



## DAFTAR PUSTAKA

Adaro Energi Tbk., 2019, *Annual Report 2019*, PT. Adaro Energi, Tbk, 411 pp.

Alpern, B., Lemos de Sousa, M.J and Flares, D., 1989, *A Progress Report on The Alpern Coal Classification*, International Journal of Coal Geology, Vol. 13, p.. 1-19.

Akinyemi, S.A., Gitari, W.M., Akinlusa, A and Petrik, L.F., 2012, *Mineralogy and Geochemistry of Sub-Bituminous Coal and Its Combustion Products from Mpumalanga Province, South Africa*, INTECH, <http://dx.doi.org/10.5772/50692>.

Amarullah, D., Margani, S., Priono dan Sudiro., 2002., *Inventarisasi dan Evaluasi Endapan Batubara Kabupaten Barito Selatan dan Barito Utara, Provinsi Kalimantan Tengah*, Direktorat Inventarisasi Sumber Daya Mineral, Laporan Inventarisasi dan Evaluasi Bahan Galian Indonesia, 21 pp.

Amijaya, H and Littke, R., 2006, *Properties of Thermally Metamorphosed Coal From Tanjung Enim Area, South Sumatra Basin, Indonesia with Special Reference to The Coalification Path of Macerals*, International Journal of Coal Geology, 66, p.271-295.

ASTM D3173., 2004, *Standard Test Method for Moisture in the Analysis Sample of Coal and Coke*, ASTM International, West Conshohocken, PA.

ASTM D3174., 2004, *Standard Test Method for Ash in the Analysis Sample of Coal and Coke from Coal*, ASTM International, West Conshohocken, PA,

ASTM D3175, 2004, *Standard Test Method for Volatile Matter in the Analysis Sample of Coal and Coke*, ASTM International, West Conshohocken, PA.

ASTM D3176-89., 2002, *Standard Practice for Ultimate Analysis of Coal and Coke*, ASTM International, West Conshohocken, PA.

ASTM D3177-02., 2007, *Standard Test Methods for Total Sulfur in the Analysis Sample of Coal and Coke*, ASTM International, West Conshohocken, PA

ASTM D3178-89., 2007, *Standard Test Methods for Carbon and Hydrogen in the Analysis Sample of Coal and Coke*, ASTM International, West Conshohocken, PA.

ASTM D2798-09., 2009, *Standard Test Method for Microscopical Determination of the Vitrinite Reflectance of Coal*, ASTM International, West Conshohocken, PA.



ASTM D4239-04., 2004, *Standard Test Methods for Sulfur in the Analysis Sample of Coal and Coke Using High-Temperature Tube Furnace Combustion Methods*, ASTM International, West Conshohocken, PA.

ASTM D6796-02., 2008, *Standard Practice for Production of Coal, Coke and Coal Combustion Samples for Interlaboratory Studies*, ASTM International, West Conshohocken, PA.

ASTM D2639 / D2639M-16., 2016, *Standard Test Method for Plastic Properties of Coal by the Constant-Torque Gieseler Plastometer*, ASTM International, West Conshohocken, PA.

ASTM D720-91., 2010, *Standard Test Method for Free-Swelling Index of Coal*, ASTM International, West Conshohocken, PA.

ASTM D5341-99., 2010 e1, *Standard Test Method for Measuring Coke Reactivity Index (CRI) and Coke Strength After Reaction (CSR)*, ASTM International, West Conshohocken, PA.

ASTM D5373-13., 2013, *Standard Test Methods for Determination of Carbon, Hydrogen and Nitrogen in Analysis Samples of Coal and Carbon in Analysis Samples of Coal and Coke*, ASTM International, West Conshohocken, PA.

ASTM D2639 / D2639M-16., 2016, *Standard Test Method for Plastic Properties of Coal by the Constant-Torque Gieseler Plastometer*, ASTM International, West Conshohocken, PA.

Australian Standard 2856., 1986, *Coal Maceral Analysis*, Standard Australia, 20 p.

Australian Standard 2856. 2., 1998, *Coal Maceral Analysis*, Standard Australia, 20 p.

Barker, C.E., Crysdale, B.L., Pawlewicz, M.J, 1986, *The relationship between vitrinite reflectance, metamorphic grade, and temperature in the Cerro Prieto, Salton Sea and East Mesa geothermal systems, Salton Trough, United States and Mexico. In: Mumpton, F.A. (Ed.), Studies in Diagenesis. U.S Geological Survey Bulletin*, vol. 1578, pp. 83–95.

Bayliss, P., Smith, D.K., Mrose, M.E and Berry, L.G., 1980a, *Mineral Powder Diffraction File: Book 1, Data Book*, JCPDS, International Centre for Diffraction Data, 1601 Park Line, Swarthmore, Pennsylvania 19081, USA, 1168p.

Bayliss, P., Smith, D.K., Mrose, M.E and Berry, L.G., 1980b, *Mineral Powder Diffraction File: Book 2, Search Manual*, JCPDS, International Centre for Diffraction Data, 1601 Park Line, Swarthmore, Pennsylvania 19081, USA, 484p.



Baysal, M., Yürüm, A., Yıldız, B and Yürüm, Y., 2016, *Structure of Some Western Anatolia Coals Investigated by FTIR, Raman, <sup>13</sup>C Solid State NMR Spectroscopy and X-Ray Diffraction*, International Journal of Coal Geology, 163, p. 166-176.

Borneo Lumbung Energi and Metal., 2013, *Annual Report 2013*, PT. Borneo Lumbung Energi and Metal, Tbk, 230 pp.

Cheng A, 2001., *Coke quality requirements for blast furnaces*, Iron Steelmaker, Vol.28, p. 78-81.

Cypres, R and Soudan-Moinet, C., 1980, *Pyrolysis of coal and iron oxides mixtures. 1. Influence of iron oxides on the pyrolysis of coal*, Fuel, Vol.59, p. 48-54.

Diessel, C.F.K., 1992, *Coal Bearing Depositional Systems*, Springer-Verlag, Berlin, 721 pp.

Diez, M.A., Alvarez, R and Barriocanal, C., 2002, *Coal For Metallurgical Coke Production: Predictions Of Coke Quality And Future Requirements For Cokemaking*, International Journal of Coal Geology, Vol.50, p. 385-412.

Doust, A and Noble, R.A., 2008, *Petroleum System of Indonesia*, Marine and Petroleum Geology, Vol.25, p. 103-129.

Falcon, R.M.S, Snyman, C.P., 1986, *An Introduction to Coal Petrography*. Geological Society of South Africa, Johannesburg.

Fuchs, W and Sandohoff, A.G., 1942, *Theory of Coal Pyrolysis*, Ind. Eng. Chem., Vol. 34 Pennsylvania, p. 567-573.

Gransden, J.F., Jorgensen, J.G., Price, J.T and Ramey, N.J., 1991, *Applications of Microscopy to Coke Making*, International Journal of Coal Geology, Vol. 19 p. 77-107.

Gray, R.J and Devaney, K.F., 1986, *Coke carbon forms: Microscopic Classification And Industrial Applications*, International Journal of Coal Geology, Vol. 6 p. 277-297.

Grigore, M, Sakurovs, R., 2007, *Effect of carbonisation conditions on mineral*, ISIJ International, Vol. 47 p.62-66

Grigore, M, Sakurovs, R, French, D, Sahajwalla, V., 2012, *Properties and CO<sub>2</sub> reactivity of the inert and reactive maceral-derived components in cokes*, International Journal of Coal Geology, Vol. 98 p.1-9

Goodarzi, F., Sanei, H., Stasiuk, L.D., Sadeghi, B.H., and Reyes, J., 2006, *A Preliminary Study of Mineralogy and Geochemistry of Four Coal Samples from Northern Iran*, International Journal of Coal Geology, Vol. 65, p. 35-50.



Haenel, M.W., 1992, *Recent Progress in Coal Structure Research*, Fuel, Vol. 71, November, p.1211-1223.

Hair, J, Anderson, R, Black, B and Babin, B, 2010., *Multivariate Data Analysis*, Uppersaddle River, Pearson Prentice-Hall, Inc, 900 pp.

Hatcher, P.G dan Clifford, D.J., 1997, *The Organic Geochemistry of Coal*, Organic Geochemistry Vol. 27, p. 251–274.

Huggins, F.E., 2002, *Overview of Analytical Methods for Inorganic Constituent in Coal*, International Journal of Coal Geology, Vol.50, p. 169-214.

Khan, M.R, Walker, P.L and Jenkins, R.G., 1988, *Swelling and plastic properties of coal devolatilized at elevated pressures of H<sub>2</sub> and He: Influence of added iron oxides*, Fuel, Vol. 67 p. 693-699.

International Committee for Coal and Organic Petrology (ICCP), 1998, *The New Vitrinite Classification (ICCP System 1994)*, Fuel, Vol. 77, No. 5, p. 349-358.

International Committee for Coal and Organic Petrology (ICCP), 2001, *The New Inertinite Classification (ICCP System 1994)*, Fuel, 80, p.459-471.

ISO 562:2010., 2010, *Hard Coal and Coke - Determination of Volatile Matter*, International Organization for Standardization, Switzerland.

ISO 1171:2010., 2010, *Solid Mineral Fuels - Determination of Ash*, International Organization for Standardization, Switzerland.

ISO 11722:2013., 2013, *Solid Mineral Fuels - Hard Coal - Determination of Moisture in The General Analysis Test Sample by Drying in Nitrogen*, International Organization for Standardization, Switzerland.

ISO 17246:2010., 2010, *Coal - Proximate Analysis*, International Organization for Standardization, Switzerland.

Kabe, T., Atsushi, I., Eika, W., Qian, I., Putu, S and Kabe, Y., 2004, *Coal and Coal-Related Compounds Structures, Reactivity and Catalytic Reactions*, Elsevier Science and Technology, Philadelphia, 362 pp.

Kontan., 2018, **Adaro Energy ingin pasok semua kebutuhan kokas domestik**, Web. 29 April 2018, <https://investasi.kontan.co.id>, 1 pp

Krzesinska, M, Slawomira Pusz, S and Smedowski, L., 2009, *Characterization of the porous structure of cokes produced from the blends of three Polish bituminous coking coals*, International Journal of Coal Geology, Vol.78, p. 167-176.



Marsh, H., Edward, S., Menendez, R., Rand, B., West, S., Hosty, A.J. Kuo, K., McEnaney, B., Mays, T., Johnson,D.J., Patrick,J.W., Clarke, D.E., Crelling, J.C and Gray, R.J., 1989, *Introduction to Carbon Science, Vol. 1*, Elsevier Science Publisher, 348 pp

Meng, F., 2015, *Effect of Coal Chemistry on Carbonization Behaviour and Association with Coke Characteristics*, Thesis, The University Of New South Wales, 251 pp

Menteri ESDM, 2017, *Peraturan Menteri ESDM Nomor 7 Tahun 2017 tentang Tata Cara Penetapan Harga Patokan Penjualan Mineral Logam Dan Batubara*, Direktur Jenderal Peraturan Perundang-undangan, Kemenhumdanham, Jakarta.

Menteri ESDM, 2017, *Peraturan Menteri ESDM Nomor 44 Tahun 2017 tentang Perubahan Tata Cara Penetapan Harga Patokan Penjualan Mineral Logam Dan Batubara*, Direktur Jenderal Peraturan Perundang-undangan, Kemenhumdanham, Jakarta.

Miller, B.G., 2005, *Coal Energy Systems*, Elsevier Academic Press, 526 pp

Moss, S.J, Chambers, J., Cloke, I., Satria, D., Ali, J.R., Baker, S., Milsom, J., and Carter, A., 1997., *New Observations on The Sedimentary and Tectonic Evolution of the Tertiary Kutai Basin, East Kalimantan*, Petroleum Geology of Southeast Asia, Geological Society Special Publication No. 126, p.395-416.

Moss, S.J and Chambers, J.L.C., 1999, *Depositional Modelling and Facies Architecture of Rift and Inversion in The Kutai Basin, Kalimantan, Indonesia*. Indonesian Petroleum Association, Proceedings 27th Annual Convention, p.459-486.

Mc Clay, K., Dooley, T., Ferguson, A and Poblet, J., 2000., *Tectonic Evolution of The Sanga-Sanga Block, Mahakam Delta, Kalimantan, Indonesia*, AAPG Bulletin Vol.84 no.6, p.765-786.

Nas, C and Hindartan., 2010, *The Quality of Central Kalimantan Coking Coals*, Kalimantan Coal and Mineral Resources, Proceeding MGEI-IAGI, p. 1-11

Nas, C., 2016, *Batubara Kokas Indonesia: Semua Pihak Harus Mengakuinya*, Web. Juni 2017, <https://www.mail-archive.com/iagi-net@iagi.or.id/msg46317.html> , 1 pp

Niekerk, D.V., Pugmire, R.J., Solum, M.S., Painter, P.C and Mathews, J.P., 2008, *Structural Characterization of Vitrinite-Rich and Inertinite-Rich Permian-Aged South African Bituminous Coals*, International Journal of Coal Geology, 76, p. 290–300



Nikolaos, K., Colin, R.W., Dimitra, P and Zhongsheng, L., 2009, *Quantitative Evolution of minerals in Lignites and Intraseam Sediments from The Achlada Basin, Northern Greece*, Energy and Fuels, Vol. 23, p. 2169-2171.

Nining, S.N., huda, M dan Suganal., 2015, *The use of Additive using Low Rank Coal for Metallurgical Coke Making*, Jurnal Teknologi Mineral dan Batubara, Vol. 11, p. 199-207.

Nomura, S, Naito, M and Yamaguchi, K., 2007, *Post-reaction strength of catalyst-added highly reactive coke*, ISIJ International, Vol. 93 p.9-17.

Reid, M.H, Mahoney, M.R and Monaghan, B.J., 2011, *A Coke Analogue for the Study of the Effects of Minerals on Coke Reactivity*, ISIJ International, Vol. 83 p.628-633.

Orrego, J.A., Hernández, R.C and Mejía-Ospino, E., 2010, *Structural Study of Colombian Coal by Fourier Transform Infrared Spectroscopy Coupled to Attenuated Total Reflectance (FTIR-ATR)*, Revista Mexicana De Física 56 (3), p. 251–254.

Petersen, H.I and Nytoft, H.P., 2006, *Oil generation capacity of coals as a function of coal age and aliphatic structure*, Organic Geochemistry Vol. 37, p.558–583.

Renton, J.J., 1982, *Mineral matter in Coal*, Coal Structure, ed. Meyer RA, Academic Press, p. 283-324.

Rollinson, H.R., 1995, *Using Geochimical Data : Evaluation, Presentation, Interpretation*, Logman Group, 351 pp.

Ruiz, S and Crelling, J.C., 2008, *Applied Coal Petrology : The Role of Coal Petrology In Coal Utilization*, 388 pp.

Satyana, A.H., Nugroho, D., Surantoko, I, 1999, *Tectonic Controls on The Hydrocarbon Habitats of The Barito, Kutai and Tarakan Basin, Eastern Kalimantan, Indonesia; Major Dissimilarities*. Journal of Asian Earth Sciences Special Issue Vol. 17, No. 1-2, p. 99-120.

Santoso, S., 2014, *Panduan Lengkap SPSS 20 (Edisi Revisi)*, Elex Media Komputindo, Jakarta, 464 pp.

Sarwono, J., 2012, *Metode Riset Skripsi Pendekatan Kuantitatif Menggunakan Prosedur SPSS (Edisi Revisi)*, Elex Media Komputindo, Jakarta, 272 pp.

Situmorang, B, J, A., 2012, *Potensi Batubara Daerah Long Bagun Kabupaten Kutai Barat, Kaltim*, Jurnal Ilmiah MATG, UPN, Vol. 5, p. 1-11.



Shin, S.M, Park, J.K and Jung, S.M., 2015, *Changes of Aromatic CH and Aliphatic CH in In-situ FT-IR Spectra of Bituminous Coals in the Thermoplastic Range*, ISIJ International, Vol. 55 p.1591-1598.

Sriwidodo., Wofgang, O., Achim, B., Reinhard, F.S., Komang, A and Wilhelm, P., 2010, *Distribution of sulfur and pyrite in coal seams from Kutai Basin (East Kalimantan, Indonesia): Implications for paleoenvironmental conditions*, International Journal of Coal Geology, Vol. 81, p.151-162

Sakurovs, R, French, D and Grigore, M., 2007, *Quantification of mineral matter in commercial cokes and their parent coals*, International Journal of Coal Geology, Vol. 72, p.81-88

Speight, J.G., 2005, *Handbook of Coal Analisys*, John Wiley & Sons. Inc. Publication, 238 pp.

Speight, J.G., 2013, *The Chemistry and Technology of Coal 3th edition*, CRC Press., 807 pp.

Spiro, C.L., 1981, *Space-Filling Models For Coals: Molecular Description Of Coal Platicity*, Fuel Vol. 60, p. 1121-1126.

Spiro, C.L and Kosky, P.G., 1982, *Space-Filling for Coal.2 Extension to coals of various ranks* , Fuel Vol. 61, p. 1080-1084.

Skoog, D.A, Holler, F.J and Crouch, S.R., 2010, *Principles of Instrumental Analysis, 6<sup>th</sup> edition*, Thomson Higher Education, 10 Davis Drive, Belmont, CA, USA, 1039p.

SMG Consultants., 2011, *Indonesia – Exploring its Potential*, Coking Coal and Met Coke Forum, Singapore, 41 pp.

Stach, E., Mackowsky, M.T.H., Teichmuller, M., Taylor, G.H., Chandra, D and Teichmuller, R., 1982, *Stach's Textbook of Coal Petrology*. Gebruder Borntraeger, Berlin, Stuttgart, 407 pp.

Sýkorová, I., W. Pickel, W., Christianis, K., Wolf, M., Taylor, G. H and Flores, D., 2005, *Classification of huminite—ICCP System 1994*, International Journal of Coal Geology, Vol.62, p. 85-106.

Supriatna, Sudrajat dan H.Z. Abidin., 1995, *Peta Regional Lembar Muaratewe, Kalimantan*, Badan Geologi, Pusat sumber Daya Geologi, Kementerian Energi dan Sumber Daya Mineral, 1 p.

Suryanegara, Y, Isnaniawardhani, V, Sunardi, E.. 2109, *Karakteristik dan lingkungan pengendapan batubara Eosen Formasi Batu Ayau Cekungan Kutei atas bagian barat di daerah Murung Raya dan sekitarnya, Kalimantan Tengah*, Bulletin of Scientific Contribution: GEOLOGY, Vol.17, p.37-59.



Taylor, G.H, Teichmüller, M., Davis, A., Diessel, C.F.K., Littke, R and Robert, P., 1998, *Organic Petrology*, Gebruder Borntraeger, Berlin, 704 pp.

Teichmuller, M., 1989, *The Genesis of Coal From The Viewpoint of Coal Petrology*, International Journal of Coal Geology, Vol. 12, p.1-87

Thomas, L., 2013, *Coal Geology*, 2<sup>nd</sup> Ed, Wiley-Blackwell, John Wiley & Sons, Ltd, 444 pp.

Vega, M.F, Fernandes, A.M, Diaz-Faes, E and Barriocanal, C., 2016, *Improving The Properties Of High Volatile Coking Coal by Controlled Mild Oxidation*, Fuel Vol. 191, p. 574-582.

Vogt, D., 2000, *Coke strength after reaction, signification regarding with various operation and various cokes.*, Ironmaking conference proceedings Vol. 59, p. 47–54.

Wang, Q, Guo, R, Zhao, X, Sun, J, Zhang, S and Liu, W., 2016, *A new testing and evaluating method of cokes with greatly varied CRI and CSR*, Fuel, Vol. 182 p.1-7.

Ward, C.R., 1986, *Review of Mineral Matter in Coal*, Australian Coal Geology, Geol. Society of Australia, Vol.6 p.87-107.

Ward, C.R., D.A, Spears., Carol, A.B., Ian, S and Lila, W.G., 1999, *Mineral Matter and Trace Element in Coal Of The Gunnedah Basin New South Wales Australia*, International Journal of Coal Geology, Vol.40, p. 281-308.

Ward, C.R., 2002, *Analysis and Significance of Mineral Matter in Coal Seam*, International Journal of Coal Geology, Vol.50, p. 135-168.

Xiang, L, Ahi-Hong, Q, Liang-hui, B, Zhuang, Y and Chen-yang, S., 2016, *Structural analysis of functional group and mechanism investigation of caking property of coking coal*, Fuell, Vol.44, April, p. 385-593.

Yossifova, M. G., 2007, *Mineral and inorganic chemical composition of the Pernik coal, Bulgaria*. International Journal of Coal Geology, 72(3-4), p. 268–292.

Yunapritta, H., 2018, *Adaro Energy ingin pasok semua kebutuhan kokas domestik*, Web. 29 April 2018, <https://investasi.kontan.co.id/>, 1 pp

Yustanti, E., 2012, *Pencampuran Batubara Coking Dengan Batubara Lignite Hasil Karbonisasi Sebagai Bahan Pembuatan Kokas*, Jurnal Teknologi Pengelolaan Limbah, Vol. 15, Pusat Teknologi Limbah Radioaktif, p.15-30.

Zhang, Q, Wu, X, Feng, A and Shi, M., 2004, *Prediction of coke quality at Baosteel*, Fuel Processing Technology, Vol. 86 p.1-11.



Petrologi dan Geokimia Batubara Coking Pada Formasi Batu Ayau Daerah Murung Raya Provinsi

Kalimantan

Tengah Serta Pengaruhnya Terhadap Karakteristik Produk Kokas Metalurgi

DEDDY NS.PUTRA TANGGARA, Dr.Ing. Ir. Donatus Hendra Amijaya, S.T., M.T., IPM

UNIVERSITAS  
GADJAH MADA

Universitas Gadjah Mada, 2020 | Diunduh dari <http://etd.repository.ugm.ac.id/>

Životić, D., Wehner, H., Cvetković, O., Jovančićević, B., Gržetić, I., Scheeder, G., Vidal, A., Šajnović, A., Ercegovac, M and Simić, V., 2008, *Petrological, Organic Geochemical and Geochemical Characteristics of Coal from the Soko Mine Serbia*, International Journal of Coal Geology, 73, p. 285–306.