

DAFTAR PUSTAKA

- Adli, H. (2012) *Pengolahan Limbah Cair Laboratorium Dengan Metode Presipitasi dan Adsorpsi Untuk Penurunan Kadar Logam Berat Kadar Logam Berat*. Universitas Indonesia.
- Aini, S. and Supratikno, S. (2018) 'Penerapan Lima Model Kesetimbangan Adsorpsi Isoterm pada Adsorpsi Ion Logam Chrom VI oleh Zeolit', *Eksergi*, 15(2), p. 48.
- Aksu, Z. and Gönen, F. (2004) 'Biosorption of phenol by immobilized activated sludge in a continuous packed bed: Prediction of breakthrough curves', *Process Biochemistry*, 39(5), pp. 599–613.
- Ariyanto, E., Melani, A. and Anggraini, T. (2015) 'Penyisihan PO₄ Dalam air Limbah Rumah Sakit Untuk Produksi Pupuk Struvite', *Seminar Nasional Sains dan Teknologi*, (November 2015), pp. 1–8.
- Asuquo, E. *et al.* (2017) 'Adsorption of Cd(II) and Pb(II) ions from aqueous solutions using mesoporous activated carbon adsorbent: Equilibrium, kinetics and characterisation studies', *Journal of Environmental Chemical Engineering*, 5(1), pp. 679–698.
- Ayawei, N., Ebelegi, A. N. and Wankasi, D. (2017) 'Modelling and Interpretation of Adsorption Isotherms', *Journal of Chemistry*, 2017, pp. 1–11.
- Bi, H. *et al.* (2019) 'Eddy current separation for recovering aluminium and lithium-iron phosphate components of spent lithium-iron phosphate batteries', *Waste Management and Research*, 37(12), pp. 1217–1228.
- Bi, H. *et al.* (2020) 'Environment-friendly technology for recovering cathode materials from spent lithium iron phosphate batteries', *Waste Management & Research*, 38(8), pp. 911–920.
- Biswas, S. and Mishra, U. (2015) 'Continuous Fixed-Bed Column Study and Adsorption Modeling: Removal of Lead Ion from Aqueous Solution by Charcoal Originated from Chemical Carbonization of Rubber Wood Sawdust', *Journal of Chemistry*, 2015, pp. 1–9.
- Calero, M. *et al.* (2009) 'Study of Cr (III) biosorption in a fixed-bed column', *Journal of Hazardous Materials*, 171(1–3), pp. 886–893.
- Costa, M. Da (2019) *Studi Penurunan Kadar Logam Kromium (Cr) dalam Limbah Buatan Elektroplating Menggunakan Metode Presipitasi dan Adsorpsi*. Institut

- D. Rocha, P., S. Franca, A. and S. Oliveira, L. (2015) 'Batch and Column Studies of Phenol Adsorption by an Activated Carbon Based on Acid Treatment of Corn Cobs', *International Journal of Engineering and Technology*, 7(6), pp. 459–464.
- Dyana, Z. N. F., Perdana, I. and Prasetya, A. (2020) *Kinetics study on lithium leaching of spent lithium iron phosphate batteries in low concentration of sulfuric acid*. Universitas Gadjah Mada.
- Eliaz, N. and Sridh, T. M. (2008) 'Electrocrystallization of hydroxyapatite and its dependence on solution conditions', *Crystal Growth and Design*, 8(11), pp. 3965–3977. doi: 10.1021/cg800016h.
- Fajrianti, H., Oktiawan, W. and Wardhana, I. W. (2016) 'Pengaruh Waktu Perendaman Dalam Aktivator NaOH dan Debit Aliran Terhadap Penurunan Krom Total (Cr) dan Seng (Zn) Pada Limbah Cair Industri Elektroplating Dengan Menggunakan Arang Aktif dari Kulit Pisang', *Jurnal Teknik Lingkungan*, 5(1), pp. 1–9.
- Fitriana, A. R. and Warmadewanthi, I. (2016) 'Penurunan Kadar Amonium dan Fosfat pada Limbah Cair Industri Pupuk', *Jurnal Teknik ITS*, 5(2).
- Forte, F. *et al.* (2021) 'Lithium iron phosphate batteries recycling: An assessment of current status', *Critical Reviews in Environmental Science and Technology*, 51(19), pp. 2232–2259.
- de Franco, M. A. E. *et al.* (2017) 'Removal of amoxicillin from water by adsorption onto activated carbon in batch process and fixed bed column: Kinetics, isotherms, experimental design and breakthrough curves modelling', *Journal of Cleaner Production*, 161, pp. 947–956.
- Gaines, L. (2014) 'The future of automotive lithium-ion battery recycling: Charting a sustainable course', *Sustainable Materials and Technologies*, 1–2, pp. 2–7.
- Gaterell, M. R. *et al.* (2000) 'An economic and environmental evaluation of the opportunities for substituting phosphorus recovered from wastewater treatment works in existing uk fertiliser markets', *Environmental Technology (United Kingdom)*, 21(9), pp. 1067–1084.
- Giyatmi, Fallihah, T. and Swantomo, D. (2020) 'Penurunan Kadar Cu dalam Limbah Cair Industri Perak Menggunakan Adsorben Abu Layang', *Seminar Nasional Teknik Kimia Soebardjo Brotohardjono XVI*, (September), pp. 1–7.
- Gratz, E. *et al.* (2014) 'A closed loop process for recycling spent lithium ion batteries', *Journal of Power Sources*, 262, pp. 255–262.

- Haryanto, B. and Chang, C. H. (2015) 'Removing adsorbed heavy metal ions from sand surfaces via applying interfacial properties of rhamnolipid', *Journal of Oleo Science*, 64(2), pp. 161–168.
- Horeh, N. B., Mousavi, S. M. and Shojaosadati, S. A. (2016) 'Bioleaching of valuable metals from spent lithium-ion mobile phone batteries using *Aspergillus niger*', *Journal of Power Sources*, 320, pp. 257–266.
- Huang, B. *et al.* (2018) 'Recycling of lithium-ion batteries: Recent advances and perspectives', *Journal of Power Sources*, 399(July), pp. 274–286.
- Huang, H. *et al.* (2016) 'Simultaneous removal of ammonia nitrogen and recovery of phosphate from swine wastewater by struvite electrochemical precipitation and recycling technology', *Journal of Cleaner Production*, 127, pp. 302–310.
- Huda, H., Ardi, Z. and Johansyah, A. (2015) 'Studi Kinetika Adsorpsi Nilai Besi Pada Air Sumur Menggunakan Karbon Aktif Dari Ampas Kopi', *Jurnal IPTEK*, 19(2), pp. 49–58.
- Hudaya, T. (2016) 'Perancangan Kolom Adsorpsi Karbon Aktif untuk Pengolahan Limbah Kromium Heksavalen', I(November), pp. 1–51.
- Hutnik, N. *et al.* (2013) 'Phosphates (V) recovery from phosphorus mineral fertilizers industry wastewater by continuous struvite reaction crystallization process', *Water Research*, 47(11), pp. 3635–3643.
- Ikhlas, N. (2017) 'Pengaruh pH, Rasio Molar, Jenis Presipitan, dan Ion Pengganggu Dalam Recovery Amonium dan Fosfat Pada Limbah Cair PT Petrokimia Gresik dengan Metode Presipitasi Struvite', p. 134.
- Iswarani, W. P. (2018) *Recovery Fosfat Dari Limbah Cair Industri*. Institut Teknologi Sepuluh Nopember.
- Kataki, S. *et al.* (2016) 'Phosphorus recovery as struvite: Recent concerns for use of seed, alternative Mg source, nitrogen conservation and fertilizer potential', *Resources, Conservation and Recycling*, 107, pp. 142–156.
- Kemala, P. (2018) *Kemampuan Adsorpsi Batang Jagung (Zea Mays L.) Terhadap Logam Berat Ion Kadmium (Cd²⁺) Pada Kolom Adsorpsi Secara Kontinu (Down Flow, Medan*. Universitas Sumatera Utara.
- Khai, N. M. (2012) 'Chemical Precipitation of Ammonia and Phosphate from Nam Son Landfill Leachate, Hanoi', *Iranica Journal of Energy & Environment*, 3, pp. 32–36.
- Koong, L. F. *et al.* (2013) 'A comparative study on selective adsorption of metal ions

- using aminated adsorbents', *Journal of Colloid and Interface Science*, 395(1), pp. 230–240.
- Liang, M. (2007) 'New Possibilities of magnesium utilization in wastewater treatment and nutrients recovery', (October), pp. 1–47.
- Manjunath, S. V. and Kumar, M. (2018) 'Evaluation of single-component and multi-component adsorption of metronidazole, phosphate and nitrate on activated carbon from *Prosopis juliflora*', *Chemical Engineering Journal*, 346, pp. 525–534.
- Marsh, H. and Rodríguez Reinoso, F. (2006) 'Introduction to the Scope of the Text', in *Activated Carbon*. Elsevier, pp. 1–12.
- Mizwar, A. (2013) 'Penyisihan Warna Pada Limbah Cair Sasirangan Dengan Adsorpsi Zeolit Dalam Fixed-Bed Column', *EnviroScientiae*, 9(1), pp. 1–9.
- Munch, E. V and Barr, K. (2012) 'Controlled Struvite Crystallisation for Removing Phosphorus From Anaerobic Digestion Sidestreams', 35(1), pp. 1–9.
- Nitta, N. *et al.* (2015) 'Li-ion battery materials: Present and future', *Materials Today*, 18(5), pp. 252–264.
- Oguz, E., Guerses, A. and Yalcin, M. (2003) 'Removal of Phosphate from Waste Water by Adsorption', *Water, Air, and Soil Pollution*, 148(5), pp. 279–287.
- Patel, H. (2019) 'Fixed-bed column adsorption study: a comprehensive review', *Applied Water Science*, 9(3), pp. 1–17.
- Prawira, W. and Zaki, M. M. (2016) 'Perilaku Adsorpsi Emas dari Larutan Ammonium Thiosulfat dengan Karbon Aktif dan Resin Penukar Ion', *Metalurgi*, 2, pp. 69–78.
- Pujiastuti, C. (2008) 'Kajian Penurunan Ca dan Mg dalam Air Laut Menggunakan Resin (Dowex)', *Jurnal Teknik Kimia*, 3(1), pp. 199–206.
- Purnomo, C. W. *et al.* (2018) 'Lithium recovery from spent Li-ion batteries using coconut shell activated carbon', *Waste Management*, 79, pp. 454–461.
- Rahman, M. M. *et al.* (2012) 'Waste Palm Shell Converted to High Efficient Activated Carbon by Chemical Activation Method and Its Adsorption Capacity Tested by Water Filtration', *APCBEE Procedia*, 1(January), pp. 293–298.
- Rahman, M. M. *et al.* (2014) 'Production of slow release crystal fertilizer from wastewaters through struvite crystallization - A review', *Arabian Journal of Chemistry*, 7(1), pp. 139–155.
- Sari, R. A., Firdaus, M. L. and Elvia, R. (2017) 'Penentuan Keseimbangan, Termodinamika Dan Kinetika Adsorpsi Arang Aktif Tempurung Kelapa Sawit Pada Zat Warna Reactive Red Dan Direct Blue', *Alotrop*, 1(1), pp. 10–14.

- Sathasivam, K. and Haris, M. R. H. M. (2010) 'Banana trunk fibers as an efficient biosorbent for the removal of Cd(II), Cu(II), Fe(II) and Zn(II) from aqueous solutions', *Journal of the Chilean Chemical Society*, 55(2), pp. 278–282.
- Siqi, Z. *et al.* (2019) 'Recovery methods and regulation status of waste lithium-ion batteries in China: A mini review', *Waste Management & Research*, 37(11), pp. 1142–1152.
- Syauqiah, I., Amalia, M. and Kartini, H. A. (2011) 'Analisis Variasi Waktu dan Kecepatan Pengaduk pada Proses Adsorpsi Limbah Logam Berat dengan Arang Aktif', *Jurnal Teknik Kimia*, 12(1), pp. 11–20.
- Tuas, M. A. (2018) *Penurunan Kadar Logam Tembaga dan Besi pada Limbah Cair Industri Perhiasan Emas Menggunakan Karbon Aktif Melalui Proses Presipitasi dan Adsorpsi*. Institut Teknologi Sepuluh November.
- Türker, M. and Çelen, I. (2011) 'Chemical equilibrium model of struvite precipitation from anaerobic digester effluents', *Turkish Journal of Engineering and Environmental Sciences*, 35(1), pp. 39–48.
- Wang, J. *et al.* (2005) 'Engineered Struvite Precipitation: Impacts of Component-Ion Molar Ratios and pH', *Journal of Environmental Engineering*, 131(10), pp. 1433–1440.
- Wang, J., Burken, J. G. and Zhang, X. J. (2006) 'Effect of Seeding Materials and Mixing Strength on Struvite Precipitation', *Water Environment Research*, 78(2), pp. 125–132.
- Wang, W. and Wu, Y. (2017) 'An overview of recycling and treatment of spent LiFePO₄ batteries in China', *Resources, Conservation and Recycling*, 127(100), pp. 233–243.
- Warmadewanthi and Liu, J. C. (2009) 'Recovery of phosphate and ammonium as struvite from semiconductor wastewater', *Separation and Purification Technology*, 64(3), pp. 368–373.
- Winslow, K. M., Laux, S. J. and Townsend, T. G. (2018) 'A review on the growing concern and potential management strategies of waste lithium-ion batteries', *Resources, Conservation and Recycling*, 129(November 2017), pp. 263–277.
- Wołowicz, A. and Hubicki, Z. (2016) 'Carbon-based adsorber resin Lewatit AF 5 applicability in metal ion recovery', *Microporous and Mesoporous Materials*, 224, pp. 400–414.
- Yadav, P. *et al.* (2020) 'Recycling of cathode from spent lithium iron phosphate batteries',

- Yagub, M. T. *et al.* (2015) 'Fixed-bed dynamic column adsorption study of methylene blue (MB) onto pine cone', *Desalination and Water Treatment*, 55(4), pp. 1026–1039.
- Yakub, E. *et al.* (2020) 'Comparative study of the batch adsorption kinetics and mass transfer in phenol-sand and phenol-clay adsorption systems', *Particulate Science and Technology*, 38(7), pp. 801–811.
- Yoon, Y. H. and Nelson, J. H. (1984) 'Application of Gas Adsorption Kinetics I. A Theoretical Model for Respirator Cartridge Service Life', *American Industrial Hygiene Association Journal*, 45(8), pp. 509–516.
- Yuliusman (2016) 'Pengambilan Kembali Logam Litium dan Cobalt dari Baterai Li-Ion dengan Metode Leaching Asam Sitrat', in *Prosiding Seminar Nasional Teknik Kimia 'Kejuangan'*, pp. 1–6.
- Yustinah *et al.* (2019) 'Keseimbangan Adsorpsi Logam Berat (Pb) Dengan Adsorben Tanah Diatomit Secara Batch', *Jurnal KONVERSI*, 9(1), pp. 17–28.
- Zeng, L. and Li, X. (2006) 'Nutrient removal from anaerobically digested cattle manure by struvite precipitation', *Journal of Environmental Engineering and Science*, 5(4), pp. 285–294.
- Zhang, T., Ding, L. and Ren, H. (2009) 'Pretreatment of ammonium removal from landfill leachate by chemical precipitation', *Journal of Hazardous Materials*, 166(2–3), pp. 911–915.
- Zhang, W. *et al.* (2011) 'Removal of methylene blue from aqueous solutions by straw based adsorbent in a fixed-bed column', *Chemical Engineering Journal*, 173(2), pp. 429–436.