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EVALUASI BETON STEEL SLAG SEBAGAI MATERIAL PERISAI RADIASI SUMBER TEKNISIUM-99m PADA RUANG HOT LAB KEDOKTERAN NUKLIR
Ivandi Cahya Pratama, Fitrotun Aliyah, S.T., M.Eng., Ph.D. ; Nur Endah Sari, M. Si.
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DAFTAR PUSTAKA

[1] L. H. E. Karssemakers *et al.*, "Diagnostic accuracy of bone SPECT and SPECT/CT imaging in the diagnosis of unilateral condylar hyperplasia: A systematic review and meta-analysis," *J. Cranio-Maxillofac. Surg.*, vol. 52, no. 4, pp. 447–453, Apr. 2024, doi: 10.1016/j.jcms.2024.01.013.

[2] M. Oumano *et al.*, "Shielding resources for four common radiopharmaceuticals utilized for imaging and therapy: Tc-99m, F-18, I-131, and Lu-177," *J. Appl. Clin. Med. Phys.*, vol. 26, no. 5, p. e70084, Mar. 2025, doi: 10.1002/acm2.70084.

[3] L. Paixão, T. C. Ferreira Fonseca, and A. D. Soares, "Comprehensive assessment of broad beam transmission factors for nuclear medicine shielding," *Phys. Med.*, vol. 130, p. 104918, Feb. 2025, doi: 10.1016/j.ejmp.2025.104918.

[4] H. S. Alorfi, M. A. Hussein, and S. A. Tijani, "The use of rocks in lieu of bricks and concrete as radiation shielding barriers at low gamma and nuclear medicine energies," *Constr. Build. Mater.*, vol. 251, p. 118908, Aug. 2020, doi: 10.1016/j.conbuildmat.2020.118908.

[5] P.-W. Fang, K.-Y. Lim, and R.-J. Sheu, "Systematic investigation of the shielding performance of 26 types of concrete in three accelerator radiation environments: an 18-MeV proton medical cyclotron, a 250-MeV proton therapy machine, and a 400-MeV/u carbon-ion therapy machine," *Radiat. Phys. Chem.*, p. 113705, Feb. 2026, doi: 10.1016/j.radphyschem.2026.113705.

[6] O. Kontani *et al.*, "Quantitative evaluation of material-dependent elemental composition in ordinary concrete for radiation shielding applications," *Nucl. Eng. Technol.*, vol. 58, no. 3, p. 104004, Mar. 2026, doi: 10.1016/j.net.2025.104004.

[7] E. B. Albayrak, N. Yüzer, and B. Dinç-Şengönül, "Valorization of aluminothermite welding slag in sustainable high-performance heavyweight concrete: mechanical and radiation-shielding performance," *Sustain. Chem. Pharm.*, vol. 50, p. 102341, Apr. 2026, doi: 10.1016/j.scp.2026.102341.

[8] J. Yang *et al.*, "The preparation of low shrinkage radiation shielding ultra-high performance concrete: Comparison between barium aluminosilicate ceramsite and super absorbent polymer," *Constr. Build. Mater.*, vol. 479, p. 141510, Jun. 2025, doi: 10.1016/j.conbuildmat.2025.141510.

[9] N. J. AbuAlRoos, N. A. Baharul Amin, and R. Zainon, "Conventional and new lead-free radiation shielding materials for radiation protection in nuclear medicine: A review," *Radiat. Phys. Chem.*, vol. 165, p. 108439, Dec. 2019, doi: 10.1016/j.radphyschem.2019.108439.

[10] N. Aral, M. A. Duch, and M. Ardanuy, "Material characterization and Monte Carlo simulation of lead and non-lead X-Ray shielding materials," *Radiat. Phys. Chem.*, vol. 174, p. 108892, Sep. 2020, doi: 10.1016/j.radphyschem.2020.108892.

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[11] H. C. Manjunatha, B. M. Sankarshan, P. S. D. Gupta, L. Seenappa, K. N. Sridhar, and R. Munirathnam, "Evaluation of tantalum–tungsten–oxygen compounds as lead-free radiation shielding materials," *Ann. Nucl. Energy*, vol. 230, p. 112141, Jun. 2026, doi: 10.1016/j.anucene.2026.112141.
[12] C. Singh, A. Shekhar, and R. Singh, "Neurotoxic Effect of Lead: A Review," in *Lead Toxicity: Challenges and Solution*, N. Kumar and A. K. Jha, Eds., Cham: Springer Nature Switzerland, 2023, pp. 33–50. doi: 10.1007/978-3-031-37327-5_3.
[13] J. O. dos Santos *et al.*, "Analysis of the influence of reusing glass on the concrete's performance in gamma radiation shielding," *Radiat. Phys. Chem.*, vol. 238, p. 113242, Jan. 2026, doi: 10.1016/j.radphyschem.2025.113242.
[14] J. Wu *et al.*, "Enhancing optical and radiation shielding properties of B2O3-TeO2-BaO-Bi2O3 high-entropy oxide glass through heavy metal oxide modification," *Ceram. Int.*, vol. 51, no. 21, Part A, pp. 32493–32501, Sep. 2025, doi: 10.1016/j.ceramint.2025.05.097.
[15] M. H. Alhakami, M. F. Alotaibi, R. B. Malidarreh, S. A. M. Issa, K. N. Alharbi, and H. M. H. Zakaly, "Advancements in construction Materials: Boron cement composites for improved physical, structural properties and radiation shielding," *Radiat. Phys. Chem.*, vol. 237, p. 112967, Dec. 2025, doi: 10.1016/j.radphyschem.2025.112967.
[16] S. Yani *et al.*, "Optimization of proton radiation shielding using multilayer concrete-iron-polyethylene barriers: A PHITS Monte Carlo study," *Radiat. Phys. Chem.*, vol. 240, p. 113422, Mar. 2026, doi: 10.1016/j.radphyschem.2025.113422.
[17] S. El-Sayed, M. H. Hassan, K. A. Khalil, and M. A. Abou Mandour, "Investigating photon radiation shielding capabilities of advanced polymers for sustainable composite materials," *J. Radiat. Res. Appl. Sci.*, vol. 19, no. 1, p. 102205, Mar. 2026, doi: 10.1016/j.jrras.2026.102205.
[18] S. A. Bassam *et al.*, "Effect of Europium oxide on structural, mechanical, optical, and radiation shielding properties of silver–doped oxyfluoro phospho–silicate glasses," *Radiat. Phys. Chem.*, vol. 243, p. 113678, Jun. 2026, doi: 10.1016/j.radphyschem.2026.113678.
[19] P. Vinothkumar, S. Praveenkumar, and A. K. John, "Thermoluminescence and EPR investigations of Tm3+-doped zinc barium tellurite ceramics for gamma radiation shielding," *Ceram. Int.*, Jan. 2026, doi: 10.1016/j.ceramint.2026.01.029.
[20] K. Ahmed, H. M. Gomaa, A. A. Bendary, S. S. Mohammad, and H. A. Saudi, "Structural and radiation shielding parameters of heavy metal-based environment-friendly glass systems for nuclear radiation security applications," *J. Phys. Chem. Solids*, vol. 181, p. 111526, Oct. 2023, doi: 10.1016/j.jpcs.2023.111526.
[21] J. Miao *et al.*, "Developing radiation shielding UHPC utilizing steel slag as heavyweight aggregates: Microstructural characteristics and shielding efficacy," *Sustain. Mater. Technol.*, vol. 47, p. e01809, Apr. 2026, doi: 10.1016/j.susmat.2025.e01809.

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Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

[22] E. T. Tousi, E. B. Jovein, and H. R. Sadeghi, "Effects of electric arc furnace steel slag replacement level, particle size, and curing duration on the mechanical, environmental, and radiation shielding performance of concrete," *Appl. Radiat. Isot.*, vol. 228, p. 112320, Feb. 2026, doi: 10.1016/j.apradiso.2025.112320.
[23] F. Aliyah, I. Kambali, A. F. Setiawan, Y. M. Radzi, and A. A. Rahman, "Utilization of steel slag from industrial waste for ionizing radiation shielding concrete: A systematic review," *Constr. Build. Mater.*, vol. 382, p. 131360, Jun. 2023, doi: 10.1016/j.conbuildmat.2023.131360.
[24] J. Baalamurugan *et al.*, "Recycling of steel slag aggregates for the development of high density concrete: Alternative & environment-friendly radiation shielding composite," *Compos. Part B Eng.*, vol. 216, p. 108885, Jul. 2021, doi: 10.1016/j.compositesb.2021.108885.
[25] R. M. El-Sharkawy *et al.*, "Doping of steel slag waste as a sustainable filler in ceramic tile composites for enhanced gamma-ray shielding," *Mater. Adv.*, vol. 6, no. 18, pp. 6305–6319, Aug. 2025, doi: 10.1039/d5ma00287g.
[26] D. Shi *et al.*, "Valorization of steel slag into sustainable high-performance radiation shielding concrete," *J. Build. Eng.*, vol. 91, p. 109650, Aug. 2024, doi: 10.1016/j.jobe.2024.109650.
[27] Y. Xia *et al.*, "Iron-rich industrial waste enhanced low-carbon radiation shielding functional composites," *J. Clean. Prod.*, vol. 449, p. 141649, Apr. 2024, doi: 10.1016/j.jclepro.2024.141649.
[28] A. M. Abdelmonem, A. Azam, A. Alruwaili, A. S. Ouda, and M. A. Elrahman, "Effect of ceramic tile waste addition on the performance of slag-based geopolymer upon exposure to marine conditions: Physico-mechanical characteristics, and shielding proficiency against ionizing radiation," *Sustain. Chem. Pharm.*, vol. 43, p. 101886, Feb. 2025, doi: 10.1016/j.scp.2024.101886.
[29] B. Kanagaraj, N. Anand, S. Raj, and E. Lubloy, "Advancements and environmental considerations in portland cement-based radiation shielding concrete: Materials, properties, and applications in nuclear power plants–review," *Clean. Eng. Technol.*, vol. 19, p. 100733, Apr. 2024, doi: 10.1016/j.clet.2024.100733.
[30] M. R. Alipoor, M. Eshghi, and O. Akhavan, "Radiation shielding for nuclear medicine using advanced dy-doped nanocomposites," *Nano Trends*, vol. 13, p. 100171, Mar. 2026, doi: 10.1016/j.nwnano.2025.100171.
[31] K. Mokhtari, M. Kheradmand Saadi, H. Ahmadpanahi, and Gh. Jahanfarnia, "Fabrication, characterization, simulation and experimental studies of the ordinary concrete reinforced with micro and nano lead oxide particles against gamma radiation," *Nucl. Eng. Technol.*, vol. 53, no. 9, pp. 3051–3057, Sep. 2021, doi: 10.1016/j.net.2021.04.001.
[32] M. A. H. Abdullah *et al.*, "Recent Trends in Advanced Radiation Shielding Concrete for Construction of Facilities: Materials and Properties," *Polymers*, vol. 14, no. 14, p. 2830, Jan. 2022, doi: 10.3390/polym14142830.
[33] G. Tyagi, A. Singhal, S. Routroy, D. Bhunia, and M. Lahoti, "A review on sustainable utilization of industrial wastes in radiation shielding concrete,"

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Mater. Today Proc., vol. 32, pp. 746–751, Jan. 2020, doi: 10.1016/j.matpr.2020.03.474.

[34] A.-L. Beaucour, P. Pliya, F. Faleschini, R. Njinwoua, C. Pellegrino, and A. Noumowé, "Influence of elevated temperature on properties of radiation shielding concrete with electric arc furnace slag as coarse aggregate," *Constr. Build. Mater.*, vol. 256, p. 119385, Sep. 2020, doi: 10.1016/j.conbuildmat.2020.119385.

[35] J. Li, C. Wu, H. Hao, Z. Wang, and Y. Su, "Experimental investigation of ultra-high performance concrete slabs under contact explosions," *Int. J. Impact Eng.*, vol. 93, pp. 62–75, Jul. 2016, doi: 10.1016/j.ijimpeng.2016.02.007.

[36] G. Tyagi, A. Singhal, S. Routroy, D. Bhunia, and M. Lahoti, "Radiation Shielding Concrete with alternate constituents: An approach to address multiple hazards," *J. Hazard. Mater.*, vol. 404, p. 124201, Feb. 2021, doi: 10.1016/j.jhazmat.2020.124201.

[37] E. Zorla *et al.*, "Radiation shielding properties of high performance concrete reinforced with basalt fibers infused with natural and enriched boron," *Nucl. Eng. Des.*, vol. 313, pp. 306–318, Mar. 2017, doi: 10.1016/j.nucengdes.2016.12.029.

[38] A. Mesbahi and H. Ghiasi, "Shielding properties of the ordinary concrete loaded with micro- and nano-particles against neutron and gamma radiations," *Appl. Radiat. Isot.*, vol. 136, pp. 27–31, Jun. 2018, doi: 10.1016/j.apradiso.2018.02.004.

[39] A. M. Onaizi *et al.*, "Radiation-shielding concrete: A review of materials, performance, and the impact of radiation on concrete properties," *J. Build. Eng.*, vol. 97, p. 110800, Nov. 2024, doi: 10.1016/j.jobe.2024.110800.

[40] G. Lakshminarayana *et al.*, "Investigation of structural, thermal properties and shielding parameters for multicomponent borate glasses for gamma and neutron radiation shielding applications," *J. Non-Cryst. Solids*, vol. 471, pp. 222–237, Sep. 2017, doi: 10.1016/j.jnoncrysol.2017.06.001.

[41] B. Kanagaraj, N. Anand, A. Diana Andrushia, and M. Z. Naser, "Recent developments of radiation shielding concrete in nuclear and radioactive waste storage facilities – A state of the art review," *Constr. Build. Mater.*, vol. 404, p. 133260, Nov. 2023, doi: 10.1016/j.conbuildmat.2023.133260.

[42] R. Şahin, R. Polat, O. İçelli, and C. Çelik, "Determination of transmission factors of concretes with different water/cement ratio, curing condition, and dosage of cement and air entraining agent," *Ann. Nucl. Energy*, vol. 38, no. 7, pp. 1505–1511, Jul. 2011, doi: 10.1016/j.anucene.2011.03.013.

[43] M. Dong *et al.*, "The potential use of boron containing resources for protection against nuclear radiation," *Radiat. Phys. Chem.*, vol. 188, p. 109601, Nov. 2021, doi: 10.1016/j.radphyschem.2021.109601.

[44] P. Kongsat, S. Sinthupinyo, E. A. O'Rear, and T. Pongprayoon, "Effect of Morphologically Controlled Hematite Nanoparticles on the Properties of Fly Ash Blended Cement," *Nanomaterials*, vol. 11, no. 4, p. 1003, Apr. 2021, doi: 10.3390/nano11041003.

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Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

[45] S. Özen, M. Y. Durgun, V. Kobya, K. Karakuzu, and A. Mardani-Aghabaglou, "Effect of Colemanite Ore Wastes Utilization on Fresh Properties and Compressive Strength of Cementitious Systems," *Arab. J. Sci. Eng.*, vol. 47, no. 10, pp. 12873–12887, Oct. 2022, doi: 10.1007/s13369-022-06641-8.
[46] W. Gao *et al.*, "Comprehensive utilization of steel slag: A review," *Powder Technol.*, vol. 422, p. 118449, May 2023, doi: 10.1016/j.powtec.2023.118449.
[47] S. Muhammad, Susyati, and Djarwanti, "Radioactive waste management of nuclear medicine in vivo diagnostic services unit," in *Proceedings of the XV National Seminar on Waste Management Technology*, 2017, pp. 157–161. Accessed: Feb. 09, 2026. [Online]. Available: https://inis.iaea.org/records/qfbb0-wdp83
[48] IAEA, "Manual on Safety Aspects of the Design and Equipment of Hot Laboratories," *Saf. Ser.*, vol. No. 30, 1969.
[49] A. S. Anwar, "PERANCANGAN DAN KONSTRUKSI FASILITAS PRODUKSI RADIOISOTOP F-18 BERBASIS SIKLOTRON: ASPEK TEKNIK, KEAMANAN, DAN KEPATUHAN REGULASI," *Kohesi J. Sains Dan Teknol.*, vol. 9, no. 4, pp. 51–60, Jul. 2025, doi: 10.2238/vva84p23.
[50] R. P. de Mendonça, C. Estrela, M. R. Bueno, T. C. A. S. G. Carvalho, L. R. de A. Estrela, and I. Chilvarquer, "Principles of radiological protection and application of ALARA, ALADA, and ALADAIP: a critical review," *Braz. Oral Res.*, vol. 39, p. e14, 2025, doi: 10.1590/1807-3107bor-2025.vol39.014.
[51] KEMENKES, "STANDAR PELAYANAN KEDOKTERAN NUKLIR DI SARANA PELAYANAN KESEHATAN," 2009.
[52] K. Tachatumvitoon, C. Preuksarattanawut, T. Tippayamontri, and P. Khomein, "Tc-99m labeled PSMA-617 as a potential SPECT radiotracer for prostate cancer diagnostics: Complexation optimization and its in vitro/vivo evaluation," *Bioorg. Med. Chem.*, vol. 118, p. 118058, Feb. 2025, doi: 10.1016/j.bmc.2024.118058.
[53] S. Kang *et al.*, "Validating electron pair distribution function analysis: The role of multiple scattering, beam, measurement, and processing parameters," *Ultramicroscopy*, vol. 281, p. 114295, Mar. 2026, doi: 10.1016/j.ultramic.2025.114295.
[54] N. Tsoulfanidis and S. Landsberger, *Measurement and Detection of Radiation*, 5th ed. Boca Raton: CRC Press, 2021. doi: 10.1201/9781003009849.
[55] N. Tsoulfanidis and S. Landsberger, *Measurement and Detection of Radiation*, 5th ed. Boca Raton: CRC Press, 2021. doi: 10.1201/9781003009849.
[56] P. J. Karpius and T. D. Reilly, "Gamma-Ray Interactions with Matter," in *Nondestructive Assay of Nuclear Materials for Safeguards and Security*, W. H. Geist, P. A. Santi, and M. T. Swinhoe, Eds., Cham: Springer Nature Switzerland, 2024, pp. 27–41. doi: 10.1007/978-3-031-58277-6_3.
[57] Z. M. Elqahtani, Z. A. Alrowaili, N. S. Alsaiari, M. M. Alnairi, I. O. Olarinoye, and M. S. Al-Buriahi, "Gamma absorption and radiation shielding properties of apatite-wollastonite containing SiO2, Fe2O3, and TiO2," *Radiat. Phys. Chem.*, vol. 226, p. 112282, Jan. 2025, doi: 10.1016/j.radphyschem.2024.112282.

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Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

[58] M. T. Madsen *et al.*, "Medical Physics | AAPM Journal | Wiley Online Library", doi: 10.1118/1.2135911.
[59] H. Yi, G. Xu, H. Cheng, J. Wang, Y. Wan, and H. Chen, "An Overview of Utilization of Steel Slag," *Procedia Environ. Sci.*, vol. 16, pp. 791–801, 2012, doi: 10.1016/j.proenv.2012.10.108.
[60] L. Bing, T. Biao, M. Zhen, C. Hanchi, and L. Hongbo, "Physical and Chemical Properties of Steel Slag and Utilization Technology of Steel Slag at Home and Abroad," *IOP Conf. Ser. Earth Environ. Sci.*, vol. 242, p. 032012, Mar. 2019, doi: 10.1088/1755-1315/242/3/032012.
[61] "The 2007 Recommendations of the International Commission on Radiological Protection. ICRP publication 103," *Ann. ICRP*, vol. 37, no. 2–4, pp. 1–332, 2007, doi: 10.1016/j.icrp.2007.10.003.
[62] "Peraturan Bapeten No. 4 Tahun 2020," Database Peraturan | JDIH BPK. Accessed: Feb. 09, 2026. [Online]. Available: http://peraturan.bpk.go.id/Details/255784/peraturan-bapeten-no-4-tahun-2020
[63] "Peraturan Kepala Badan No 4 Tahun 2013 Tentang Keselamatan Radiasi dalam Pemanfaatan Tenaga Nuklir," JDIH Badan Pengawas Tenaga Nuklir. Accessed: Feb. 09, 2026. [Online]. Available: https://jdih.bapeten.go.id/id/dokumen/peraturan/peraturan-kepala-badan-no-4-tahun-2013-tentang-keselamatan-radiasi-dalam-pemanfaatan-tenaga-nuklir
[64] J. Baalamurugan *et al.*, "Recycling of steel slag aggregates for the development of high density concrete: Alternative & environment-friendly radiation shielding composite," *Compos. Part B Eng.*, vol. 216, p. 108885, Jul. 2021, doi: 10.1016/j.compositesb.2021.108885.
[65] J. Baalamurugan *et al.*, "Utilization of induction furnace steel slag in concrete as coarse aggregate for gamma radiation shielding," *J. Hazard. Mater.*, vol. 369, pp. 561–568, May 2019, doi: 10.1016/j.jhazmat.2019.02.064.
[66] M. F. L'Annunziata, *Radioactivity: Introduction and History*. Amsterdam: Elsevier Science & Technology, 2007.
[67] G. F. Knoll, *Radiation detection and measurement*, 4th ed. Hoboken, N.J: John Wiley, 2010.
[68] N. Tsoulfanidis and S. Landsberger, *Measurement and detection of radiation*, Fifth edition. Boca Raton: CRC Press, 2021.
[69] A. K. John and P. Vinothkumar, "Evaluation holmium phosphate glass ceramic system's efficacy to radiation shielded transport containers for radioactive materials," *Ceram. Int.*, May 2025, doi: 10.1016/j.ceramint.2025.04.386.
[70] S. M. Reda and H. M. Saleh, "Calculation of the gamma radiation shielding efficiency of cement-bitumen portable container using MCNPX code," *Prog. Nucl. Energy*, vol. 142, p. 104012, Dec. 2021, doi: 10.1016/j.pnucene.2021.104012.
[71] R. Singh, S. Singh, G. Singh, and K. S. Thind, "Gamma Radiation Shielding Properties of Steel and Iron Slags," *New J. Glass Ceram.*, vol. 07, no. 01, pp. 1–11, 2017, doi: 10.4236/njgc.2017.71001.

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Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

[72] M. A. Khalaf, C. C. Ban, M. Ramli, N. M. Ahmed, L. J. Sern, and H. A. Khaleel, "Physicomechanical and gamma-ray shielding properties of high-strength heavyweight concrete containing steel furnace slag aggregate," *J. Build. Eng.*, vol. 30, p. 101306, Jul. 2020, doi: 10.1016/j.jobe.2020.101306.

[73] R. A. H. Muslim, S. N. Yaqoob, and R. Q. Ghdban, "Refined formulation of the Taylor equation for calculating build-up factors of gamma rays in aluminium and anticipated radiation effects," *Radiat. Phys. Chem.*, vol. 224, p. 112089, Nov. 2024, doi: 10.1016/j.radphyschem.2024.112089.

[74] M. A. Judge, E. Keavey, and N. Phelan, "Scatter radiation intensities around full-field digital mammography units," *Br. J. Radiol.*, vol. 86, no. 1021, p. 20120130, Jan. 2013, doi: 10.1259/bjr.20120130.

[75] F. Aliyah, "Multi-layer Radiation Shielding Design For Compact Proton Therapy System Using Monte Carlo Simulation," Sep. 2024, Accessed: Feb. 09, 2026. [Online]. Available: https://erepo.usm.my/handle/123456789/21288