

## DAFTAR PUSTAKA

- Anonim, 2011, *Balai Besar Penelitian dan Pengembangan Sumber daya Lahan Pertanian tentang Potensi Hara Di Balik Bencana Letusan Gunung Api*, Sekretariat Badan Litbang Pertanian: Jawa Timur.
- Alwash, A., Abdullah, A., dan Ismail, N., 2013, TiO<sub>2</sub>-Zeolite Y Catalyst Prepared Using Impregnation and Ion-Exchange Method for Sonocatalytic Degradation of Amaranth Dye in Aqueous Solution, *Inter. Sch. and Sci. Res. and Innov.*, 7 (6) , 785-793.
- Asahi, R., Morikawa, T., Ohwaki, T., Aoki, K., dan Taga, Y., 2001, Visible-Light Photocatalysis in Nitrogen-Doped Titanium Oxides, *J. Env. Sci. and Tech.*, 293, 269-271.
- Bhatkhande, D., Pangarkar, V., dan Beenackers, A., 2001, Photocatalytic Degradation for Environmental Applications, *J. Chem. Tech. Biotech.*, 77, 102-116.
- Bhatia, R., dan Brinker, C., 2000, Aqueous Sol Gel Process for Protein Encapsulation, *Chem. Mater.*, 12, 2434-2441.
- Bickley, R., Carreno, T., Lees, J., Palmisano, L., dan Tilley, R., 1991, A Structural Investigation of Titanium Dioxide Photocatalysts, *J. Solid State Chem.*, 92 (1), 178-190.
- Bowmaker, G.A., Effendy, Skelton, B.W., dan White, A.H., 1998, Spectroscopic and Structural Studies on 1:2 Adducts of Silver(I) Salts with Tricyclohexylarsine, *J. Chem. Soc. Dal. Transac.*, 2123-2129
- Chang, T., Wu, M., dan Zhu, F., 2004, A Kinetic Model for Photocatalytic Degradation of Organic Contaminants in a Thin-Film TiO<sub>2</sub> Catalyst, *Water Res.*, 34, 407-416.
- Costa, M., dan Klein, C.B., 2008, Toxicity and Carcinogenicity of Chromium Coumpounds in Humans, *Crit. Rev. Toxicol.*, 36(2),155-163.
- Cotton, F.A., dan Wilkinson, G., 1980, *Advanced Inorganic Chemistry 4<sup>th</sup> Ed.*, New York: John Wiley and Sons.
- Cozzolino, M., Diserio, M., Tesser, R., dan Santacesaria, E., 2006, Preparation, Characterization and Catalytic Performances of Highly Dispersed Supported TiO<sub>2</sub>/SiO<sub>2</sub> Catalyst in Biodiesel Production, *Stud. Surf. Sci. Cat.*, 162, 299-306.

- Daneshvar, N., Salari, D., dan Aber, S., 2002, Chromium Adsorption and Cr(VI) Reduction to Trivalent Chromium in Aqueous Solutions by Soya Cake, *J. Haz. Mater. B.*, 94, 49-61.
- Diaz, C.E.B., Landeros, C.R., Bilyeu, B., Guerrero, V.V., dan Nunez, F.U., 2013, A Review on Cr(VI) Adsorption Using Inorganic Materials, *Sci. Res.*, 4, 8-16.
- Doolin, K., Alerasool, S., Zalewski, J., dan Hoffman, 1994, Acidity Studies of Titania-Silica Mixed Oxides, *J. F. Cat. Lett.*, 25, 209.
- Durgakumari, V., Subrahmanyam, M., Subba, K., Ratnamala, A., Noorjahan, M., dan Tanaka, K., 2002, An Easy and Efficient Use of TiO<sub>2</sub> Supported HZSM-5 and TiO<sub>2</sub>+HZSM-5 Zeolite Combine in the Photodegradation of Aqueous Phenol and p-Chlorophenol, *Appl. Cat. Gen.*, 234, 155-165.
- Ekimov, A.I., Effros, A.I.L., dan Anuchenko, A., 1985, Quantum Size Effect in Semiconductor Microcrystal, *Sol. State. Comm.*, 5611, 921-1524
- Ellenbecker, M., dan Harriman, E., 2006, *Five Chemicals Alternatives Assessment Study, Toxics Use Reduction Institute*, Massachusetts: University of Massachusetts Lowell.
- Fernandez, A., Caballero, A., dan Gonzalez, A., 1992, Size and Support Effects in the Photoelectron Spectra of Small TiO<sub>2</sub> Particles, *Surf. Inter. Analy.*, 18, 392-396.
- Fox, A., dan Dulay, T., 1993, Heterogeneous Photocatalysis, *Chem. Rev.*, 93, 341-357.
- Fruchter, J.S., Cole, C.R., Williams, M.D., Vermeul, V.R., Amonette, J.E., Szecsody, J.E., Istok, J.D., dan Humphrey, M.D., 2000, Creation of a Subsurface Permeable Treatment Barrier Using in Situ Redox Manipulation, *Ground. Monit. and Remed. Rev.*
- Gordillo, A., Tzompantzi, F., dan Gomez, R., 2012, Enhanced Photoreduction of Cr(VI) using ZnS(en) 0.5 Hybrid Semiconductor, *Cat. Comm.*, 19, 51-55.
- Haukka, S., Lakomaa, E., dan Root, 1993, An IR and NMR Study of the Chemisorption of TiCl<sub>4</sub> on Silica. *J. Phys. Chem.*, 97, 5085-5094.
- Hoffman, M.R., Martin, S., Choi, w., dan Bahnemann, D., 1995, Environmental Applications of Semiconductor Photocatalysis, *J. Chem. Rev.*, 95, 69-96.
- Hu, S., Li, F., dan Fan, Z., 2012, Preparation of SiO<sub>2</sub>-Coated TiO<sub>2</sub> Composite Materials with Enhanced Photocatalytic Activity Under UV Light, *Bull. Korean Chem. Soc.*, 33(6).

- Hung, C., dan Katz, J., 1992, Formation of mixed oxide powders in flames: Part I. TiO<sub>2</sub>-SiO<sub>2</sub>, *J. Mat. Res.*, 7 (7), 1861-1869.
- Juan, J.T., Maria, A.G., dan Marta, I.L., 2004, Involvement of Cr(VI) species, *J. Env. Sci. Tech.*, 38, 1589-1594.
- Junaidi, Giacinta, M., dan Salimin, Z., 2012, Pengolahan Logam Berat Krom (Cr) pada Limbah Cair Industri Penyamakan Kulit dengan Proses Koagulasi Flokulasi dan Presipitasi. *Indo. J. Chem.*
- Klankaw, P., Chawengkijwanich, C., Grisdanurak, N., dan Chiarakorn, S., 2012, The Hybrid Photocatalyst of TiO<sub>2</sub>-SiO<sub>2</sub> Thin Film Prepared from Rice Husk Silica, *Superlatt. and Microstruc.*, 51, 343-352.
- Kim, C., Zhou, Q., Deng, B., Thornton, E., dan Xu, H., 2001, Chromium(VI) Reduction by Hydrogen Sulfide in Aqueous Media: Stoichiometry and Kinetics, *J. Env. Sci. and Tech.*, 35, 2219-2225.
- Kozuh, N., Stupar, J., dan Gorenc, B., 2000, Reduction and Oxidation Processes of Chromium in Soils, *J. Env. Sci. and Tech.*, 34, 112-119.
- Lauofi, R., dan Moufagh, K., 2008, Investigation of Photocatalytic Degradation of Phenol by UV/TiO<sub>2</sub> Process in Aquatic Solutions, *J. Health. Sci.*, 5, 354-368.
- Lingarweni, B., 2014, Kajian Fotoreduksi Ion Cr(IV) dengan Menggunakan Fotokatalis TiO<sub>2</sub>-Resin, *Tesis*, Program Studi S2 Kimia FMIPA UGM, Yogyakarta.
- Linsebigler, L., Lu, G., dan Yates, J., 1995, Photocatalysis on TiO<sub>2</sub> Surfaces: Principles, Mechanisms, and Selected Results, *J. Chem. Rev.*, 95, 735-758.
- Liu, Y., Hu, X., Wang, H., Chen, A., Liu, S., Guo, Y., He, Y., Hu, X., Li, J., Liu, S., Wang, Y., dan Zhou, L., 2013, Photoreduction of Cr(VI) from Acidic Aqueous Solution Using TiO<sub>2</sub> Impregnated Glutaraldehyde-Crosslinked Alginate Beads and The Effect of Fe(II) Ions, *J. Chem. Eng.*, 226, 131-138.
- Mahyar, A., Behnajady, M., dan Naser, M., 2010, Characterization and Photocatalytic Activity of SiO<sub>2</sub>-TiO<sub>2</sub> Mixed Oxide Nanoparticles Prepared by Sol Gel Method, *Indi. J. Chem.*, 1593-1600.
- Manuel J., Mata, D., González, J., Juárez, V., dan Rodríguez, I., 2012, Hexavalent Chromium Removal by Citrus limonium Shell, *J. Inorg. Mat.*, 2, 19-24.
- Martins, R., Rugerri, G., Paoli, M., 2003, Synthesis in Pilot Plant Scale and Physical Properties of Sulfonated Polystyrene, *Braz. J. Chem. Soc.*, 14.

- Massel, R., 1996, *Principles of Adsorption and Reaction on Solid Surfaces*, New York : Wiley.
- Mohan, D., dan Pittman, U., 2006, Activated Carbons and Low Cost Adsorbents for Remediation of Tri- and Hexavalent Chromium from Water, *J. Haz. Mat.*, B137, 762-811.
- Mukhopadhyay, B., Sundquist, J., dan Schmitz, 2007, Removal of Cr(VI) from Cr-Contaminated Groundwater Through Electrochemical Addition of Fe(II), *J. Env. Manag.*, 82, 66-76.
- Nandi, 2006, *Geologi Lingkungan: Vulkanisme*, Bandung: Jurusan Pendidikan Geografi Fakultas Pendidikan Universitas Pendidikan Indonesia.
- Nilchi, A., Darzi, S., dan Garmarodi, S., 2011, Sol-Gel Preparation of Nanoscale TiO<sub>2</sub>/SiO<sub>2</sub> Composite for Eliminating of Con Red Azo Dye, *Mat. Sci. and App.*, 2, 476-480.
- Ökte, A., dan Yilmaz, O., 2009, Characteristics of Lanthanum Loaded TiO<sub>2</sub> - ZSM-5 Photocatalysts: Decolorization and Degradation Processes of Methyl Orange, *Micropor. Mesopor. Mat.*, 354, 132-142.
- Palar, H., 2008, *Pencemaran dan Toksikologi Logam Berat*, Jakarta: Rineka Cipta.
- Peter, A., Cozmuta, L., Cozmuta, A., dan Nicula, C., 2013, Photocatalytic Efficiency of Zeolite-Based TiO<sub>2</sub> Composites for Reduction of Cu (II): Kinetic Models, *Inter. J. App. Tech.*, 1-14.
- Pettine, M., Campanella, L., dan Millero, F., 2002, Reduction of Hexavalent Chromium by H<sub>2</sub>O<sub>2</sub> in Acidic Solutions, *J. Env. Sci. and Tech.*, 36, 901-907.
- Rashed, M., dan Amin, A., 2007, Photocatalytic Degradation of Methyl Orange In Aqueous TiO<sub>2</sub> Under Different Solar Irradiation Sources. *Inter. J. Phy. Sci.*, 2 (3), 073-081.
- Riazian, M., Montazeri, N., dan Biazar, E., 2011, Nano Structural Properties of TiO<sub>2</sub>-SiO<sub>2</sub>, *Ori. J. Chem.*, 903-910.
- Ridho, R., 2008, Imobilisasi TiO<sub>2</sub> Ke Dalam Resin Penukar Kation dan Aplikasinya Sebagai Fotokatalis Dalam Proses Fotoreduksi Ion Hg(II), *Tesis*, Program Studi S2 Kimia FMIPA UGM, Yogyakarta.
- Scott, W., 1993, *Silica Gel and Bonded Phases*, Willey & Sons Ltd., Chichester, 2-14, 23-25, 43-54.

- Selli, E., Giorgi, A., dan Bidoglio, G., 1996, Humic Acid-Sensitized Photoreduction of Cr(VI) on ZnO Particles, *J. Env. Sci. and Tech.*, 30, 598-604.
- Sharma, S.K., Pandey, P.K., dan Sambhi, S.S., 2010, Kinetics and Equilibrium Study of Chromium Adsorption on ZeoliteNaX, *Inter. J. Env. Sci. Tech.*, 7(2), 395-404.
- Shivpuri, K., Lokeshappa B., Kulkarni, D., dan Dikshit, A., 2011, Metal Leaching Potential in Coal Fly Ash, *Americ. J. Env. Eng.* 1(1): 21-27.
- Skoog, A., Douglas, M., Holler, J., dan Crouch, H., 2014, *Fundamentals of Analytical Chemistry Ninth Edition*, USA: Mary Finch.
- Slamet, R., Arbianti, E., dan Marlina, 2007, Pengolahan Limbah Cr(VI) dan Fenol dengan Fotokatalis Serbuk TiO dan CuO/ TiO, *J. REAKTOR*, 11(2), ISSN: 0852-0798.
- Sperling, M., Xu, S., dan Welz, B., 1992, Determination of Chromium (III) and Chromium(VI) in Water Using Flow Injection on line Preconcentration with Selective Adsorption on Activated and Flame Atomic Adsorption Spectrometric Detection, *Analy. Chem.*, 64, 3101-3108.
- Stöber, W., Fink, A., Bohn, E., 1968, Controlled Growth of Monodispersed Spheres in The Micron Size Range, *J. Coll. Interface. Sci.*, 26, 62-69.
- Sun, J., Qiu, L., Zhau, E., Liu, H., Zhang, L., dan Shen, J., 2012, Drying and Nondrying Layer by Layer Assembly for the Fabrication of Sodium Silicate/TiO<sub>2</sub> Nanoparticle Composite Films, *J. Lang.*, 28, 1816-1823.
- Tjokrodinuljo, K., 2007, *Teknologi Bahan Kontruksi*, Yogyakarta: Biro Penerbit Teknik Sipil dan Lingkungan Universitas Gadjah Mada.
- Thuadaj, N., dan Nuntiya, A., 2008, Preparation of Nanosilica Powder from Rice Husk Ash by Precipitation Method, *J. Sci.*, 35(1), 206-211.
- Wahyuni, E.T., Triyono, S., dan Suherm, 2012, Penentuan Komposisi kimia Abu Vulkanik dari Erupsi Gunung Merapi, *J. Ling.*, vol.,19.
- Wijaya, K., Yeslia, U., Triyono, dan Eko, S., 2006, Preparation and Characterization of TiO<sub>2</sub>-Zeolite and its Application to Degrade Textille Wastewater by Photocatalytic Method, *Indo. J. Chem.*, 231-237.
- Willems, G.J., Blaton, N.M., Peeters, O.M., dan Ranter, C.J., 1997, The Interaction of Chromium(VI), Chromium(III) and Chromium(II) with Diphenylcarbazine, Diphenylcarbazon, Diphenylcarbadiazon, *Analy. Chem. Acta.*, 88, 345-352.

- Wilhelm, P., dan Stephan, D., 2006, Photodegradation of Rhodamine B in Aqueous Solution Via SiO<sub>2</sub>@TiO<sub>2</sub> Nano-Spheres, *J. Photochem. Photobio. Chem.*, 185, 19-25.
- Xu, Y., Zheng, W., dan Liu, J., 1999, Enhanced Photocatalytic Activity of Supported TiO<sub>2</sub>: Dispersing Effect of SiO<sub>2</sub>, *J. Photochem. Photobio. Chem.*, 122, 57.
- Yang, G., dan Chan, S., 2009, Photocatalytic Reduction of Chromium (VI) in Aqueous Solution using Dye-Sensitized Nanoscale ZnO under Visible Light Irradiation, *J. Nanopart. Res.*, 11, 221–230.
- Ziolo, R.F., Giannelis, E., Weinstein, B., O'Horo, M., Ganguly, B., Mehrotra, V., Russell, M., dan Huffman, D., 1992, Matrix-Mediated Synthesis of Nanocrystalline-Fe<sub>2</sub>O<sub>3</sub>: A New Optically Transparent Magnetic Material, *J. Env. Sci. and Tech.*, 257, 219-223.