

DAFTAR PUSTAKA

- Ai, L., and Jiang, J., 2010, Fast removal of organic dyes from aqueous solutions by AC/ferrospinel composite, *Desalination*, 262(1), 134-140.
- Aloko, D.F., and Adebayo, G.A., 2007, Production and characterization of activated carbon from agricultural waste (rice-husk and corn-cob), *J.Eng.App.Sci.*, 2(2), 440–444.
- Ariani, 2011, Struktur Nano Partikel Oksida Besi dari Pasir Besi Pantai Tiram Sumatera Barat, *Prosiding SEMIRATA 2017 Bidang MIPA*, 102-103.
- Arias, M., Barral, M.T., Silva, D.J., Mejuto, J.C. and Rubino, D., 2004, Interaction of Hg(II) With Kaolin-Humic Acid Complexes, *J. Clay Minerals.*, 39, 35-45.
- Austin, G.T., 1996, *Physical Chemistry*, Oxford University Press., Oxford.
- Baharudin, 2005, Pemanfaatan Serbuk Gergaji Kayu Jati (*Tectona grandis* L.f.) yang Direndam dalam Air Dingin sebagai Media Tumbuh Jamur Tiram (*Pleurotus communicipae*), *Jurnal Perrenial*, 2(1), 1-5.
- Chen, H., 2014, *Biotechnology of Lignocellulose: Theory and Practice*, Springer, New York.
- Chiang, H.L., Huang, C.P., and Chiang, P.C., 2002, The surface characteristics of activated carbon as affected by ozone and alkaline treatment, *Chemosphere*, 47, 257–65.
- Choirunnisa, V., 2015, Abu Ampas Tebu sebagai Adsorben dan Aplikasinya pada Pungut Ulang Kromium(VI) dalam Limbah Cair Elektroplating, *Tesis*, Departemen Kimia FMIPA UGM, Yogyakarta.
- Deng, J., Xiong, T., Wang, H., Zheng, A., and Wang, Y., 2016, Effects of Cellulose, Hemicellulose, and Lignin on the Structure and Morphology of Porous Carbons, *ACS Sustainable Chem. Eng.*, 4(7), 3750–3756.
- Dewi, R.K.M., 2014, Isomerisasi 1-Oktena Menggunakan Katalis Ni/Karbon Aktif, *Skripsi*, Departemen Kimia FMIPA UGM, Yogyakarta.
- Do, MH., Phan, NH., Nguyen, TD., Pham, TTS., Nguyen, VK., Vu, TTT., and Nguyen, TKP., 2011, Activated carbon/Fe₃O₄ nanoparticle composite: Fabrication, methyl orange removal and regeneration by hydrogen peroxide, *Chemosphere*, 85(2011), 1269-1276.

- Eloussaief, M., Hamzah, W., Kallel, N., Benzina, M., 2013, Wastewaters Decontamination: Mechanisms of Pb(II), Zn(II), and Cd(II) Competitive Adsorption on Tunisian Smectite in Single and Multi-solute Systems, *Environ. Prog. Sustain. Energ.*, 32, 229 -238.
- El-Sayed, Y. and Bandosz, T.J., 2004, Adsorption of valeric acid from aqueous solution onto activated carbon: role of surface basic sites, *J. Colloid Interface Sci.*, 273, 64-72.
- Esterlita, M.O., dan Herlina, N., 2015, Pengaruh penambahan penambahan ZnCl_2 , KOH, dan H_3PO_4 dalam pembuatan karbon aktif dari pelepah areng (*Arenga Pinnata*), *Jurnal Teknik Kimia USU*, 4(1), 34-54.
- Faujiah, F., 2012, Pemanfaatan karbon aktif dari limbah padat industri agar-agar sebagai adsorben logam berat dan bahan organik dari limbah industri tekstil, *Skripsi*, Institut Pertanian Bogor, Bogor.
- Faulconer, E.K., Hoogesteijn von Reitzenstein, N.V., and Mazyck, D. W., 2012, Optimization of magnetic powdered activated carbon for aqueous Hg(II) removal and magnetic recovery, *J. Hazard. Mater.*, 199-200, 9-14.
- Fernandez, B. R., 2011, *Nanomaterial : sintesis, karakterisasi, sifat, dan peralatan elektronik*, Pascasarjana Universitas Andalas, Padang.
- Foo, K.Y. and Hameed, B.H., 2010, Insights into the modeling of adsorption isotherm systems, *Rev. Chem. Eng. J.*, 156, 2–10.
- Gaur, V. and Shankar, P.A., 2008, Surface modification of activated carbon for the removal of water impurities, *Water Cond. Purif.*, 4, 1–5.
- Gokce, Y. and Aktas, Z., 2014, Nitric acid modification of activated carbon produced from waste tea and adsorption of methylene blue and phenol, *Appl. Surf. Sci.*, 313, 352-359.
- Gupta, S.S., dan Bhattacharyya, K.G., 2006, Adsorption of Ni(II) on Clay, *J. Colloid Inter. Sci.*, 295, 21-32.
- Harni, M.R., Iryani, A., dan Affandi, H., 2017, Pemanfaatan Serbuk Gergaji Kayu Jati (*Tectona Grandis* L.f.) sebagai adsorben logam timbal (Pb), *Jurnal UNPAK*, Universitas Pakuan, Bogor.
- Hartanto, S. dan Ratnawati, 2010, Pembuatan karbon aktif dari tempurung kelapa sawit dengan metode aktivasi kimia, *JUSAMI*, 12(1), 12–16.
- Hernández-Montoya, V., and Bonilla-Petriciolet, A., 2012, *Lignocellulosic precursors used in the synthesis of activated carbon: characterization techniques and applications in the wastewater treatment*, InTech, Rijeka.

- Hsu, L. Y. and Teng, H., 2000, Influence of different chemical reagents on the preparation of activated carbons from bituminous coal, *Fuel Process. Technol.*, 64(1-3), 155-166, 2000.
- Ho, Y.S. and McKay, G., 1999, The Kinetics of Sorption of Basic Dyes from Aqueous Solution by Sphagnum Moss Peat, *Can. J. Chem. Eng.*, 74(3), 822-827.
- Hosono, T., Takashi, H., Fujita, A., Joseyphus, R.J., Tohiji, K., and Jeyadevan, B., 2009, Synthesis of Magnetite Nanoparticles for AC Magnetic Heating, *J. Magn. Mater.*, 321, 3019-3023.
- Hou, T., Chen, M., and George, W., 2015, Mercury Vapor Sorption and Amalgamation with a Thin Gold Film, *ACS Appl. Mater. Interfaces*, 41, 23172-23181.
- Kakavandi, B., Jafar, A. J., 2013, Synthesis and properties of Fe₃O₄-activated carbon magnetic nanoparticles for removal of aniline from aqueous solution: equilibrium, kinetic and thermodynamic studies, *Iranian J. Environ. Health. Sci. Eng.*, 20(3), 122-123
- Kim, D.K., Mikhaylova, M., Zhang, Y., and Muhammed, M., 2003, Protective Coating of Superparamagnetic Iron Oxide Nanoparticles, *Chem. Mater.*, 15, 1617-1627.
- Klemm, D., Schmauder, H.P., and Heinze, T., 2002, *Cellulose*, In De Baets, S., Vandamme, E.J., Steinbuchel, A., *Polysaccharides from Eukaryotes*, WileyVCH, Weinheim.
- Larmer, B., 2009, Tumbal yang Dituntut Emas, *National Geographic Indonesia*, Januari 2009.
- Lempan, M., Syafii, W., dan Pari, G., 2012, Sifat dan mutu arang aktif tempurung kemiri, *J. Penelit. Has. Hutan*, 30(2), 100-113.
- Li, Q., Wu, S., Liu, G., and Liao X., 2004, Simultaneous biosorption of cadmium(II) and lead (II) ions by pretreated biomass of *phanerochaete chrysosporium*, *Sep. Purif. Technol.*, 34(1), 925-940.
- Liu, J.F., Zhao, ZS., and Jiang, GB., 2008, Coating Fe₃O₄ magnetic nanoparticles with humic acid for high efficient removal of heavy metals in water, *Environ. Sci. Technol.*, 42(18), 6949-6954.
- Maity, D., and Agrawal, D.C., 2007, Synthesis of Iron Oxide Nanoparticles Under Oxidizing Environment and Their Stabilization in Aqueous and Non-Aqueous Media, *J. Magn. Mater.*, 308(1), 46-55.
- Manahan, S.E., 2003, *Toxicological Chemistry and Biochemistry*, 3rd edition, CRC Press LLC, New York.

- Mohapatra, S.P., Nikolova, I., and Mitchell, A., 2007, Managing Mercury in The Great Lakes: An Analytical Review of Abatement Policies, *J. Environ. Manage.*, 83, 80-92.
- Moreno-Castilla, C., Carrasco-Marín, F., López-Ramón, M.V. and Alvarez-Merino, M.A., 2001, Chemical and physical activation of olive-mill waste water to produce activated carbons, *J. Carbon*, 39(9), 1415–1420.
- Massel, R. I., 1996, *Principles of Adsorption and Reaction on Solid Surface*, John Wiley and Sons, New York.
- Ofomaja, A.E., Naidoo, E.B., and Modise, S.J., 2010, Dynamic Studies and PseudoSecond Order Modeling of Copper(II) Biosorption onto Pine Cone Powder, *Desalination*, 251, 112-122.
- Pambayun, G.S., Yulianto, R.Y.E., Rachimoellah, M., dan Putri, E.M.M., 2013, Pembuatan arang aktif dari arang tempurung kelapa dengan aktifator ZnCl_2 dan Na_2CO_3 sebagai adsorben untuk mengurangi kadar fenol dalam air limbah, *Jurnal Teknik POMITS*, 2(1), 116–120.
- Pari, G., 2004, Kajian struktur arang aktif dari serbuk gergaji kayu sebagai adsorben emisi formaldehida kayu lapis, *disertasi*, Institut Pertanian Bogor, Bogor.
- Pari, G., dan Hendra, J., 2006, Pengaruh lama waktu aktivasi dan konsentrasi asam fosfat terhadap mutu arang aktif kulit kayu *Acacia mangium*, *J. Penelit. Has. Hutan*, 24(1), 1-22.
- Prasetyani, F., 2014, Validasi Metode Analisis Hg(II) Secara Spektrofotometri UVVisible dengan Pengompleks Iodida dan Rhodamin B Serta Aplikasinya pada Analisis Sampel Kosmetik, *Skripsi*, Jurusan Kimia Fakultas Ilmu Pengetahuan Alam, Universitas Gadjah Mada, Yogyakarta.
- Purwanto, 2005, Pengelolaan Bahan dan Limbah Berbahaya dan Beracun, *Jurnal Ilmu Lingkungan*, 3(1), 29-39.
- Qaiser, S., Saleemi, A.R., and Ahmad, M.M., 2007, Heavy Metal Uptake by Agro Based Waste Materials, *J. Biotechnol.*, 10, 409-416.
- Rahmawati, dan Dessy, 2009. *Penurunan Kandungan Phospat pada Limbah Cair Industri Pencucian Pakaian Menggunakan Karbon Aktif dari Sampah Plastik dengan Metode Batch dan Kontinyu*, Universitas Diponegoro, Semarang.
- Rahmawati E, dan Yuanita, L., 2013, Adsorpsi Pb^{2+} oleh arang aktif sabut siwalan (*Borassus flabellifer*), *UNESA Journal of Chemistry*, 2(3), 82-87.
- Rasjidin, I., 2006, Pembuatan Arang Aktif dari Tempurung Biji Jambu Mede (*anacarbium occidentale*) sebagai Adsorben pada Pemurnian Minyak Goreng Bekar, *Skripsi*, Institut Pertanian Bogor, Bogor.

- Ratnaningsih, W., 2016, Karbon Aktif Kulit Singkong (*manihot esculenta*) Termodifikasi Asam Nitrat sebagai Adsorben Logam Cr(VI), *Skripsi*, Universitas Gadjah Mada, Yogyakarta.
- Reis, A. T., Davidson, C. M., Vale, C., and Pereira, E., 2016, Overview and Challenges of Mercury Fractionation and Speciation in Soils, *TrAC, Trends Anal. Chem.*, 82, 109-117.
- Risher, J.F., 2003, *Elemental Mercury and Inorganic Mercury Compounds: Human Health Aspects*, Research Report, Concise International Chemical Assessment Document 50, Atlanta.
- Santosa, S. J., Siswanta, D., Kurniawan, A., and Rahmanto, W.H., 2007, Hybrid of Chitin and Humic as High Performance Sorbent for Ni(II), *Surf. Sci.*, 601, 5155–5161.
- Sembiring, Meiliata T, Sinaga T, 2003, Pengenalan dan proses pembuatan arang aktif, *tesis*, Sekolah Pascasarjana Universitas Sumatera Utara, Medan.
- Setiabudi, B.T., 2005, *Pendataan Penyebaran merkuri terhadap penambangan emas di dusun Sengon Desa Kecamatan Kokap Kabupaten Kulon Progo*, Subdit Konservasi Bandung, Jawa Barat.
- Shafirnia, Rahma., Wardana, I.W., Oktawan, dan Wiharyanto., 2016, Pengaruh Variasi Ukuran Adsorben dan Debit Aliran terhadap Penurunan Khrom (Cr) dan Tembaga (Cu) dengan Arang Aktif dari Limbah Kulit Pisang Pada Limbah Cair Industri Pelapisan Logam (Elektroplating) Krom, *Jurnal Teknik Lingkungan*, 5(1), Universitas Diponogoro, Semarang.
- Shen, W., Li, Z., and Liu, Y., 2008, Surface Chemical Functional Groups Modification of Porous Carbon, *Recent Pat. Chem. Eng.*, 1(1), 27-40.
- Sirait, S.M., dan Sisilia, L., 2008, Kualitas arang aktif tempurung nipah (*Nypa fruticans* Wurmb) dengan bahan pengaktif NH_4HCO_3 dan H_3PO_4 dan penggunaannya sebagai pemurni minyak goreng, *Jurnal Penelitian Universitas Tanjungpura*, 10(2), 58-69.
- Soldan, P., Lee, E. P., and Wright, T.G., 2002, Microsolvain of Hg and Hg^{2+} : Energy $\text{Hg.H}_2\text{O}$ and HgOH^+ , *J. Phys. Chem.*, 8619-8626.
- Sparks, D.L., 1989, *Kinetics of Soil Chemical Process*, Academic Press, New York.
- Spinall, C., 2001, *Small-scale Mining in Indonesia*, International Institute for Environment and Development, Mining Minerals and Sustainable Development Report, Jakarta.
- Spiegel, S.J. and Veiga, M.M., 2010, International Guidelines on Mercury Management in Small-Scale Gold Mining, *J. Clean. Prod.*, 18, 375-385.

- Stum, W. and J.J. Morgan, 1981, *Aquatic Chemistry*, John Wiley & Sons, Inc, New York.
- Sudarmaji, Sutomo, A.H., dan Suwarni, A., 2004, Konsumsi Ikan Laut, Kadar Merkuri dalam Rambut, dan Kesehatan Nelayan di Pantai Kenjeran Surabaya, *JML*, 11(3), 134-142.
- Suwilin, 2007, Efektifitas arang aktif kayu sengon (*Paraserianthes falcataria* L. Nielsen) dan tempurung kelapa (*Coconus nucifera* L.) untuk pemurnian minyak goreng bekas, *Skripsi*, Institut Pertanian Bogor, Bogor.
- Suzuki, R.M., Andrade, A.D., Sousa, J.C., and Rollemberg, 2007, Preparation and characterization of activated carbon from rice bran, *Biores. Technol.*, 98:1985-1991.
- Tao K, Dou HJ, and Sun K., 2008, Interfacial coprecipitation to prepare magnetite nanoparticles: Concentration and temperature dependence, *Colloids. Surf.*, 320, 115-122.
- Udrajat, R., 1994, *Petunjuk Pembuatan Arang Aktif*, Badan Penelitian dan Pengembangan Kehutanan, Jakarta.
- Vaclavikova, M., Jagabsky, S., and Hredazk, S., 2003, Magnetit Nanoscale Particles for Removal of Heavy Metal Ions, <http://drexel.edu/coe/research/conference/NATO ASI 2003/manuscript/5.2.vaclavikova.pdf>, diakses tanggal 11 April 2018.
- Verla, A.W., Horsfall, M., Verla, E.N., Spiff, A.I., and Ekpote, O.A., 2012, Preparation and characterization of activated carbon from fluted pumpkin (*Telfairia occidentalis* Hook F) seed shell, *AJSC*, 1(3), 39-50.
- Wahajuddin, dan Arora, S., 2012, Superparamagnetic iron oxide nanoparticles: magnetic nanoplatforms as drug carriers, *Int. J. Nanomed.*, 7(12), 3445-3471.
- Wei, Y., Han, B., Hu, X., Lin, Y., Wang, X., and Deng, X., 2012, Synthesis of Fe₃O₄ nanoparticles and their magnetic properties, *Procedia Engineering*, 27(12), 632-637.
- Wijayanti, R., 2009, Arang aktif dari ampas tebu sebagai adsorben pada pemurnian minyak goreng bekas, *Skripsi*, Institut Pertanian Bogor, Bogor.
- Yahya, M.A., Al-Qodah, Z., and Ngah, C.W.Z., 2015, Agriculture bio-waste materials as potential sustainable precursors used for activated carbon production: A review, *Renew. Sust. Energ. Rev.*, 46, 218-235.
- Yao, S., Zhang, J., Shen, D., Xiao, R., Gu, S., Zhao, M., and Liang, J., 2016, Removal of Pb(II) from water by the activated carbon modified by nitric acid under microwave heating, *J. Colloid Interface Sci.*, 463, 118-127.



UNIVERSITAS
GADJAH MADA

**KARBON AKTIF DARI SERBUK KAYU JATI (*Tectona grandis* L.f.) TERMODIFIKASI MAGNETIT
SEBAGAI ADSORBEN
LIMBAH Hg(II) PADA PENAMBANGAN EMAS TRADISIONAL DI DAERAH SANGON, KABUPATEN
KULON PROGO, DIY**

M RIFQI AL GHIFARI, Prof. Dr. Bambang Rusdiarso, DEA., Dr. Sutarno, M.Si.

Universitas Gadjah Mada, 2018 | Diunduh dari <http://etd.repository.ugm.ac.id/>

Zeng, H., Jin, F., and Guo, J., 2004, Removal of elemental mercury from coal combustion flue gas by chloride-impregnated activated carbon, *Fuel*, 83, 143-146.