-scale spouted-bed reactor. *Bioresour Technol*, 191, 187-196. <https://doi.org/10.1016/j.biortech.2015.04.129>
- Hilbers, T. J., Wang, Z., Pecha, B., Westerhof, R. J. M., Kersten, S. R. A., Pelaez-Samaniego, M. R., & Garcia-Perez, M. (2015). Cellulose-Lignin interactions during slow and fast pyrolysis. *Journal of Analytical and Applied Pyrolysis*, 114, 197-207. <https://doi.org/10.1016/j.jaap.2015.05.020>
- Huang, S., Su, Y., Luo, W., He, Q., Huang, S., Zhou, N., & Zhou, Z. (2021). Kinetic analysis and in-situ no support catalytic pyrolysis product distribution of Chinese herb residue. *Journal of Analytical and Applied Pyrolysis*, 156. <https://doi.org/10.1016/j.jaap.2021.105114>
- Ji, G., Xu, X., Yang, H., Zhao, X., He, X., & Zhao, M. (2017). Enhanced Hydrogen Production from Sawdust Decomposition Using Hybrid-Functional Ni-CaO-Ca<sub>2</sub>SiO<sub>4</sub> Materials. *Environ Sci Technol*, 51(19), 11484-11492. <https://doi.org/10.1021/acs.est.7b03481>



Jiang, G., Nowakowski, D. J., & Bridgwater, A. V. (2010). A systematic study of the kinetics of lignin pyrolysis. *Thermochimica Acta*, 498(1-2), 61-66.  
<https://doi.org/10.1016/j.tca.2009.10.003>

Jiang, L. Q., Lin, Q., Lin, Y., Xu, F. X., Zhang, X., Zhao, Z. L., & Li, H. B. (2020). Impact of ball-milling and ionic liquid pretreatments on pyrolysis kinetics and behaviors of crystalline cellulose. *Bioresour Technol*, 305, 123044.  
<https://doi.org/10.1016/j.biortech.2020.123044>

Kan, T., Strezov, V., Evans, T., He, J., Kumar, R., & Lu, Q. (2020). Catalytic pyrolysis of lignocellulosic biomass: A review of variations in process factors and system structure. *Renewable and Sustainable Energy Reviews*, 134.  
<https://doi.org/10.1016/j.rser.2020.110305>

Kristanto, J., Azis, M. M., & Purwono, S. (2021). Multi-distribution activation energy model on slow pyrolysis of cellulose and lignin in TGA/DSC. *Heliyon*, 7(7), e07669. <https://doi.org/10.1016/j.heliyon.2021.e07669>

Kristanto, J., Daniyal, A. F., Pratama, D. Y., Bening, I. N. M., Setiawan, L., Azis, M. M., & Purwono, S. (2022). Kinetic Study on The Slow Pyrolysis of Isolated Cellulose and Lignin from Teak Sawdust. *Thermochimica Acta*, 711.  
<https://doi.org/10.1016/j.tca.2022.179202>

Lin, Y., Tian, Y., Xia, Y., Fang, S., Liao, Y., Yu, Z., & Ma, X. (2019). General distributed activation energy model (G-DAEM) on co-pyrolysis kinetics of bagasse and sewage sludge. *Bioresour Technol*, 273, 545-555.  
<https://doi.org/10.1016/j.biortech.2018.11.051>

Liu, H., Ahmad, M. S., Alhumade, H., Elkamel, A., Sammak, S., & Shen, B. (2020). A hybrid kinetic and optimization approach for biomass pyrolysis: The hybrid scheme of the isoconversional methods, DAEM, and a parallel-reaction mechanism. *Energy Conversion and Management*, 208.  
<https://doi.org/10.1016/j.enconman.2020.112531>

Liu, Y., Hu, T., Wu, Z., Zeng, G., Huang, D., Shen, Y., He, X., Lai, M., & He, Y. (2014). Study on biodegradation process of lignin by FTIR and DSC. *Environ Sci Pollut Res Int*, 21(24), 14004-14013. <https://doi.org/10.1007/s11356-014-3342-5>

Mishra, R. K., & Mohanty, K. (2018). Pyrolysis kinetics and thermal behavior of waste sawdust biomass using thermogravimetric analysis. *Bioresour Technol*, 251, 63-74. <https://doi.org/10.1016/j.biortech.2017.12.029>



Papari, S., & Hawboldt, K. (2015). A review on the pyrolysis of woody biomass to bio-oil: Focus on kinetic models. *Renewable and Sustainable Energy Reviews*, 52, 1580-1595. <https://doi.org/10.1016/j.rser.2015.07.191>

Quan, C., Gao, N., & Song, Q. (2016). Pyrolysis of biomass components in a TGA and a fixed-bed reactor: Thermochemical behaviors, kinetics, and product characterization. *Journal of Analytical and Applied Pyrolysis*, 121, 84-92. <https://doi.org/10.1016/j.jaat.2016.07.005>

Richardson, J. T. (1992). *Principles of Catalyst Development*. Springer Science+Business Media, LLC.

Singh, R. K., Pandey, D., Patil, T., & Sawarkar, A. N. (2020). Pyrolysis of banana leaves biomass: Physico-chemical characterization, thermal decomposition behavior, kinetic and thermodynamic analyses. *Bioresour Technol*, 310, 123464. <https://doi.org/10.1016/j.biortech.2020.123464>

Tian, Y., & Perré, P. (2021). Multiple-distribution DAEM modelling of spruce pyrolysis: An investigation of the best trade-off regarding the number and shape of distributions. *Energy Conversion and Management*, 229. <https://doi.org/10.1016/j.enconman.2020.113756>

Várhegyi, G., Bobály, B., Jakab, E., & Chen, H. (2010). Thermogravimetric Study of Biomass Pyrolysis Kinetics. A Distributed Activation Energy Model with Prediction Tests. *Energy & Fuels*, 25(1), 24-32. <https://doi.org/10.1021/ef101079r>

Vyazovkin, S., Burnham, A. K., Criado, J. M., Pérez-Maqueda, L. A., Popescu, C., & Sbirrazzuoli, N. (2011). ICTAC Kinetics Committee recommendations for performing kinetic computations on thermal analysis data. *Thermochimica Acta*, 520(1-2), 1-19. <https://doi.org/10.1016/j.tca.2011.03.034>

Vyazovkin, S., Burnham, A. K., Favergeon, L., Koga, N., Moukhina, E., Pérez-Maqueda, L. A., & Sbirrazzuoli, N. (2020). ICTAC Kinetics Committee recommendations for analysis of multi-step kinetics. *Thermochimica Acta*, 689. <https://doi.org/10.1016/j.tca.2020.178597>

Wang, D., Xiao, R., Zhang, H., & He, G. (2010). Comparison of catalytic pyrolysis of biomass with MCM-41 and CaO catalysts by using TGA–FTIR analysis. *Journal of Analytical and Applied Pyrolysis*, 89(2), 171-177. <https://doi.org/10.1016/j.jaat.2010.07.008>



Wang, J., Yellezuome, D., Zhang, Z., Liu, S., Lu, J., Zhang, P., Zhang, S., Wen, P.,

Rahman, M. M., Li, C., & Cai, J. (2022). Understanding pyrolysis mechanisms of pinewood sawdust and sugarcane bagasse from kinetics and thermodynamics.

*Industrial Crops and Products*, 177.

<https://doi.org/10.1016/j.indcrop.2021.114378>

Wang, S., Ru, B., Lin, H., Sun, W., & Luo, Z. (2015). Pyrolysis behaviors of four lignin polymers isolated from the same pine wood. *Bioresour Technol*, 182, 120-127.

<https://doi.org/10.1016/j.biortech.2015.01.127>

Wintoko, J., Purwono, S., Fahrurrozi, M., & Soehendro, B. (2019). *Kinetic analysis for the drying and devolatilization stages of concentrated black liquor*

Yang, H., Ji, G., Clough, P. T., Xu, X., & Zhao, M. (2019). Kinetics of catalytic biomass pyrolysis using Ni-based functional materials. *Fuel Processing Technology*, 195.

<https://doi.org/10.1016/j.fuproc.2019.106145>

Yang, H., Yan, R., Chen, H., Lee, D. H., & Zheng, C. (2007). Characteristics of hemicellulose, cellulose and lignin pyrolysis. *Fuel*, 86(12-13), 1781-1788.

<https://doi.org/10.1016/j.fuel.2006.12.013>

Zhang, J., Chen, T., Wu, J., & Wu, J. (2014). Multi-Gaussian-DAEM-reaction model for thermal decompositions of cellulose, hemicellulose and lignin: comparison of N<sub>(2)</sub> and CO<sub>(2)</sub> atmosphere. *Bioresour Technol*, 166, 87-95.

<https://doi.org/10.1016/j.biortech.2014.05.030>

Zhao, C., Jiang, E., & Chen, A. (2017). Volatile production from pyrolysis of cellulose, hemicellulose and lignin. *Journal of the Energy Institute*, 90(6), 902-913.

<https://doi.org/10.1016/j.joei.2016.08.004>

Zhao, M., Church, T. L., & Harris, A. T. (2011). SBA-15 supported Ni-Co bimetallic catalysts for enhanced hydrogen production during cellulose decomposition.

*Applied Catalysis B: Environmental*, 101(3-4), 522-530.

<https://doi.org/10.1016/j.apcatb.2010.10.024>