

## DAFTAR PUSTAKA

- Abbady, A.G., El-Arabi, A., Abbady, A., 2006. Heat production rate from radioactive elements in igneous and metamorphic rocks in Eastern Desert, Egypt. Appl. Radiat. Isot. 64, 131–137.
- Abbady, A.G.E., Al-Ghamdi, A.H., 2018. Heat production rate from radioactive elements of granite rocks in north and southeastern Arabian shield Kingdom of Saudi Arabia. J. Radiat. Res. Appl. Sci. 11, 281–290. <https://doi.org/10.1016/j.jrras.2018.03.002>
- Abidin, H.Z., 2010. Characteristics of the Arai Granite Associated with the Iron Ore and Zn-Cu-Pb Deposits in Musi Rawas Regency, South Sumatera. Geo-Resources 133–146.
- American Society for Testing Materials (ASTM), 1986. Recommended practice for investigation and sampling soil and rock for engineering purposes. Philadelphia.
- Arnórsson, S., Andrésdóttir, A., 1995. Processes controlling the distribution of boron and chlorine in natural waters in Iceland. Geochim. Cosmochim. Acta 59, 4125–4146. [https://doi.org/10.1016/0016-7037\(95\)00278-8](https://doi.org/10.1016/0016-7037(95)00278-8)
- Artemieva, I.M., Tybo, H., Jakobsen, K., 2017. Heat production in granitic rocks: Global analysis based on a new data compilation GRANITE2017. Earth-Science Rev. 172, 1–26.
- Arwanda, F., Pitulima, J., 2018. Identifikasi Persebaran Batu Granit Menggunakan Metode Geomagnetik Pada Pt Vitrama Properti Di Desa Air Mesu Kecamatan Pangkalan Baru Kabupaten Bangka Tengah 4, 1–6.
- Aryanto, N.C.D., Kamiludin, U., 2016. The Content of placer heavy mineral and characteristics of REE at Toboali Coast and its surrounding area , Bangka Belitung

Province. Bull. Mar. Geol. 31, 45–54.

Ashwal, L.D., Morgan, P., Kelley, S.A., Percival, J.A., 1987. Heat production in an Archean crustal profile and implications for heat flow and mobilization of heat-producing elements. Earth Planet. Sci. Lett. 85, 439–450. [https://doi.org/10.1016/0012-821X\(87\)90139-7](https://doi.org/10.1016/0012-821X(87)90139-7)

Aydin, A., Ferré, E.C., Aslan, Z., 2007. The magnetic susceptibility of granitic rocks as a proxy for geochemical composition: Example from the Saruhan granitoids, NE Turkey. Tectonophysics 441, 85–95. <https://doi.org/10.1016/j.tecto.2007.04.009>

Baioumy, H., Nawawi, M., Wagner, K., Arifin, M.H., 2015. Geochemistry and geothermometry of non-volcanic hot springs in West Malaysia. J. Volcanol. Geotherm. Res. 290, 12–22. <https://doi.org/10.1016/j.jvolgeores.2014.11.014>

Baltaztis. Esson, J. Mitropulos, E., 1992. Geochemical characteristics and petrogenesis of the main granitic intrusions of Greece: an application of trace element discrimination. Miner. Mag. 56, 487–501.

Barbarin, B., 1999. A review of the relationships between granitoid types, their origins and their geodynamic environments. Lithos 46, 605–626. [https://doi.org/10.1016/S0024-4937\(98\)00085-1](https://doi.org/10.1016/S0024-4937(98)00085-1)

Barber, A.J., Crow, M.J., Milsom, J.S., 2005. Sumatra: Geology, Resources and Tectonic Evolution. The Geological Society, London.

Barbier, E., 2002. Geothermal energy technology and current: An overview. Renew. Sustain. Energy Rev. 6, 3–65.

Beamish, D., Busby, J., 2016. The Cornubian geothermal province: heat production and flow in SW England: estimates from boreholes and airborne gamma-ray measurements. Geotherm. Energy 4. <https://doi.org/10.1186/s40517-016-0046-8>

- Boden, D.R., 2007. Geologic fundamentals of geothermal energy. Taylor & Francis Group, Florida.
- Bonin, B., 2007. A-type granites and related rocks: Evolution of a concept, problems and prospects. *Lithos* 97, 1–29. <https://doi.org/10.1016/j.lithos.2006.12.007>
- Brady, R.J., Ducea, M.N., Kidder, S.B., Saleeby, J.B., 2006. The distribution of radiogenic heat production as a function of depth in the Sierra Nevada Batholith, California. *Lithos* 86, 292–244.
- Browne, P.R.L., Rodgers, K.A., 2006. Occurrence and significance of anomalous chloride waters at the Orakei Korako geothermal field, Taupo Volcanic Zone, New Zealand. *Geothermics* 35, 211–220. <https://doi.org/10.1016/j.geothermics.2006.02.005>
- Carvalho, H.D., Purwoko, S., Thamrin, M., Vacquier, V., 1980. Terrestrial heat flow in the Tertiary basin of Central Sumatra. *Tectonophysics* 69, 163–188.
- Chandrasekharam, D., Bundschuh, J., 2008. Low-enthalpy geothermal resources for power generation, Low-Enthalpy Geothermal Resources for Power Generation. <https://doi.org/10.1080/00207233.2010.498602>
- Chappel, B.W., White, A.J.R., 1974. Two contrasting granite types. *Pac. Geol* 8, 173–174.
- Chappell, B.W., 1999. Aluminium saturation in I- and S-type granites and the characterization of fractionated haplogranites. *Lithos* 46, 535–551. [https://doi.org/10.1016/S0024-4937\(98\)00086-3](https://doi.org/10.1016/S0024-4937(98)00086-3)
- Chappell, B.W., White, A.J.R., 2001. Two contrasting granite types: 25 years later. *Aust. J. Earth Sci.* 48, 489–499. <https://doi.org/10.1046/j.1440-0952.2001.00882.x>
- Chatterjee, S., Mishra, P., Keesari, T., Pant, H.J., 2023. Why is it imperative to use

multicomponent geothermometry in medium/low enthalpy thermal waters? Insights from the Gujarat geothermal region, India. *Environ. Earth Sci.* 82, 1–17. <https://doi.org/10.1007/s12665-023-11241-2>

Chave, A.D., Jones, A.G., 2012. *The magnetotelluric method: theory and practice.* Cambridge University Press, Cambridge.

Chiozzi, P., Pasquale, V., Verdoya, M., Furfaro, V., 2008. Hydrothermal Alteration Inferred from a Radiometric Survey on Lipari (Aeolian Islands, Italy). *Environ. Semeiot.* 1, 70–82. <https://doi.org/10.3383/es.1.1.5>

Clemens, J.D., Wall, V.J., 1981. Origin and crystallization of some peraluminous (S-type) granitic magmas. *Can. Mineral.* 19, 111–131.

Cobbing, E.J., Mallick, D.I.J., Pitfield, P.E.J., Teoh, L.H., 1986. The granites of the southeast Asian tin belt. *J. Geol. Soc. London.* 143, 537–550. <https://doi.org/10.1144/gsjgs.143.3.0537>

Darma, S., Imani, Y.L., Shidqi, M.N.A., Riyanto, T.D., Daud, M.Y., 2021. Country Update: The Fast Growth of Geothermal Energy Development in Indonesia. *Proceeding World Geotherm. Congr. 2020+1* 1–9.

De Roever, W., 1951. Some additional data on the stratigraphy of Bangka. *Geol. en Mijnb.* 10, 339–342.

Deer, W., Howie, R., Zussman, J., 1976. *An introduction to the Rock Forming Minerals.* Longman Group Limited, London.

Delisle, G., Zeibig, M., 2007. Marine heat flow measurements in hard ground offshore Sumatra. *Eos, Trans. Am. Geophys. Union* 88, 38–39.

Eby, G.N., 1992. Chemical subdivision of the A-type granitoids: petrogenetic and tectonic implications. *Geology* 20, 641–644. [https://doi.org/10.1130/0091-7613\(1992\)020<0641:CSOTAT>2.3.CO;2](https://doi.org/10.1130/0091-7613(1992)020<0641:CSOTAT>2.3.CO;2)

- Fan, Y., Pang, Z., Liao, D., Tian, J., Hao, Y., Huang, T., Li, Y., 2019. Hydrogeochemical characteristics and genesis of geothermal water from the Ganzi geothermal field, eastern Tibetan Plateau. *Water* 11. <https://doi.org/10.3390/w11081631>
- Fauzi, I., 2020. Studi sebaran batuan granit dan struktur bawah permukaan daerah manifestasi panas bumi radiogenik Keretak (Bangka Tengah) menggunakan metode magnetik. Institut Teknologi Sumatera.
- Forster, A., Forster, H.-J., 2000. Crustal composition and mantle heat flow: Implications from surface heat flow and radiogenic heat production in the Variscan Erzgebirge (Germany). *J. Geophys. Res.* 105, 917–927.
- Fournier, R.O., 1977. Chemical geothermometers and mixing models for geothermal systems. *Geothermics* 5, 41–50. [https://doi.org/10.1016/0375-6505\(77\)90007-4](https://doi.org/10.1016/0375-6505(77)90007-4)
- Fournier, R.O., Potter, R.W., 1982. A revised and expanded silica (quartz) geothermometer. *Geotherm. Resour. Counc. Bull.* 11, 3–12.
- Fowler, A.D., Doig, R., 1983. The significance of europium anomalies in the REE spectra of granites and pegmatites, Mont Laurier, Quebec. *Geochim. Cosmochim. Acta* 47, 1131–1137. [https://doi.org/10.1016/0016-7037\(83\)90243-0](https://doi.org/10.1016/0016-7037(83)90243-0)
- Gaafar, I., Cuney, M., Gawad, A.A., 2014. Mineral chemistry of two-mica granite rare metals: Impact of geophysics on the distribution of uranium mineralization at El Sela Shear Zone, Egypt. *Open J. Geol.* 04, 137–160. <https://doi.org/10.4236/ojg.2014.44011>
- Gao, J., Zhangm, H., Zhang, S., Chen, X., Cheng, Z., Jia, X., Li, S., Fu, L., Gao, L., Xin, H., 2018. Three-dimensional magnetotelluric imaging of the geothermal system beneath the Gonghe Basin, Northeast Tibetan Plateau. *Geothermics* 76, 15–25.

- Gasparon, M., Varne, R., 1995. Sumatran granitoids and their relationship to Southeast Asian terranes. *Tectonophysics* 251, 277–299. [https://doi.org/10.1016/0040-1951\(95\)00083-6](https://doi.org/10.1016/0040-1951(95)00083-6)
- Ghani, A.A., Hazad, F.I., Jamil, A., Xiang, Q.L., Wan Ismail, W.N.A., Chung, S.L., Lai, Y.M., Roselee, M.H., Islami, N., Nyein, K.K., Hassan, M.H.A., Bakar, M.F.A., Umor, M.R., 2014. Permian ultrafelsic a-type granite from Besar Islands group, Johor, peninsular Malaysia. *J. Earth Syst. Sci.* 123, 1857–1878. <https://doi.org/10.1007/s12040-014-0501-5>
- Ghani, A.A., Lo, C.H., Chung, S.L., 2013a. Basaltic dykes of the Eastern Belt of Peninsular Malaysia: The effects of the difference in crustal thickness of Sibumasu and Indochina. *J. Asian Earth Sci.* 77, 127–139. <https://doi.org/10.1016/j.jseaes.2013.08.004>
- Ghani, A.A., Searle, M., Robb, L., Chung, S.L., 2013b. Transitional I S type characteristic in the Main Range Granite, Peninsular Malaysia. *J. Asian Earth Sci.* 76, 225–240. <https://doi.org/10.1016/j.jseaes.2013.05.013>
- Giggenbach, W.F., 1988. Geothermal solute equilibria. Derivation of Na-K-Mg-Ca geoindicators. *Geochim. Cosmochim. Acta* 52, 2749–2765. [https://doi.org/10.1016/0016-7037\(88\)90143-3](https://doi.org/10.1016/0016-7037(88)90143-3)
- Gill, R., 2010. *Igneous rock and processes: a practical guide*. Wiley-Blackwell, West Sussex, UK.
- Gillespie, M., Crane, E., Barron, H., 2013. Study into the Potential for Deep Geothermal Energy in Scotland. Volume 2 of 2. *Br. Geol. Surv.* 2, 125. <https://doi.org/10.13140/2.1.1186.4322>
- Glaas, C., Genter, A., Girard, J.F., Patrier, P., Vidal, J., 2018. How do the geological and geophysical signatures of permeable fractures in granitic basement evolve after long periods of natural circulation? Insights from the Rittershoffen

- geothermal wells (France). *Geotherm. Energy* 6. <https://doi.org/10.1186/s40517-018-0100-9>
- Gu, X., Zhang, Q., Cui, Y., Shao, J., Xiao, Y., Zhang, P., Liu, J., 2017. Hydrogeochemistry and genesis analysis of thermal and mineral Springs in Arxan, Northeastern China. *Water (Switzerland)* 9. <https://doi.org/10.3390/w9010061>
- Gupta, H.K., Roy, S., 2007. *Geothermal Energy: An Alternative Resource for the 21st Century*.
- Hasterok, D., Gard, M., Webb, J., 2018. On the radiogenic heat production of metamorphic, igneous, and sedimentary rocks. *Geosci. Front.* 9, 1777–1794. <https://doi.org/10.1016/j.gsf.2017.10.012>
- Hasterok, D., Webb, J., 2017. On the radiogenic heat production of igneous rocks. *Geosci. Front.* 8, 919–940. <https://doi.org/10.1016/j.gsf.2017.03.006>
- Hayase, I., 1954. Uranium contents of zircons in granite. *Mineral. J.* 1, 147–159.
- He, Z., Xu, X., Niu, Y., 2010. Petrogenesis and tectonic significance of a Mesozoic granite – syenite – gabbro association from inland South China. *LITHOS* 119, 621–641. <https://doi.org/10.1016/j.lithos.2010.08.016>
- Hendrawan, R.N., 2019. *Deformasi zona sutur Bentong-Raub Pulau Bangka bagian Utara*. Institut Teknologi Bandung.
- Henley, R., Truesdell, A., Barton, P., Whitney, J., 1984. Fluid-mineral equilibria in hydrothermal systems. *Society of Economic Geologist*, Yale.
- Hochstein, M.P., Browne, P.R.L., 2000. Surface manifestations of geothermal systems with volcanic heat sources, in: *Encyclopedia of Volcanoes*. Academic Press, pp. 835–836.
- Hochstein, M.P., Sudarman, S., 2016. Indonesian Volcanic Geothermal Systems, in: *World Geothermal Congress*. Melbourne.

- Horton, F., Hacker, B., Kylander-Clark, A., Holder, R., Jöns, N., 2016. Focused radiogenic heating of middle crust caused ultrahigh temperatures in southern Madagascar. *Tectonics* 35, 293–314.
- Huang, H., Polat, A., Fryer, B.J., 2013. Origin of Archean tonalite-trondhjemite-granodiorite (TTG) suites and granites in the Fiskenæsset region, southern West Greenland: Implications for continental growth. *Gondwana Res.* 23, 452–470. <https://doi.org/10.1016/j.gr.2011.12.001>
- Hutchings, S.J., Mooney, W.D., 2021. The Seismicity of Indonesia and Tectonic Implications. *Geochemistry, Geophys. Geosystems* 22, 1–42. <https://doi.org/10.1029/2021GC009812>
- Hutchison, C., 1977. Granite emplacement and tectonic subdivision of Peninsular Malaysia. *Bull. Geol. Soc. Malaysia* 9 187–207.
- Hutchison, C.S., 2014. Tectonic evolution of Southeast Asia. *Bull. Geol. Soc. Malaysia* 60, 1–18. <https://doi.org/10.7186/bgsm60201401>
- Hutchison, C.S., 1994. Gondwana and Cathaysian blocks, palaeotethys sutures and cenozoic tectonics in South-east Asia. *Geol. Rundschau* 83, 388–405. <https://doi.org/10.1007/BF00210553>
- Jaupart, C., Mareschal, J.C., Iarotsky, L., 2016. Radiogenic heat production in the continental crust. *Lithos* 262, 398–427. <https://doi.org/10.1016/j.lithos.2016.07.017>
- Khaleal, F.M., Kamar, M.S., 2016. Geology and radioactivity of peraluminous granite and associated pegmatite hosting magnetite mineralization at Um Regeba area, Southeastern desert, Egypt. *Nucl. Sci. J.* 5, 69–90. <https://doi.org/10.21608/nssj.2016.30825>
- Krieger, L., Peacock, J.R., 2014. MTPy: A Python toolbox for magnetotellurics.



Comput. Geosci. 72, 167–175. <https://doi.org/10.1016/j.cageo.2014.07.013>

Kukkonen, I., Lahtinen, R., 2001. Variation of radiogenic heat production rate in 2.8–1.8 Ga old rocks in the Central Fennoscandian shield. *Phys. Earth Planet. Inter.* 126, 279–294.

Kukkonen, I.T., Lauri, L., 2009. Modelling the thermal evolution of a collisional Precambrian orogen: High heat production migmatitic granites of southern Finland. *Precambrian Res.* 168, 232–246. <https://doi.org/10.1016>

Lamas, R., Miranda, M., Neves, L.J.P.F., Pereira, A.J.S.C., 2015. Radiogeni heat production from a deep borehole in The Beiras radiogenic heat production from a deep borehole in The Beiras granite (Almeida , Central Portugal ), in: *Energy for Sustainability 2015*. Coimbra, pp. 1–5.

Lawver, L., Taylor, P., 1987. Heat flow off Sumatra [WWW Document]. URL <https://doi.org/10.1029/2007eo040004>

Le Bas, M.J., Streckeisen, A.L., 1991. The IUGS systematics of igneous rocks. *J. Geol. Soc. London.* 148, 825–833. <https://doi.org/10.1144/gsjgs.148.5.0825>

Li, P., Li, J., Chen, Z., Liu, X., Huang, Z., Zhou, F., 2021. Compositional evolution of the muscovite of Renli pegmatite-type rare-metal deposit, northeast Hunan, China: Implications for its petrogenesis and mineralization potential. *Ore Geol. Rev.* 138, 104380. <https://doi.org/10.1016/j.oregeorev.2021.104380>

Li, X., Fan, H., Santosh, M., Hu, F., Yang, K., Lan, T., 2013. Hydrothermal alteration associated with Mesozoic granite-hosted gold mineralization at the Sanshandao deposit , Jiaodong Gold Province , China. *Ore Geol. Rev.* 53, 403–421. <https://doi.org/10.1016/j.oregeorev.2013.01.020>

Li, Y., Dor, J., Zhang, C., Wang, G., Zhang, B., Zhang, F., Xing, Y., 2021. Genesis of the Xifeng Low-Temperature Geothermal Field, Guizhou, SW China: Constrains

From Geology, Element Geochemistry, and D-O Isotopes. *Front. Earth Sci.* 9, 1–17. <https://doi.org/10.3389/feart.2021.782943>

Liao, D., Feng, D., Luo, J., Yun, X., 2023. Relationship between radiogenic heat production in granitic rocks and emplacement age. *Energy Geosci.* 4, 100157. <https://doi.org/10.1016/j.engeos.2023.100157>

Liu, M., Guo, Q., Shi, H., Cao, Y., Shang, J., Zhang, M., 2023. Chlorine geochemistry of various geothermal waters in China: Implications for geothermal system geneses. *J. Hydrol.* 616, 128783. <https://doi.org/10.1016/j.jhydrol.2022.128783>

Loisselle, M., Wones, D., 1979. Characteristics of anorogenic granites. *Geol. Soc. Am. Abstr. with Programs* 7, 468.

Lund, J.W., 2007. Characteristics, development and utilization of geothermal resources. *GHC Bull.* 1, 87–95. [https://doi.org/10.1007/978-3-540-75997-3\\_13](https://doi.org/10.1007/978-3-540-75997-3_13)

Mabi, A., Yang, Z., Zhang, M., Wen, D., Yanlong, L.I., Liu, X., 2018. Two Types of Granites in the Western Yangtze Block and Their Implications for Regional Tectonic Evolution: Constraints from Geochemistry and Isotopic Data. *Acta Geol. Sin. (English Ed.)* 92, 89–105. <https://doi.org/10.1111/1755-6724.13496>

Maden, N., Akaryali, E., 2015. A review for genesis of continental arc magmas: U, Th, K and radiogenic heat production data from the Gümüşhane Pluton in the Eastern Pontides (NE Türkiye). *Tectonophysics* 664, 225–243.

Madon, M., Jong, J., 2021. Geothermal gradient and heat flow maps of offshore Malaysia: Some updates and obbservations. *Bull. Geol. Soc. Malaysia* 71, 159–183.

Mangga, A.S., Amiruddin, Suwarti, T., Gafoer, S., Sidarto, 1993. Peta Geologi Lembar Tanjungkarang, Sumatera skala 1:250.000.

Mangga, A.S., Djamal, B., 1994. Peta geologi lembar Bangka Utara, Sumatera.

- Maniar, P.D., Piccoli, P.M., 1989. Tectonic discrimination of granitoids. *Geol. Soc. Am. Bull.* 635–643. [https://doi.org/10.1130/0016-7606\(1989\)101<0635](https://doi.org/10.1130/0016-7606(1989)101<0635)
- Mareschal, J.C., Jaupart, C., 2013. Radiogenic heat production, thermal regime and evolution of continental crust. *Tectonophysics* 609, 524–534. <https://doi.org/10.1016/j.tecto.2012.12.001>
- Margono, U., Supandjono, R.J., Partoyo, E., 1995. Peta geologi lembar Bangka Selatan, Sumatera.
- McCay, A.T., Younger, P.L., 2017. Ranking the geothermal potential of radiothermal granites in Scotland: are any others as hot as the Cairngorms? *Scottish J. Geol.* 53, 1–11.
- Mcdonough, W.F., Sun, S., 1995. The composition of the Earth. *Chem. Geol.* 120, 223–253.
- McLaren, S., Sandiford, M., Neumann, N., 2003. The hot southern continent: Heat flow and heat production in Australian Proterozoic terranes. *Geol. Soc. Aust. Spec. Publ.* 22, 151–161.
- Mcneal, J.M., Lee, D.E., Millard, H.T., 1981. The distribution of Uranium and Thorium in granitic rocks of the Basin and Range Province, Western United States. *J. Geochemical Explor.* 14, 25–40.
- Mercier, M., 2009. Relations entre flux de chaleur océanique et zone sismogène : cas de la subduction de Sumatra.
- Metcalf, I., 2013. Gondwana dispersion and Asian accretion: Tectonic and palaeogeographic evolution of eastern Tethys. *J. Asian Earth Sci.* 66, 1–33. <https://doi.org/10.1016/j.jseaes.2012.12.020>
- Metcalf, I., 2011. Tectonic framework and Phanerozoic evolution of Sundaland. *Gondwana Res.* 19, 3–21. <https://doi.org/10.1016/j.gr.2010.02.016>

- Metcalf, I., 2000. The Bentong-Raub Suture Zone. *J. Asian Earth Sci.* 18, 691–712.  
[https://doi.org/10.1016/S1367-9120\(00\)00043-2](https://doi.org/10.1016/S1367-9120(00)00043-2)
- Metcalf, I., 1984. Stratigraphy, palaeontology and palaeogeography of the Carboniferous of Southeast Asia. *Mem. la Soc. Ge'ologique Fr.* 147, 107–118.
- Meybeck, M., 1987. Global chemical weathering of surficial rocks estimated from river dissolved loads. *Am. J. Sci.* 287, 401–428. <https://doi.org/10.2475/ajs.287.5.401>
- Middlemost, E.A.K., 1994. Naming materials in the magma/igneous rock system. *Earth Sci. Rev.* 37, 215–224. [https://doi.org/10.1016/0012-8252\(94\)90029-9](https://doi.org/10.1016/0012-8252(94)90029-9)
- Middleton, M.F., 2016. Radiogenic Heat generation in Western Australia-Implications for Geothermal Energy, in: *Advances in Geothermal Energy*. pp. 50–90.
- Moeck, I.S., 2014. Catalog of geothermal play types based on geologic controls. *Renew. Sustain. Energy Rev.* 37, 867–882.  
<https://doi.org/10.1016/j.rser.2014.05.032>
- Ng, S.W.P., Chung, S.L., Robb, L.J., Searle, M.P., Ghani, A.A., Whitehouse, M.J., Oliver, G.J.H., Sone, M., Gardiner, N.J., Roselee, M.H., 2015a. Petrogenesis of Malaysian granitoids in the Southeast Asian tin belt: Part 1. Geochemical and Sr-Nd isotopic characteristics. *Bull. Geol. Soc. Am.* 127, 1209–1237.  
<https://doi.org/10.1130/B31213.1>
- Ng, S.W.P., Whitehouse, M.J., Roselee, M.H., Teschner, C., Murtadha, S., Oliver, G.J.H., Ghani, A.A., Chang, S.C., 2017. Late Triassic granites from Bangka, Indonesia: A continuation of the Main Range granite province of the South-East Asian Tin Belt. *J. Asian Earth Sci.* 138, 548–561.  
<https://doi.org/10.1016/j.jseaes.2017.03.002>
- Ng, S.W.P., Whitehouse, M.J., Searle, M.P., Robb, L.J., Ghani, A.A., Chung, S.L., Oliver, G.J.H., Sone, M., Gardiner, N.J., Roselee, M.H., 2015b. Petrogenesis of

- Malaysian granitoids in the Southeast Asian tin belt: Part 2. U-Pb zircon geochronology and tectonic model. *Bull. Geol. Soc. Am.* 127, 1238–1258. <https://doi.org/10.1130/B31214.1>
- Ngadenin, 2013. Geologi dan potensi terbentuknya mineralisasi Uranium tipe batupasir di daerah Hatapang, Sumatera Utara. *Eksplorium* 34, 111–120.
- Ngadenin, Karunianto, A.J., 2016. Identification of radioactive minerals occurrences in Muncung granite as the initial stage for assesment of Uranium and Thorium prospect in Singkep Island. *Eksplorium* 37, 63–72.
- Ngadenin, N., Karunianto, A.J., 2016. Identifikasi Keterdapatan Mineral Radioaktif pada Granit Muncung Sebagai Tahap Awal untuk Penilaian Prospek Uranium dan Thorium di Pulau Singkep. *Eksplorium* 37, 63. <https://doi.org/10.17146/eksplorium.2016.37.2.3101>
- Ngadenin, N., Syaeful, H., Widana, K.S., 2014. Studi potensi thorium pada batuan granit di pulau bangka. *J. Pengemb. Energi Nukl.* 16, 143–155.
- Ngadenin, Syaeful, H., Widana, K.S., Sukadana, I.G., Indrastomo, D.F., 2014. Studi potensi thorium pada batuan granit di Pulau Bangka. *J. Pengemb. Energi Nukl.* 16, 143–155.
- Ngadenin, Widodo, Fauzi, R., Pratiwi, F., 2021. Studi potensi terbentuknya cebakan mineral radioaktif pada batuan granitik di Pulau Sulawesi. *Bul. Sumber Daya Geol.* 16, 152–164.
- Nicholson, K., 1993. Geothermal fluids: Chemistry and exploration techniques, *Journal of Geochemical Exploration*. Springer Berlin Heidelberg. [https://doi.org/10.1016/0375-6742\(95\)90013-6](https://doi.org/10.1016/0375-6742(95)90013-6)
- Novriyanisti, A., Prassanti, R., Widana, K.S., 2021. Separation of Elements in Bangka Monazite with Multilevel Precipitation. *Eksplorium* 42, 69–76.

<https://doi.org/10.17146/eksplorium.2021.42.1.6093>

Nukman, M., 2014. Geothermal exploration involving structural geology and hydrochemistry in the Tarutung Basin , Northern Central Sumatra ( Indonesia). Universitat Berlin.

Nuraini, F., 2017. Analisis resistivitas terhadap pengaruh mode pada pengolahan data magnetotelurik (Studi kasus daerah panasbumi 'Z'). Uinversitas Hasanuddin.  
<https://doi.org/10.1017/CBO9781107415324.004>

Nurdiana, A., 2015. Evolusi tektonik pulau bangka bagian selatan berdasarkan analisis petrografi dan geokimia granitoid. Institut Teknologi Bandung.

O'Nions, R.K., McKenzie, D., 1992. Estimates of mantle thorium/uranium ratios from Th, U and Pb isotope abundances in basaltic melts. Philos. Trans. - R. Soc. London, A 342, 65–77. <https://doi.org/10.1098/rsta.1993.0005>

Parkhurst, D.L., Appelo, C.A.J., 1999. User's guide to PHREEQC (Version 2)- a computer proram for speciation, batch-reaction, one-dimensional transport, and inverse geochemical calculations.

Paul, D., White, W.M., Turcotte, D.L., 2003. Constraints on the  $^{232}\text{Th}/^{238}\text{U}$  ratio (K) of the continental crust. Geochemistry, Geophys. Geosystems 4.  
<https://doi.org/10.1029/2002GC000497>

Pearce, J., 1996. Sources and settings of granitic rocks. Episodes 19, 120–125.

Pearce, J.A., Harris, N.B.W., Tindle, A.G., 1984. Trace element discrimination diagrams for the tectonic interpretation of granitic rocks. J. Petrol. 25, 956–983.  
<https://doi.org/10.1093/petrology/25.4.956>

Peccerillo, A., Taylor, S.R., 1976. Geochemistry of eocene calc-alkaline volcanic rocks from the Kastamonu area, Northern Turkey. Contrib. to Mineral. Petrol. 58, 63–81. <https://doi.org/10.1007/BF00384745>

- Peiffer, L., Wanner, C., Spycher, N., Sonnenthal, E.L., Kennedy, B.M., Iovenitti, J., 2014. Optimized multicomponent vs. classical geothermometry: Insights from modeling studies at the Dixie Valley geothermal area. *Geothermics* 51, 154–169. <https://doi.org/10.1016/j.geothermics.2013.12.002>
- Pleitavino, M., Carro Pérez, M.E., García Aráoz, E., Cioccale, M.A., 2021. Radiogenic heat production in granitoids from the Sierras de Córdoba, Argentina. *Geotherm. Energy* 9. <https://doi.org/10.1186/s40517-021-00198-9>
- Roberts, N.M.W., Van Kranendonk, M.J., Parman, S., Clift, P.D., 2015. Continent formation through time. *Geol. Soc. Spec. Publ.* 389, 1–16. <https://doi.org/10.1144/SP389.13>
- Rohim, M., 2020. Identifikasi potensi sebaran batuan granit di Desa Terak menggunakan metode geomagnetik. Institut Teknologi Sumatera.
- Rolling, K., 1984. Gravity modelling of the eastern Highlands granites in relation to heat flow studies. In: *Investigation of the Geothermal Potential of the UK*. Br. Geol. Surv. 17.
- Roselee, M.H., Umor, M.R., Ghani, A.A., Badrudin, M.H., Quek, L.X., 2018. Petrographic and geochemical characteristic of volcanic rocks from Tasik Kenyir and Kampung Awah, East Malaya block, Peninsular Malaysia. *AIP Conf. Proc.* 1940. <https://doi.org/10.1063/1.5027948>
- Rudnick, R.L., Gao, S., 2013. *Composition of the Continental Crust*, 2nd ed, Treatise on Geochemistry: Second Edition. Elsevier Ltd. <https://doi.org/10.1016/B978-0-08-095975-7.00301-6>
- Rudnick, R.L., Gao, S., 2003. Composition of the continental crust. *Treatise on Geochemistry* 3, 1–64.
- Rybach, L., Bunterbath, G., 1984. The variation of heat generation, density and seismic

velocity with rock type in the continental lithosphere. *Tectonophysics* 103, 335–344.

Rybach, L., Bunterbath, G., 1982. Relationship between the petrophysical properties density, seismic velocity, heat generation, and mineralogical constitution. *Earth Planet. Sci. Lett.* 57, 335-367–376.

Rybach, L., Muffler, L.J.P., 1981. Geothermal systems, conductive hat flow, geothermal anomalies, in: *Geothermal Systems: Principles and Case Histories*. John Wiley & Sons, New York, pp. 3–36.

Saksama, K.D., Ngadenin, 2013. Geologi daerah Muntok dan potensi granit menumbing sebagai sumber Uranium (U) dan Thorium (Th). *Eksplorium* 34, 137–149.

Saleh, G.M., 2006. Uranium mineralization in the muscovite-rich granites of the Shalatin region, Southeastern Desert, Egypt. *Chinese J. Geochemistry* 25, 1–15. <https://doi.org/10.1007/BF02894791>

Scharfenberg, L., Regelous, A., De Wall, H., 2019. Radiogenic heat production of variscan granites from the Western Bohemian Massif, Germany. *J. Geosci. (Czech Republic)* 64, 251–269. <https://doi.org/10.3190/jgeosci.293>

Schon, J.H., 2015. *Physical properties of rocks : fundamentals and principles of petrophysics*. Elsevier, Amsterdam.

Schwartz, M.O., Rajah, S.S., Askury, A.K., 1995. The Southeast Asian tin belt. *Earth Sci. Rev.* 38, 95–293. [https://doi.org/10.1016/0012-8252\(95\)00004-T](https://doi.org/10.1016/0012-8252(95)00004-T)

Sclater, J.G., Jaupart, C., Galson, D., 1980. The heat flow through oceanic and continental crust and the heat loss of the Earth. *Rev. Geophys.*

Setiawan, K., Priadi, B., 2016. CHARACTERISTICS OF TRACE ELEMENTS IN GRANITOID MAGMATISM DISCRIMINATION ON BANGKA ISLAND.



Eksplorium 36, 1–16.

Sevastjanova, I., Clements, B., Hall, R., Belousova, E., Griffin, W., Pearson, N., 2011. Granitic magmatism, basement ages, and provenance indicators in The Malay Peninsula: Insights from detrital zircon U-Pb and Hf-isotope data. *Gondwana Res.* 19, 1024–1039.

Simpson, F., Bahr, K., 2005. *Practical Magnetotellurics*. Cambridge University Press, Cambridge.

Şimşek, Demir, A., 1991. Reservoir and cap rock characteristics of some geothermal fields in turkey and encountered problems based on lithology. *J. Geotherm. Res. Soc. Japan* 13, 191–204. <https://doi.org/10.11367/grsj1979.13.191>

Singarimbun, A., 2020. Simulasi Aliran Konveksi Fluida Di Daerah Reservoir Panas Bumi 1.

Singh, L.S., Vallinayagam, G., 2016. High Heat Producing Volcano-Plutonic Rocks of the Siner Area , Malani Igneous Suite , Western Rajasthan , India. *Int. J. Geosci.* 2012, 1–5. <https://doi.org/10.4236/ijg.2012.35115>

Siregar, R.N., Nukman, M., Widana, K.S., Harijoko, A., Sismanto, S., 2024. Radiogenic geothermal systems of Bangka Island, Indonesia: Implications of high heat production and tectonic framework. *Energy Geosci.* 5. <https://doi.org/10.1016/j.engeos.2024.100306>

Siregar, R.N., Widana, K.S., Sismanto, S., 2022. Radiogenic heat production of S-type and I-type granite rocks in Bangka Island, Indonesia. *Kuwait J. Sci.* 49, 1–11. <https://doi.org/10.48129/kjs.15423>

Soetopo, B., 2016. Geologi dan keterdapatan zirkon, monasit pada endapan sedimen dan aluvial di daerah katingan kalimantan tengah, in: *Prosiding Seminar Nasional Riset Tenaga Nuklir 2016*. Batam, pp. 4–5.

- Soetopo, B., Subiantoro, L., Ngadenin, Madyaningarum, N., 2011. Studi prospek monasit di daerah Tumbang Rusa, Tanjung Pandan, Belitung, Provinsi Bangka Belitung. *Eksplorium* XXXII, 29–46.
- Soetopo, B., Subiantoro, L., Sularto, P., Haryanto, D., 2012. Studi deposit monasit dan zirkon dalam batuan kuartar di daerah Cerucuk Belitung. *Eksp* 33, 25–40.
- Sone, M., Metcalfe, I., 2008. Parallel Tethyan sutures in mainland Southeast Asia: New insights for Palaeo-Tethys closure and implications for the Indosinian orogeny. *Comptes Rendus - Geosci.* 340, 166–179.  
<https://doi.org/10.1016/j.crte.2007.09.008>
- Spycher, N., Peiffer, L., Sonnenthal, E.L., Saldi, G., Reed, M.H., Kennedy, B.M., 2014. Integrated multicomponent solute geothermometry. *Geothermics* 51, 113–123.  
<https://doi.org/10.1016/j.geothermics.2013.10.012>
- Streckeisen, A., 1976. To each plutonic rock its proper name. *Earth Sci. Rev.* 12, 1–33.  
[https://doi.org/10.1016/0012-8252\(76\)90052-0](https://doi.org/10.1016/0012-8252(76)90052-0)
- Subiantoro, L., Soetopo, B., Haryanto, D., 2011. Preliminary study of the monazite materials prospect containing of U and elements association in Semelangan Ketapang, West Kalimantan. *Eksplorium* XXXII, 1–16.
- Sugiono, D., 2014. Analisis geokimia dan petrografi pada granitoid di utara pulau bangka. Institut Teknologi Bandung.
- Sum, C.W., Irawan, S., Fathaddin, M.T., 2010. Hot Springs in Peninsula Malaysia. *Proc. World Geotherm. Congr.* 2010 1–5.
- Taylor, S.R., McLenna, S.M., 1985. The continental crust: Its composition and Evolution. Backwell, Oxfor.
- Teixeira, R., Gomes, M., Martins, L., Pereira, A., Neves, L., 2013. Natural radiation and geochemistry of the Lamas de Olo biotite granite, Northern Portugal. *Mineral.*

Mag. 77, 2458.

Thamrin, M., 1987. Terrestrial heat flow map of Indonesian basins. Indones. Pet. Assoc.

U, K.K., 1986. Preliminary synthesis of the geology of Bangka Island, Indonesia. Bull. Geol. Soc. Malaysia 20, 81–90. <https://doi.org/10.7186/bgsm20198606>

Vacquier, V., Taylor, P., 1966. Geothermal and magnetic survey off the coast of Sumatra. Bull. Earthq. Res. Inst. 44, 531–540.

Weinert, S., Bär, K., Scheuven, D., Sass, I., 2021. Radiogenic heat production of crystalline rocks in the Gonghe Basin Complex (northeastern Qinghai–Tibet plateau, China). Environ. Earth Sci. 80, 1–19. <https://doi.org/10.1007/s12665-021-09558-x>

White, A.J., 1979. Sources of granite magmas. Geo. Soc. Am. Abstr. Programs 11, 539.

Widana, K.S., 2013. Petrografi dan geokimia unsur utama granitoid Pulau Bangka: kajian awal tektomagmatisme. Eksplorium 34, 1–16.

Widana, K.S., Priadi, B., 2015. Karakteristik unsur jejak dalam diskriminasi magmatisme granitoid Pulau Bangka. Eksplorium 36, 1–16.

Wright, M., 1998. Nature of geothermal resources, in geothermal direct-use engineering and design guidebook. Geo-Heat Center, Klamath Falls.

Xiang, W., Griffin, W.L., Jie, C., Pinyung, H., Xiang, L., 2011. U and Th contents and Th/U ratios of Zircon in felsic and mafic magmatic rocks: improved Zircon-melt distribution coefficients. Acta Geol. Sin. 85, 164–174.

Yaguchi, M., Muramatsu, Y., Chiba, H., Okumura, F., Ohba, T., Yamamuro, M., 2014. Hydrochemistry and isotopic characteristics of non-volcanic hot springs around the Miocene Kofu granitic complex surrounding the Kofu Basin in the South

Fossa Magna region, central Honshu, Japan. *Geochem. J.* 48, 345–356.  
<https://doi.org/10.2343/geochemj.2.0310>

Yang, H., Yuan, X., Chen, Y., Liu, J., Zhan, C., Lv, G., Hu, J., Sun, M., Zhang, Y.,  
2024. Geochemical Evidence Constraining Genesis and Mineral Scaling of the  
Yangbajing Geothermal Field, Southwestern China. *Water (Switzerland)* 16.  
<https://doi.org/10.3390/w16010024>

Zhang, C., Hu, S., Zhang, S., Li, S., Zhang, L., Kong, Y., Zuo, Y., Song, R., Jiang, G.,  
Wang, Z., 2020. Radiogenic heat production variations in the Gonghe basin,  
northeastern Tibetan Plateau: Implications for the origin of high-temperature  
geothermal resources. *Renew. Energy* 148, 284–297.  
<https://doi.org/10.1016/j.renene.2019.11.156>

Zheng, H., Luo, J., Zhang, Y., Feng, J., Zeng, Y., Wang, M., 2021. Geological  
Characteristics and Distribution of Granite Geothermal Reservoir in Southeast  
Coastal Areas in China. *Front. Earth Sci.* 9, 1–18.  
<https://doi.org/10.3389/feart.2021.683696>

Zhou, Z.M., Ma, C.Q., Qi, S.H., Xi, Y.F., Liu, W., 2020. Late Mesozoic high-heat-  
producing (HHP) and high-temperature geothermal reservoir granitoids: The most  
significant geothermal mechanism in South China. *Lithos* 366–367, 105568.  
<https://doi.org/10.1016/j.lithos.2020.105568>