

DAFTAR PUSTAKA

- Adamson, A. W., 1990, *Physical Chemistry of Surface*, 5th Ed., John Wiley dan Son Inc., Toronto.
- Ai, L., Zhang, C., dan Meng, L., 2011, Adsorption of Methyl Orange from Aqueous Solution on Hydrothermal Synthesized Mg-Al Layered Double Hydroxide, *J. Chem. Eng. Data*, 56, 4217–4225.
- Anard, D., KirschVolders, M., Elhajouji, A., Balpaeme, K., dan Lison, D., 1997, In Vitro Genotoxic Effect of Hard Metal Particles Assessted by Alkaline Single Cell Gel and Elution Assays, *Carcinogenesis*, 18, 177-184.
- Atkins, 1986, *Physical Chemistry*, 3rd Ed, Oxford University Press, Oxford.
- Ayala, A., Fetter, G., Palomares, E., dan Bosch, P., 2011, CuNi/Al Hydrotalcites Synthesized in Presence of Microwave Irradiation, *Mater Lett.*, 65, 1663-1665.
- Baes, C. F., dan Mesmer, R.E., 1976, *The Hydrolysis of Cations*, 1st Ed., Wiley, New York.
- Baldé, C.P., Wang, F., Kuehr, R., Huisman, J., 2015, *The Global e-waste Monitor-2014*, United Nations University, IAS-SCYCLE, Bonn, Germany.
- Bednar, A. J., Boyd, R. E., Jones, W. T., McGrath, C. J., Johnson, D. R., Chappell, M. A., dan Ringelberg, D. B., 2009, Investigations of Tungsten Mobility in Soil Using Column Test, *Chemosphere*, 75, 1049-1056.
- Benfield, L. D., Judkinns, J. F., dan Weand, B. L., 1982, *Process Chemistry for Water and Wastewater Treatment*, 1th Ed., Englewood Cliffs, Prentice-Hall.
- Benito, P., Herrero, M., Labajos, F. M., dan Rives, V., 2010, Effect of Post-Synthesis Microwave-Hydrothermal Treatment on the Properties of Layered Double Hydroxides and Related Materials, *Apply. Clay Sci.*, 48, 218-227.

- Birloaga, I., Coman, V., Kopacek, B., dan Vegliò, F., An Advanced Study on the Hydrometallurgical Processing of Waste Computer Printed Circuit Boards to Extract their Valuable Content of Metals. *Waste. Manage.*, 34, 2581–2586.
- Boyd, G. E., Adamson, A. W., dan Myers, L. S., 1947, The Exchange Adsorption of Ions from Aqueous Solutions by Organic Zeolites, II, Kinetics, *J. Am. Chem. Soc.*, 69, 2836-2848.
- Bradl, H. B., 2004, Adsorption of Heavy Metal Ions on Soils and Soil Constituents, *J. Colloid Interf. Sci.*, 227, 1-18.
- Cavani, F., Trifiro, F., dan Vaccari, A., 1991, Hydrotalcite-Type Anionics Clays: Preparation, Properties, and Application. *Catal. Today*, 11, 173-301.
- Chempel, M., Nikel, G., 2006, Nickel: A Review of its Sources and Environmental Toxicology, *Polish J. Environ. Stud.*, 15, 375-382.
- Clausen, J. L., dan Korte, N., 2009, Environmental Fate of Tungsten from Military Use, *Sci. Total Environ.*, 407, 2887-2893.
- Climent, M. J., Corma, A., Iborra, S., Epping, K., dan Velty, A., 2004, Increasing the Basicity and Catalytic Activity of Hydrotalcites by Different Synthesis Procedures. *J. Catal.*, 225, 316–326.
- Collazo, A., Hernandez, M., Novoa, X. R., dan Perez, C., 2011, Effect of the Addition of Thermally Activated Hydrotalcite on the Protective Features of Sol-Gel Coatings Applied on AA2024 Aluminium Alloys. *Electrochim. Acta*, 56, 7805-7814.
- Considine, Glenn D., 2005, *Molybdenum van Nostrand's Encyclopedia of Chemistry*, 5th Ed., Wiley Interscience, New York.
- Cornelis, G., Johnson, C. A., Gerven, T. V., dan Vandecasteele, C., 2008, Leaching Mechanisms of Oxyanionic Metalloid and Metal Species in Alkaline Solid Wastes: A review, *Appl. Geochem.*, 23, 955-976.
- Das, D. P., Das, J., dan Parida, K., 2003, Physicochemical Characterization and Adsorption Behavior of Calcined Zn/Al Hydrotalcite-like Compounds (HTLs) Towards Removal of Fluoride from Aqueous Solution. *J. Colloid Interf. Sci.*, 261, 213–220.

- Davantes, A., Costa, D., dan Lefevre, G., 2015, Infrared Study of (Poly)tungstate Ions in Solution and Sorbed into Layered Double Hydroxides: Vibrational Calculation and In situ Analysis, *J. Phys. Chem.*, 119, 12356-12364.
- Domingo, J. L., 2002, Vanadium and Tungsten Derivatives as Antidiabetic Agents-a Review of their Toxic Effects, *Biol. Trace Element Res.*, 88, 97-112.
- Dudek, B., Kustrowski, P., Bialas, A., Natkanski, P., Piwowarska, Z., Chmielarz, L., Kozak, M., dan Michalik, M., 2012, Influence of Textural and Structural Properties of Mg-Al Capacity and Mg-Zn-Al Containing Hydrotalcite Derived Oxides on Cr(VI) Adsorption, *Mater. Chem. Phys.*, 132, 929-936.
- Emsley, J., 2001, *Nature's Building Blocks*, 1th Ed., Oxford University Press, Oxford.
- Ferreira, O. P., Moraes, S. G., Duran, N., Cornejo, L., dan Alves, O. L., 2006, Evaluation of Boron Removal from Water by Hydrotalcite-like Compounds. *Chemosphere*, 62, 80-88.
- Fetter, G., 1997, Microwave Irradiation Effect On Hydrotalcite Synthesis, *J. Porous Mat.*, 4, 27-30.
- Fierro, V., Torne, V., Montane, D., dan Celzard, A., 2008, Adsorption of Phenol onto Activated Carbons Having Different Textural and Surface Properties, *Micropor. Mesopor.*, 111, 276-284.
- Frost, R. L., Weier, M. L., dan Klopogge, J. T., 2003, Raman Spectroscopy of Some Natural Hydrotalcites with Sulphate and Carbonate in the Interlayer, *J. Raman Spectrosc.*, 34, 760-768.
- Galvao, T. L., Neves, C. S., Caetano, A. P., Maia, F *et al.*, 2016, Control of Crystallite and Particle Size in the Synthesis of Layered Double Hydroxides: Macromolecular Insights and a Complementary Modeling Tool. *J. Colloid Interf. Sci.*, 468, 86-94.
- Gecol, H., Miakatsindila, P., Ergican, E., dan Hiibel, S. R., 2006. Biopolymer Coated Clay Particles for the Adsorption of Tungsten from Water, *Desalination*, 197, 165-178.

- Goh, K. H., Lim, T. T., dan Dong, Z., 2008, Application of Layered Double Hydroxides for Removal of Oxyanions: A review. *Water Res.*, 42, 1343-1368.
- Guan, W., Zhang, G., dan Gao, C., 2012, Solvent Extraction Separation of Molybdenum and Tungsten from Ammonium Solution by H₂O₂-complexation, *Hydrometallurgy*, 127-128, 84-90.
- Gupta, S. S., dan B, K. G., 2006, Adsorption of Ni(II) on Clays, *J. Colloid Interf. Sci.*, 295, 21-32.
- Gürmen, S., dan Friedrich, B., 2004, Recovery of Cobalt Powder and Tungsten Carbide from Cemented Carbide Scrap - Part I: Kinetics of Cobalt Acid Leaching. *World of Metallurgy- Erzmetal*, 57, 143-147.
- Gustafsson, J. P., 2003, Modelling Molybdate and Tungstate Adsorption to Ferrihydrite, *Chem. Geol.*, 200, 105-115.
- Habashi, F., 1969, *Extractive Metallurgy Vol.1*, 1st Ed., Gordon and Breach, New York.
- Han, S., Hou, W., Zhang, C., Sun, D., *et al.*, 1998, Structure and the Point of Zero Charge of Magnesium Aluminium Hydroxide, *J. Chem. Soc. Faraday. Trans.*, 94, 915-918.
- Hayes, J. R., Grosvenor, A. P., Rowson, J., Hughes, K., Frey, R. A., dan Reid, J., 2014, Analysis of the Mo-speciation in the JEB Tailings Management Facility at McClean Lake Saskatchewan, *Environ. Sci. Tech.*, 48, 4460-4467.
- Ho, Y. S., dan Mc.Kay, G., 1999, Pseudo-second Order Model for Sorption Processes, *Process Biochem.*, 34, 451-465.
- Hur, H., dan Reeder, R. J., 2015, Tungstate Sorption Mechanisms on Boehmite: Systematic uptake Studies and X-Ray Absorption Spectroscopy Analysis, *J. Colloid Interf. Sci.*, 461, 249-260.
- Iksan, N. A., 2011. Kajian Adsorpsi-Desorpsi [AuCl₄]⁻ pada Mg/Al Hidrotalsit. *Tesis*. FMIPA Universitas Gadjah Mada, Yogyakarta.

- Iyaka, Y. A., 2011, Nickel in soils: A Review of its Distribution and Impacts, *Sci. Res. Essays.*, 6, 6774-6777.
- Jin, X., Bayley, G. W., Yu, S. W., dan Lynch, A. T., 1996, Kinetic of Single and Multiple Metal Ion Sorption Process on Humic Substance, *Soil Sci.*, 161, 509-520.
- Karmanto, 2006, Sintesis Mg/Al Hidrotalsit sebagai Adsorben Asam Humat, *Skripsi*, FMIPA Universitas Gadjah Mada, Yogyakarta.
- Kazantis, G., 1979, *Tungsten: Handbook on the Toxicology of Metals*, 3rd Ed., Elsevier, Amsterdam.
- Kieffer dan Lassner, E., 1988, Proc. 4th Int. Tungsten Symp, Vancouver 1987, pp. 59-67, MPR Publishing Services Ltd., United Kingdom.
- Kloprogge, J. T., Hickey, L., dan Frost, R. L., 2004, The Effects of Synthesis pH and Hydrothermal Treatment on the Formation of Zinc Aluminium Hydroxalicates, *J. Solid State Chem.*, 177, 4047-4057.
- Kondilenko, I. I., Pasechny, V. A., dan Tsyashchenko, Y. P., 1972, Infrared Absorption and Local Symetry of WO₄²⁻ and MoO₄²⁻ Impurity Ions in KI and CsI Crystals. *Phys. Stat. Sol.*, 54, 783-789.
- Koutsospyros, A., Braidia, W., Christodoulatos, C., Dermatas, D., dan Strigul, N., 2006, A Review of Tungsten: From Environmental Obscurity to Scrutiny, *J. Hazard. Mater.*, 136, 1-19.
- Kovanda, F., Jindova, E., Dousova, B., Kolousek, D., Plestil, J., dan Sedlakova., 2009, Layered Double Hydroxides Intercalated with Organic Anions and their Application in Preparation of LDH/Polymer Nanocomposites, *Acta Geodyn. Geomater.*, 6, 111-119.
- Kumar, K. V. 2006. Linear and Non-linear Regression Analysis for the Sorption Kinetics of Smethilene Blue onto Activated Carbon. *J. Hazard. Mat.*, 137,1538-1544.
- Lagarde, F. dan Leroy, M., Metabolisme and Toxicity of Tungsten in Humans and animals, *Metal Ions Biol. Syst.*, 39, 741-759.

- Lagergren, S 1898. About the Theory of so-called Adsorption of Soluble Substances, *K. Vetenskapsakad. Handl*, 24, 1-39.
- Lamer, S., Cros, G., Pinol, C., Alvarez, J. P., dan Bressolle, F., 2002, An Application of Population Kinetics Analysis to Estimate Pharmacokinetic Parameters of Sodium Tungstate After Multiple-dose During Preclinical Studies in rats, *Pharmacol. Toxicol.*, 90, 100-105.
- Lassner, E., dan Schubert, W. D., 1999, *Tungsten: Properties, Chemistry, Technology of Elements, Alloys and Chemical Compounds*, 1st Ed., Kluwer Academic Publishing, New York.
- Li, L. F., Hou, W. G., Dai, X. N., dan Liu, C. X., 2004, Studies of the Point of Zero Net Charge and Isoelectrical Point of Zn-Al Hydrotalcite-like Compounds, 62, 429-432.
- Lide, David R., 1994, *Molybdenum Handbook of Chemistry and Physics*, 1st Ed., Chemical Rubber Publishing Company.
- Lindsay, W. L., 1979, *Chemical Equilibria in Soil*, 1st Ed., John Wiley and Sons, New York.
- Lin, J. dan Wang, L., 2009, Comparison Between Linear and Non-linear Forms of Pseudo-First-Order and Pseudo-Second-Order Adsorption Kinetic Models for the Removal of Methylene Blue by Activated Carbon, *Front. Environ. Sci. Engin. China*, 3, 320-324
- Marcus, Y., 1988, Ionic Radii in Aqueous Solutions, *Chem. Rev.*, 88, 1475-1498.
- McKay, G., Otterbun, M. S., dan Sweeney, A. G., 1980, The Removal of Color from Effluent Using Various Adsorbent III Silica: Rate Processes., *Water Res.*, 14, 5-20.
- Miyata, S., 1975, The Synthesis of Hydrotalcite-like Compounds and their Structure and Physico-Chemical Properties. *Clay Miner.*, 23, 369-375.
- Miyata, S. 1983, Anion-exchange Properties of Hydrotalcite-like Compounds. *Clays Clay Miner.*, 31, 305-3011.

- Ozeki, T., Kihara, H. dan Ikeda, S., 1988, Study of Equilibria in 0.03 mM Molybdate Acidic Aqueous Solutions by Factor Analysis Applied to Ultraviolet Spectra, *Anal. Chem.*, 60, 2055-2059.
- Peuster, M., Fink, C., dan von Schnakenburg, C., 2003, Biocompatibility of Corrosing Tungsten Coils: In Vitro Assesment of Degradation Kinetics and Cytotoxicity on Human Celss, *Biomaterials*, 24, 4057-4061.
- Puscasu, C. M., Gherasim, C., Mardare, D., dan Carja, G., 2013, Study of the Textural Propertis of some Layered Double Hydroxides, *Acta Chem.*, 21, 1-8.
- Riman, R. E., Suchanek, W. L., dan Lengka, M. M., 2002, Hydrothermal Crystallization of ceramics. *Ann. Chem. Sci. Mat.* , 27, 15-36.
- Rivera, J. A., Fetter, G., dan Bosch, P., 2006, Microwave Power Effect on Hydrotalcite Synthesis, *Micropor. Mesopor. Mat.*, 89, 306–314.
- Roedel, E. Q., Cafasso, D. E., Lee, K. W. M., dan Pierce, L. M., 2012, Pulmonary Toxicity After Exposure to Military-relevant Heavy Metal Tungsten Alloy Particles, *Toxicol. Appl. Pharm.*, 259, 74-86.
- Rout, S., Kumar, A., Ravi, P. M., Tripathi, R. M., 2015, Pseudo Second Order Kinetic Model for the Sorption of U(VI) onto Soil: A Comparison of Linear and Non-Linear Methods, *Int. J. Environ. Sci*, 6.
- Rovita, E., 2013, Imobilisasi Asam Salisilat pada MgAl Hydrotalcite dan Aplikasinya untuk Adsorpsi-Reduksi [AuCl₄]⁻, *Tesis*, FMIPA Universitas Gadjah Mada, Yogyakarta.
- Salomao, R., Milena, L. M., Wakamatsu, M. H., dan Pandolfelli, V. C., 2011, Hydrotalcites Synthesis via Co-precipitation Reactions Using MgO and Al(OH)₃ Precusors, *Ceram. Int.*, 37, 3063-3070.
- Santosa, S. J., 2014, Sorption Kinetics of Cd(II) Species on Humic Acid-based Sorbent, *Clean-Soil, Air, Water*, 42, 760-766.
- Schulze, K., 2001. *Ni/Mg/Al Catalyst Derived from Hydrotalcite-Type Precursors for the Partial Oxidation of Propane: Synthesis and Characterization of Physicochemical and Catalytic Properties*, Thesis, Gerhard-Mercator University, Germany.

- Singh, D., McLaren, r. G., Cameron, K. C., 2006, Zinc sorption-desorption by Soils: Effet of Concentration and Length of Contact Period, *Geoderma*, 137, 117-125.
- Spark, D. L., 1995, *Environmental Soil Chemistry*, 1st Ed., Academic Press, Sandiago.
- Sun, N. N., Fastje, C. D., Wong, S. S., Sheppard, P. R., *et al.*, 2003, Dose-dependent Transcriptome Changes by Metal Ores on Human Acute Lymphoblastic Cell Line, *Toxicol. Indust. Health*, 19, 157-163.
- Trifiro, F., dan Vaccari, A., 1996, *Comprehensive Supramolecular Chemistry.*, 1st Ed., Vogtle, F., Atwood, F., Davies, dan Acniol, D., Trans, Oxford: Pergamon Press.
- Tronto, J., Bordonal, A. C., Naal, Z., dan Valim, J. B., 2013, Conducting Polymers/Layered Double Hydroxides Intercalated Nanocomposites. *Mater. Sci-Adv Topics*.
- Tseng, R. L., Wu, P. H., Wu, F. C., dan Juang, R. S., 2014, A Convenient Method to Determine Kinetic Parameters of Adsorption Processes by Nonlinear Regression of Pseudo-nth-order Equation. *Chem. Eng. J.*, 237, 153-161.
- Van Goethem, F., Lison, D., Volders, dan KirschVolders, M., 1997, Comparative Evaluation of the in Vitro Micronucleus Test and the Alkaline Single Cell Gel Electrophoresis Assay for the Detection of DNA Damaging Agents: Genotoxic Effects of Cobalt Powder, Tungsten Carbide and Cobalt Tungsten Carbide, *Mutat. Res. Genet. Toxicol. Environ. Mutagen.*, 392, 31-43.
- Varank, G., Demir, A., Yetilmezsoy, K., Top, S., Sekman, E., dan Sinan, M., 2012, Removal of 4-Nitrophenol from Aqueous Solution by Natural Low-Cost Adsorbents, *Indian Chem. Tech.*, 19, 75.
- Wang, J., Li, D., Yu, X., Jing, X., Zhang, M., dan Jiang, Z., 2010, Hydrotalcite Conversion on Coating on Mg Alloy And its Corrosion Resistance, *J. Alloy Compd.*, 494, 271-274.
- Wang, Y., Tang, X., dan Wang, H., 2015, Characteristics an Mechanism of NI(II) Removal from Aqueous Solution by Chinese Loess, *J. Cent. South Univ* , 22, 4184-4192.

- Weber, W. J., dan Morris, J. C., 1963, Kinetics of Adsorption on Carbon from Solution, *J. San. Eng. Div.*, 89, 31-60.
- Wiberg, E., Wiberg, N., Holleman, A. F., 2001, *Inorganic Chemistry*, 1st Ed., Academic Press, San Diego.
- Wihadi, M. N., 2012, Hidrotalsit Mg-Al-NO₃ sebagai Adsorbent untuk Pungut Ulang Logam Emas dari Larutan [AuCl₄], *Tesis*, FMIPA Universitas Gadjah Mada, Yogyakarta.
- Wilson, B., dan Pyatt, F. B., 2006, Bio-availability of Tungsten in the Vicinity of Abandoned Mine in the English Lake District and some Potential Health Implications, *Sci. Total Environ.*, 370, 401-408.
- Witten, M. L., Sheppard, P. R., dan Witten, B. L., 2012, Tungsten Toxicity. *Chem-Biol Interact.*, 196, 87-88.
- Wu, F. C., Tseng, R.L., dan Juang, R.S., 2009, Initial Behavior of Intraparticle Diffusion Model Used in Description of Adsorption Kinetics, *Chem. Eng. J.*, 153, 1-8.
- Xu, Z.P., Stevenson, G., Lu, C-Q., dan Lu, G.Q., 2007, Dispersion and Size Control of Layered Double Hydroxide Nanoparticle in Aqueous Solutions, *J. Phys. Chem.*, 111, 3411-3418.