

REFERENCES

- Alguacil, F. J., & Robla, J. I. (2024). Using Ionic Liquids to Improve CO₂ Capture. *Molecules* 2024, Vol. 29, Page 5388, 29(22), 5388. <https://doi.org/10.3390/MOLECULES29225388>
- Ali, M., Sarwar, T., Mubarak, N. M., Karri, R. R., Ghalib, L., Bibi, A., & Mazari, S. A. (2024). Prediction of CO₂ Solubility in Ionic Liquids for CO₂ Capture Using Deep Learning Models. *Scientific Reports* 2024 14:1, 14(1), 14730-. <https://doi.org/10.1038/s41598-024-65499-y>
- Amelinda, A. T., Soekarno, S., & Amelinda, A. T. (2023). Financial Feasibility Study of Carbon Capture, Utilization, and Storage Project in West Java, Indonesia. *European Journal of Business and Management Research*, 8(3), 215–220. <https://doi.org/10.24018/EJBMR.2023.8.3.1969>
- Amru, K., Anjani, R., Aryantie, M. H., Ihsan, I. M., & Oktivia, R. (2024). Calculation of Carbon Emissions and Sequestration to Support the Net Zero Emission Target of Central Java Province (Case Study: Cilacap and Brebes Regencies). *Jurnal Pengelolaan Sumberdaya Alam Dan Lingkungan (Journal of Natural Resources and Environmental Management)*, 14(3), 525–525. <https://doi.org/10.29244/JPSL.14.3.525>
- Anthony, J. L., Maginn, E. J., & Brennecke, J. F. (2001). Solution Thermodynamics of Imidazolium-Based Ionic Liquids and Water. *Journal of Physical Chemistry B*, 105(44), 10942–10949. <https://doi.org/10.1021/JP0112368>
- Bentéjac, C., Csörgő, A., & Martínez-Muñoz, G. (2019). A Comparative Analysis of XGBoost. *Artificial Intelligence Review*, 54(3), 1937–1967. <https://doi.org/10.1007/s10462-020-09896-5>
- Bhattacharyya, S., Filippov, A., & Shah, F. U. (2017). High CO₂ Absorption Capacity by Chemisorption at Cations and Anions in Choline-Based Ionic Liquids. *Physical Chemistry Chemical Physics*, 19(46), 31216–31226. <https://doi.org/10.1039/C7CP07059D>
- Block, S., Viebahn, P., & Jungbluth, C. (2024). Analysing Direct Air Capture for Enabling Negative Emissions in Germany: an Assessment of the Resource

- Requirements and Costs of a Potential Rollout in 2045. *Frontiers in Climate*, 6, 1353939. <https://doi.org/10.3389/FCLIM.2024.1353939/BIBTEX>
- Breiman, L. (2001). Random Forests. *Machine Learning*, 45(1), 5–32. <https://doi.org/10.1023/A:1010933404324/METRICS>
- Brennecke, J. F., & Gurkan, B. E. (2010). Ionic Liquids for CO₂ Capture and Emission Reduction. *Journal of Physical Chemistry Letters*, 1(24), 3459–3464. https://doi.org/10.1021/JZ1014828/ASSET/IMAGES/MEDIUM/JZ-2010-014828_0006.GIF
- Bursch, M., Mewes, J.-M., Hansen, A., & Grimme, S. (2022). Best-Practice DFT Protocols for Basic Molecular Computational Chemistry. *Angewandte Chemie*, 134(42), e202205735. <https://doi.org/10.1002/ANGE.202205735>
- Canongia Lopes, J. N. A., & Pádua, A. A. H. (2006). Nanostructural Organization in Ionic Liquids. *Journal of Physical Chemistry B*, 110(7), 3330–3335. <https://doi.org/10.1021/JP056006Y>
- Cao, F., Kikkawa, S., Yamada, H., Kawasoko, H., & Yamazoe, S. (2024). Low-Temperature Desorption of CO₂ from Carbamic Acid for CO₂ Condensation by Direct Air Capture. *ACS Omega*. https://doi.org/10.1021/ACSOMEGA.4C05978/ASSET/IMAGES/LARGE/AO4C05978_0008.JPEG
- Cawley, G. C., & Talbot, N. L. C. (2010). On Over-fitting in Model Selection and Subsequent Selection Bias in Performance Evaluation. *Journal of Machine Learning Research*, 11, 2079–2107.
- Cha, G. W., Moon, H. J., & Kim, Y. C. (2021). Comparison of Random Forest and Gradient Boosting Machine Models for Predicting Demolition Waste Based on Small Datasets and Categorical Variables. *International Journal of Environmental Research and Public Health* 2021, Vol. 18, Page 8530, 18(16), 8530. <https://doi.org/10.3390/IJERPH18168530>
- Chai, T., & Draxler, R. R. (2014). Root Mean Square Error (RMSE) or Mean Absolute Error (MAE)? -Arguments Against Avoiding RMSE in the Literature. *Geoscientific Model Development*, 7(3), 1247–1250. <https://doi.org/10.5194/GMD-7-1247-2014>

- Chen, C. H., Tanaka, K., Kotera, M., & Funatsu, K. (2020). Comparison and Improvement of the Predictability and Interpretability with Ensemble Learning Models in QSPR Applications. *Journal of Cheminformatics*, 12(1), 19-. <https://doi.org/10.1186/S13321-020-0417-9/FIGURES/8>
- Chen, T., & Guestrin, C. (2016). XGBoost: A Scalable Tree Boosting System. *Proceedings of the ACM SIGKDD International Conference on Knowledge Discovery and Data Mining, 13-17-August-2016*, 785–794. https://doi.org/10.1145/2939672.2939785/SUPPL_FILE/KDD2016_CHEN_BOOSTING_SYSTEM_01-ACM.MP4
- Chen, X., Luo, X., Li, J., Qiu, R., & Lin, J. (2020). Cooperative CO₂ Absorption by Amino Acid-Based Ionic Liquids with Balanced Dual Sites. *RSC Advances*, 10(13), 7751–7757. <https://doi.org/10.1039/C9RA09293E>
- Cheng, C.-Y., Kuo, C.-C., Yang, M.-W., Zhuang, Z.-Y., Lin, P.-W., Chen, Y.-F., Yang, H.-S., & Chou, C.-T. (2021). CO₂ Capture from Flue Gas of a Coal-Fired Power Plant Using Three-Bed PSA Process. *Energies* 2021, Vol. 14, Page 3582, 14(12), 3582. <https://doi.org/10.3390/EN14123582>
- Dhawal, P., & Shah, J. K. (2022). A Generalized Machine Learning Model for Predicting Ionic Conductivity of Ionic Liquids. *Molecular Systems Design & Engineering*, 7(10), 1344–1353. <https://doi.org/10.1039/D2ME00046F>
- Foxall, R., Ishaq, H., & Crawford, C. (2024). Ambient Wind Conditions Impact on Energy Requirements of an Offshore Direct Air Capture Plant. *Journal of Physics: Energy*, 6(2), 025016. <https://doi.org/10.1088/2515-7655/AD331E>
- Friedlingstein, P., O’Sullivan, M., Jones, M. W., Andrew, R. M., Hauck, J., Landschützer, P., Le Quéré, C., Li, H., Luijkx, I. T., Olsen, A., Peters, G. P., Peters, W., Pongratz, J., Schwingshackl, C., Sitch, S., Canadell, J. G., Ciais, P., Jackson, R. B., Alin, S. R., ... Zeng, J. (2025). Global Carbon Budget 2024. *Earth System Science Data*, 17(3), 965–1039. <https://doi.org/10.5194/ESSD-17-965-2025>
- Gholizadeh, F., & Sabzi, F. (2017). Prediction of CO₂ Sorption in Poly(ionic liquid)s Using ANN-GC and ANFIS-GC Models. *International Journal of*

- Greenhouse Gas Control*, **63**, 95–106.
<https://doi.org/10.1016/J.IJGGC.2017.05.013>
- Ghosh, S. K. (2002). Density Functional Theory and Materials Modeling at Atomistic Length Scales. *International Journal of Molecular Sciences* **2002**, Vol. 3, Pages 260-275, 3(4), 260–275. <https://doi.org/10.3390/I3040260>
- Greer, A. J., Taylor, S. F. R., Daly, H., Jacquemin, J., & Hardacre, C. (2022). Combined Superbase Ionic Liquid Approach to Separate CO₂ from Flue Gas. *ACS Sustainable Chemistry and Engineering*, **10**(29), 9453–9459. https://doi.org/10.1021/ACSSUSCHEMENG.2C01848/ASSET/IMAGES/LARGE/SC2C01848_0004.JPEG
- Harnik, Y., & Milo, A. (2024). A Focus on Molecular Representation Learning for the Prediction of Chemical Properties. *Chemical Science*, **15**(14), 5052–5055. <https://doi.org/10.1039/D4SC90043J>
- Hastie, T., Tibshirani, R., & Friedman, J. (2009). *The Elements of Statistical Learning*. <https://doi.org/10.1007/978-0-387-84858-7>
- Huang, J., Riisager, A., Berg, R. W., & Fehrmann, R. (2008). Tuning Ionic Liquids for High Gas Solubility and Reversible Gas Sorption. *Journal of Molecular Catalysis A: Chemical*, **279**(2), 170–176. <https://doi.org/10.1016/J.MOLCATA.2007.07.036>
- Huang, Y., Cui, G., Wang, H., Li, Z., & Wang, J. (2019). Absorption and Thermodynamic Properties of CO₂ by Amido-Containing Anion-Functionalized Ionic Liquids. *RSC Advances*, **9**(4), 1882–1888. <https://doi.org/10.1039/C8RA07832G>
- Huang, Z., Jin, X., Zhao, X., Meng, F., & Yin, A. (2024). Industrial Test of Post Combustion CO₂ Capture by Reactive Absorption with Two New Solvents in Natural Gas Power Plant. *E3S Web of Conferences*, **520**, 02024. <https://doi.org/10.1051/E3SCONF/202452002024>
- Jian, Y., Wang, Y., & Barati Farimani, A. (2022). Predicting CO₂ Absorption in Ionic Liquids with Molecular Descriptors and Explainable Graph Neural Networks. *ACS Sustainable Chemistry and Engineering*, **10**(50), 16681–16691.

https://doi.org/10.1021/ACSSUSCHEMENG.2C05985/SUPPL_FILE/SC2C05985_SI_001.PDF

- Kamolov, A., Turakulov, Z., Furda, P., Variny, M., Norkobilov, A., & Fallanza, M. (2024). Techno-Economic Feasibility Analysis of Post-Combustion Carbon Capture in an NGCC Power Plant in Uzbekistan. *Clean Technologies*, 6(4), 1357–1388. <https://doi.org/10.3390/CLEANTECHNOL6040065/S1>
- Kittichotsatsawat, Y., Tippayawong, N., & Tippayawong, K. Y. (2022). Prediction of Arabica Coffee Production using Artificial Neural Network and Multiple linear regression techniques. *Scientific Reports*, 12(1). <https://doi.org/10.1038/S41598-022-18635-5>
- Kurniawan, M. P., Wiguna, R. B., Nugroho, D., & Sutejo, A. S. (2024). Indonesia's Climate Change Mitigation for Achieving NZE by 2060: Power Plant Carbon Capture vs. Renewable Energy Development. *ICT-PEP 2024 - International Conference on Technology and Policy in Energy and Electric Power: Resilient Power Systems: Navigating the Clean Energy Transition, Proceedings*, 409–414. <https://doi.org/10.1109/ICT-PEP63827.2024.10733373>
- Kuroki, N., Suzuki, Y., Kodama, D., Chowdhury, F. A., Yamada, H., & Mori, H. (2023). Machine Learning-Boosted Design of Ionic Liquids for CO₂ Absorption and Experimental Verification. *Journal of Physical Chemistry B*, 127(9), 2022–2027. https://doi.org/10.1021/ACS.JPCB.2C07305/ASSET/IMAGES/LARGE/JP2C07305_0002.JPEG
- Laakso, J. P., Gorji, A. E., Uusi-Kyyny, P., & Alopaeus, V. (2025). Machine Learning Modeling of the CO₂ Solubility in Ionic Liquids by using σ -profile Descriptors. *Chemical Engineering Science*, 307, 121226. <https://doi.org/10.1016/J.CES.2025.121226>
- Lee, H., & Romero, J. (2023). Climate Change 2023 Synthesis Report IPCC, 2023: Sections. In: Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. *IPCC*, 35–115. <https://doi.org/10.59327/IPCC/AR6-9789291691647>

- Lin, X. S., Zou, Y., Zhao, K. H., Yang, T. X., Halling, P., & Yang, Z. (2016). Tetraalkylammonium Ionic Liquids as Dual Solvents–Catalysts for Direct Synthesis of Sugar Fatty Acid Esters. *Journal of Surfactants and Detergents*, 19(3), 511–517. <https://doi.org/10.1007/S11743-016-1798-7/METRICS>
- Lindsey, R. (2025, May 21). *Climate change: atmospheric carbon dioxide* | NOAA Climate.gov. <https://www.climate.gov/news-features/understanding-climate/climate-change-atmospheric-carbon-dioxide>
- Liu, A. J., Mukherjee, A., Hu, L., Chen, J., & Nair, V. N. (2022). *Performance and Interpretability Comparisons of Supervised Machine Learning Algorithms: An Empirical Study*. <https://arxiv.org/abs/2204.12868v2>
- Liu, H., Maginn, E., Visser, A. E., Bridges, N. J., & Fox, E. B. (2012). Thermal and Transport Properties of Six Ionic Liquids: An Experimental and Molecular Dynamics Study. *Industrial and Engineering Chemistry Research*, 51(21), 7242–7254. https://doi.org/10.1021/IE300222A/SUPPL_FILE/IE300222A_SI_001.PDF
- Liu, X., & Turner, C. H. (2022). Understanding Gas Absorption in Multivalent Ionic Liquids via Solute-Solvent Interaction Analyses. *Chemical Physics Letters*, 786, 139204. <https://doi.org/10.1016/J.CPLETT.2021.139204>
- Maniam, K. K., Paul, S., Tiecco, M., & Sher, F. (2021). Ionic Liquids and Deep Eutectic Solvents for CO₂ Conversion Technologies—A Review. *Materials* 2021, Vol. 14, Page 4519, 14(16), 4519. <https://doi.org/10.3390/MA14164519>
- McCulloch, J. A., St. Pierre, S. R., Linka, K., & Kuhl, E. (2024). On Sparse Regression, Lp-Regularization, and Automated Model Discovery. *International Journal for Numerical Methods in Engineering*, 125(14), e7481. <https://doi.org/10.1002/NME.7481>
- McFarland, D. J., Sarnacki, W. A., Wolpaw -, J. R., Chen, Y.-T., Takahashi, S., Nakayama, H., -, al, George, A., Damjanov, I., Bertoni, L., Roussanaly, S., Riboldi, L., Anantharaman, R., & Gazzani, M. (2024). Integrating Direct Air Capture with Small Modular Nuclear Reactors: Understanding Performance, Cost, and Potential. *Journal of Physics: Energy*, 6(2), 025004. <https://doi.org/10.1088/2515-7655/AD2374>

- Md Moshikur, R., Shimul, I. M., Uddin, S., Wakabayashi, R., Moniruzzaman, M., & Goto, M. (2022). Transformation of Hydrophilic Drug into Oil-Miscible Ionic Liquids for Transdermal Drug Delivery. *ACS Applied Materials and Interfaces*, 14(50), 55332–55341. https://doi.org/10.1021/ACSAMI.2C15636/SUPPL_FILE/AM2C15636_SI_001.PDF
- Mekoung, P. M. A., Mountessou, B. Y. G., Mbah, M. B., Signe, M., Zintchem, A. A. A., Nanseu, C. P. N., Mbouombouo, I. N., Mekoung, P. M. A., Mountessou, B. Y. G., Mbah, M. B., Signe, M., Zintchem, A. A. A., Nanseu, C. P. N., & Mbouombouo, I. N. (2022). Vibrational Spectroscopic Investigations, Electronic Properties, Molecular Structure and Quantum Mechanical Study of an Antifolate Drug: Pyrimethamine. *Computational Chemistry*, 10(4), 157–185. <https://doi.org/10.4236/CC.2022.104008>
- Miao, S., Atkin, R., & Warr, G. (2022). Design and Applications of Biocompatible Choline Amino Acid Ionic Liquids. *Green Chemistry*, 24(19), 7281–7304. <https://doi.org/10.1039/D2GC02282F>
- Mitra, A., Jain, A., Kishore, A., & Kumar, P. (2022). A Comparative Study of Demand Forecasting Models for a Multi-Channel Retail Company: A Novel Hybrid Machine Learning Approach. *Operations Research Forum*, 3(4), 58-. <https://doi.org/10.1007/S43069-022-00166-4/METRICS>
- Mohammadi, M. R., Larestani, A., Schaffie, M., Hemmati-Sarapardeh, A., & Ranjbar, M. (2024). Predictive Modeling of CO₂ Solubility in Piperazine Aqueous Solutions using Boosting Algorithms for Carbon Capture Goals. *Scientific Reports* 2024 14:1, 14(1), 22112-. <https://doi.org/10.1038/s41598-024-73070-y>
- Mohan, M., Smith, M. D., Demerdash, O. N., Simmons, B. A., Singh, S., Kidder, M. K., & Smith, J. C. (2023). Quantum Chemistry-Driven Machine Learning Approach for the Prediction of the Surface Tension and Speed of Sound in Ionic Liquids. *ACS Sustainable Chemistry and Engineering*, 11(20), 7809–7821.

https://doi.org/10.1021/ACSSUSCHEMENG.3C00624/SUPPL_FILE/SC3C00624_SI_002.XLSX

Moosanezhad-Kermani, H., Rezaei, F., Hemmati-Sarapardeh, A., Band, S. S., & Mosavi, A. (2021). Modeling of Carbon Dioxide Solubility in Ionic Liquids Based on Group Method of Data Handling. *Engineering Applications of Computational Fluid Mechanics*, 15(1), 23–42.
<https://doi.org/10.1080/19942060.2020.1842250>

Nguyen, T. H., Le, K. M., Nguyen, L. H., & Truong, T. N. (2023). Atom-Based Machine Learning Model for Quantitative Property-Structure Relationship of Electronic Properties of Fusenes and Substituted Fusenes. *ACS Omega*, 8(41), 38441–38451.
https://doi.org/10.1021/ACSOMEGA.3C05212/ASSET/IMAGES/LARGE/AO3C05212_0009.JPEG

Niazi, S. K., & Mariam, Z. (2023). Recent Advances in Machine-Learning-Based Chemoinformatics: A Comprehensive Review. *International Journal of Molecular Sciences* 2023, Vol. 24, Page 11488, 24(14), 11488.
<https://doi.org/10.3390/IJMS241411488>

Obi, D., Onyekuru, S., & Orga, A. (2024). Review of Recent Process Developments in the Field of Carbon Dioxide (CO₂) Capture from Power Plants Flue Gases and the Future Perspectives. *International Journal of Sustainable Energy*, 43(1). <https://doi.org/10.1080/14786451.2024.2317137>

Ogut, J. O., Piepho, H. P., & Schulz-Streeck, T. (2011). A comparison of Random Forests, Boosting and Support Vector Machines for Genomic Selection. *BMC Proceedings*, 5(SUPPL. 3), S11-. <https://doi.org/10.1186/1753-6561-5-S3-S11/FIGURES/2>

Osman, A., Ziyada, A. K., Khan, A. M., & Rajab, F. (2024). Alkylimidazolium-Based Ionic Liquids with Tailored Anions and Cations for CO₂ Capture. *RSC Advances*, 14(6), 3985–3995. <https://doi.org/10.1039/D3RA08335G>

Ouaer, H., Hosseini, A. H., Amar, M. N., Seghier, M. E. A. Ben, Ghriga, M. A., Nabipour, N., Andersen, P. Ø., Mosavi, A., & Shamshirband, S. (2019). Rigorous Connectionist Models to Predict Carbon Dioxide Solubility in

- Various Ionic Liquids. *Applied Sciences* 2020, Vol. 10, Page 304, 10(1), 304.
<https://doi.org/10.3390/APP10010304>
- Ozkan, M. (2025). Atmospheric Alchemy: The Energy and Cost Dynamics of Direct Air Carbon Capture. *MRS Energy and Sustainability*, 12(1), 46–61.
<https://doi.org/10.1557/S43581-024-00091-5/FIGURES/3>
- Pachernegg, L., Maier, J., Yagmur, R., Damm, M., Kalb, R., Coclite, A. M., & Spirk, S. (2024). Physicochemical Properties of 20 Ionic Liquids Prepared by the Carbonate-Based IL (CBILS) Process. *Journal of Chemical and Engineering Data*, 69(5), 1814–1823.
https://doi.org/10.1021/ACS.JCED.3C00687/ASSET/IMAGES/LARGE/JE3C00687_0006.JPEG
- Pedregosa FABIANPEDREGOSA, F., Michel, V., Grisel OLIVIERGRISEL, O., Blondel, M., Prettenhofer, P., Weiss, R., Vanderplas, J., Cournapeau, D., Pedregosa, F., Varoquaux, G., Gramfort, A., Thirion, B., Grisel, O., Dubourg, V., Passos, A., Brucher, M., Perrot and Édouardand, M., Duchesnay, and Édouard, & Duchesnay EDOUARDDUCHESNAY, Fré. (2011). Scikit-learn: Machine Learning in Python. *Journal of Machine Learning Research*, 12(85), 2825–2830. <http://jmlr.org/papers/v12/pedregosa11a.html>
- Pendyala, S., & Nainggolan, Y. A. (2024). Green Disclosure and Innovation to Corporate Loan: Case of LQ45 Index Companies. *International Journal of Current Science Research and Review*, 07(06).
<https://doi.org/10.47191/IJCSRR/V7-I6-68>
- Peters, G. P., & Meinshausen, M. (2024). We Are Not on Track: Greenhouse Gas Emissions Are Higher Than Ever! *Frontiers for Young Minds*, 12.
<https://doi.org/10.3389/FRYM.2024.1343809>
- Plechkova, N. V., & Seddon, K. R. (2007). Applications of Ionic Liquids in the Chemical Industry. *Chemical Society Reviews*, 37(1), 123–150.
<https://doi.org/10.1039/B006677J>
- Prakarsa, W. U., & Dewi, K. (2025). The Effect of Plant Characteristics on CO₂ Emission Factor Development: A Case Study of Coal-Fired Power Plants in

- Indonesia. *Journal of Community Based Environmental Engineering and Management*, 9(1), 1–10. <https://doi.org/10.23969/JCBEEM.V9I1.18935>
- Probst, P., & Boulesteix, A.-L. (2018). To Tune or Not to Tune the Number of Trees in Random Forest. *Journal of Machine Learning Research*, 18, 1–18. <http://jmlr.org/papers/v18/17-269.html>.
- Purwanto, A. (2024). Carbon Stocks Estimation Using the Stock Difference Method of Various Land Use Systems Based on Geospatial in Kualan Watershed. *Jurnal Penelitian Pendidikan IPA*, 10(11), 8602–8611. <https://doi.org/10.29303/JPPIPA.V10I11.6818>
- Putra, J. J. H., Nabilla, & Jabanto, F. Y. (2021). Comparing “Carbon Tax” and “Cap and Trade” as Mechanism to Reduce Emission in Indonesia. *International Journal of Energy Economics and Policy*, 11(5), 106–111. <https://doi.org/10.32479/IJEEP.11375>
- Qin, H., Wang, K., Ma, X., Li, F., Liu, Y., & Ji, X. (2024). Predicting the Solubility of CO₂ and N₂ in Ionic Liquids based on COSMO-RS and Machine Learning. *Frontiers in Chemistry*, 12, 1480468. <https://doi.org/10.3389/FCHEM.2024.1480468/BIBTEX>
- Racki, A., & Paduszyński, K. (2025). Recent Advances in the Modeling of Ionic Liquids Using Artificial Neural Networks. *Journal of Chemical Information and Modeling*, 65(7), 3161–3175. https://doi.org/10.1021/ACS.JCIM.4C02364/ASSET/IMAGES/LARGE/CI4C02364_0009.JPEG
- Raeissi, S., & Peters, C. J. (2008). Carbon Dioxide Solubility in the Homologous 1-Alkyl-3-methylimidazolium Bis(trifluoromethylsulfonyl)imide Family†. *Journal of Chemical and Engineering Data*, 54(2), 382–386. <https://doi.org/10.1021/JE800433R>
- Rahimi, A., Bahmanzadegan, F., & Ghaemi, A. (2025). Analysis of CO₂ Solubility in Ionic Liquids as Promising Absorbents Using Response Surface Methodology and Machine Learning. *Journal of CO₂ Utilization*, 93, 103043. <https://doi.org/10.1016/J.JCOU.2025.103043>

- Ramdani, F., & Furqon, M. T. (2022). The Simplicity of XGBoost Algorithm Versus the Complexity of Random Forest, Support Vector Machine, and Neural Networks algorithms in urban forest classification. *F1000Research*, 11, 1069. <https://doi.org/10.12688/F1000RESEARCH.124604.1>
- Rehman, Z. U., Punnaanan, K., Nootong, K., & In-Na, P. (2024). The Status of Algal Decarbonization in Southeast Asian Region: a Review. *Environmental Research Letters*, 19(9), 093004. <https://doi.org/10.1088/1748-9326/AD64ED>
- Reza, A. M., Heksaprilla, A. B., & Prakoso, A. A. (2024). Carbon Capture & Storage for Indonesia Coal-Power Plant: Opportunity or Gimmick? *ICT-PEP 2024 - International Conference on Technology and Policy in Energy and Electric Power: Resilient Power Systems: Navigating the Clean Energy Transition, Proceedings*, 358–363. <https://doi.org/10.1109/ICT-PEP63827.2024.10733386>
- Ribeiro, M. T., Singh, S., & Guestrin, C. (2016). “Why Should I Trust You?”: Explaining the Predictions of Any Classifier. *NAACL-HLT 2016 - 2016 Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies, Proceedings of the Demonstrations Session*, 97–101. <https://doi.org/10.18653/v1/n16-3020>
- Rosen, N., Welter, A., Schwankl, M., Plumeré, N., Staudt, J., & Burger, J. (2024). Assessment of the Potential of Electrochemical Steps in Direct Air Capture through Techno-Economic Analysis. *Energy and Fuels*, 38(16), 15469–15481. https://doi.org/10.1021/ACS.ENERGYFUELS.4C02202/ASSET/IMAGES/LARGE/EF4C02202_0008.JPEG
- Rybińska-Fryca, A., Sosnowska, A., & Puzyn, T. (2020). Representation of the Structure—A Key Point of Building QSAR/QSPR Models for Ionic Liquids. *Materials* 2020, Vol. 13, Page 2500, 13(11), 2500. <https://doi.org/10.3390/MA13112500>
- Š. Komorsky-Lovrić, K. Riedl, R. Gulaboski, V. Mirčeski, and, & Scholz, F. (2003). Determination of Standard Gibbs Energies of Transfer of Organic

- Anions across the Water/Nitrobenzene Interface. *Langmuir*, 19(7), 3090. <https://doi.org/10.1021/LA0209233>
- Sari, R. L., & Haeruddin, H. (2024). Studi Pendahuluan Potensi Carbon Capture Storage (CCS) Melalui Identifikasi Sumber Emisi CO₂ beserta tinjauan geologi di Daerah Probolinggo, Jember, dan Bondowoso, Jawa Timur. *Jurnal Teknologi Lingkungan Lahan Basah*, 12(1), 137–142. <https://doi.org/10.26418/JTLLB.V12I1.71804>
- Schnakenberg, J. (1980). A. Z. Patashinskii, V. L. Pokrovskii: Fluctuation Theory of Phase Transitions. Pergamon Press, Oxford, New York, Toronto, Sydney, Paris, Frankfurt 1979. 321 Seiten, Preis: \$ 40.00. *Berichte Der Bunsengesellschaft Für Physikalische Chemie*, 84(7), 709–709. <https://doi.org/10.1002/BBPC.19800840723>
- Sechidis, K., Tsoumakas, G., & Vlahavas, I. (2011). On the Stratification of Multi-label Data. *Lecture Notes in Computer Science (Including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*, 6913 LNAI(PART 3), 145–158. https://doi.org/10.1007/978-3-642-23808-6_10
- Shalygin, A. S., Shubin, A. A., Prihod'ko, S. A., & Yu. Adonin, N. (2024). Carbon Dioxide Interaction with a Series of Ionic Liquids Consisting of Fluorophenyltrifluoroborate Anions Studied by in situ ATR-FTIR Spectroscopy. *Journal of Molecular Liquids*, 407, 125169. <https://doi.org/10.1016/J.MOLLIQ.2024.125169>
- Shiflett, M. B., & Yokozeki, A. (2005). Solubilities and Diffusivities of Carbon Dioxide in Ionic Liquids: [bmim][PF₆] and [bmim][BF₄]. *Industrial and Engineering Chemistry Research*, 44(12), 4453–4464. <https://doi.org/10.1021/IE058003D>
- Shimizu, K., Bernardes, C. E. S., Triolo, A., & Canongia Lopes, J. N. (2013). Nano-Segregation in Ionic Liquids: Scorpions and Vanishing Chains. *Physical Chemistry Chemical Physics*, 15(38), 16256–16262. <https://doi.org/10.1039/C3CP52357H>

- Shukla, S. K., Khokarale, S. G., Bui, T. Q., & Mikkola, J. P. T. (2019). Ionic liquids: Potential Materials for Carbon Dioxide Capture and Utilization. *Frontiers in Materials*, 6, 439940. <https://doi.org/10.3389/FMATS.2019.00042/BIBTEX>
- Silva, W., Zanatta, M., Ferreira, A. S., Corvo, M. C., & Cabrita, E. J. (2020). Revisiting Ionic Liquid Structure-Property Relationship: A Critical Analysis. *International Journal of Molecular Sciences* 2020, Vol. 21, Page 7745, 21(20), 7745. <https://doi.org/10.3390/IJMS21207745>
- Singh, P., & Harbola, M. K. (2023). Density Functional Theory of Material Design: Fundamentals and Applications -- I. *Oxford Open Materials Science*, 1(1). <https://doi.org/10.1093/oxfmat/itab018>
- Srivastava, N., Hinton, G., Krizhevsky, A., & Salakhutdinov, R. (2014). Dropout: A Simple Way to Prevent Neural Networks from Overfitting. *Journal of Machine Learning Research*, 15, 1929–1958.
- Syahrial, E., Pasarai, U., & Iskandar, U. P. (2010). Understanding Carbon Capture And Storage (Ccs) Potential In Indonesia. *Scientific Contributions Oil and Gas*, 33(2), 129–134. <https://doi.org/10.29017/SCOG.33.2.816>
- Szabo, A., & Ostlund, N. S. (1989). Modern Quantum Chemistry: Introduction to Advanced Electronic Structure Theory. Revised. *McGraw-Hili, New York*, 141–147.
https://books.google.com/books/about/Modern_Quantum_Chemistry.html?hl=id&id=6mV9gYzEkgIC
- Tokuda, H., Hayamizu, K., Ishii, K., Susan, M. A. B. H., & Watanabe, M. (2004). Physicochemical Properties and Structures of Room Temperature Ionic Liquids. 1. Variation of Anionic Species. *Journal of Physical Chemistry B*, 108(42), 16593–16600. <https://doi.org/10.1021/JP047480R>
- Tosca, E. M., Bartolucci, R., & Magni, P. (2021). Application of Artificial Neural Networks to Predict the Intrinsic Solubility of Drug-like Molecules. *Pharmaceutics*, 13(7), 1101. <https://doi.org/10.3390/PHARMACEUTICS13071101/S1>
- United Nations Environment Programme. (2024). Emissions Gap Report 2024: No More Hot Air ... Please! With a Massive Gap Between Rhetoric and Reality,

- Countries Draft New Climate Commitments. *Emissions Gap Report 2024*.
<https://doi.org/10.59117/20.500.11822/46404>
- van den Maagdenberg, H. W., Šicho, M., Araripe, D. A., Luukkonen, S., Schoenmaker, L., Jespers, M., Béquignon, O. J. M., González, M. G., van den Broek, R. L., Bernatavicius, A., van Hasselt, J. G. C., van der Graaf, P. H., & van Westen, G. J. P. (2024). QSPRpred: a Flexible Open-Source Quantitative Structure-Property Relationship Modelling Tool. *Journal of Cheminformatics*, 16(1), 128-. <https://doi.org/10.1186/S13321-024-00908-Y/FIGURES/4>
- Welton, T. (1999). Room-Temperature Ionic Liquids. Solvents for Synthesis and Catalysis. *Chemical Reviews*, 99(8), 2071–2083.
<https://doi.org/10.1021/CR980032T>
- Winter, R., Montanari, F., Noé, F., & Clevert, D. A. (2019). Learning Continuous and Data-driven Molecular Descriptors by Translating Equivalent Chemical Representations. *Chemical Science*, 10(6), 1692–1701.
<https://doi.org/10.1039/C8SC04175J>
- Xia, L., Liu, S., & Pan, H. (2020). Prediction of the Solubility of CO₂ in Imidazolium Ionic Liquids Based on Selective Ensemble Modeling Method. *Processes* 2020, Vol. 8, Page 1369, 8(11), 1369.
<https://doi.org/10.3390/PR8111369>
- Xia, L., Wang, J., Liu, S., Li, Z., & Pan, H. (2019). Prediction of CO₂ Solubility in Ionic Liquids Based on Multi-Model Fusion Method. *Processes* 2019, Vol. 7, Page 258, 7(5), 258. <https://doi.org/10.3390/PR7050258>
- Yang, F., Wang, X., Liu, Y., Yang, Y., Zhao, M., Liu, X., & Li, W. (2020). Understanding CO₂ Capture Kinetics and Energetics by Ionic Liquids with Molecular Dynamics Simulation. *RSC Advances*, 10(24), 13968–13974.
<https://doi.org/10.1039/D0RA02221G>
- Zhang, X., Zhang, X., Dong, H., Zhao, Z., Zhang, S., & Huang, Y. (2012). Carbon Capture with Ionic Liquids: Overview and Progress. *Energy & Environmental Science*, 5(5), 6668–6681. <https://doi.org/10.1039/C2EE21152A>

- Zhao, Y., Pan, M., Kang, X., Tu, W., Gao, H., & Zhang, X. (2018). Gas Separation by Ionic Liquids: A Theoretical Study. *Chemical Engineering Science*, 189, 43–55. <https://doi.org/10.1016/J.CES.2018.05.044>
- Zou, X., Zhu, Y., Lv, J., Zhou, Y., Ding, B., Liu, W., Xiao, K., & Zhang, Q. (2024). Toward Estimating CO₂ Solubility in Pure Water and Brine Using Cascade Forward Neural Network and Generalized Regression Neural Network: Application to CO₂ Dissolution Trapping in Saline Aquifers. *ACS Omega*, 9(4), 4705–4720. https://doi.org/10.1021/ACSOMEGA.3C07962/ASSET/IMAGES/LARGE/AO3C07962_0013.JPEG
- Zulfiqar, S., Sarwar, M. I., & Mecerreyes, D. (2015). Polymeric Ionic Liquids for CO₂ Capture and Separation: Potential, Progress and Challenges. *Polymer Chemistry*, 6(36), 6435–6451. <https://doi.org/10.1039/C5PY00842E>