

## DAFTAR PUSTAKA

- [1] N. Tsoulfanidis and S. Landsberger, *Measurement & Detection of Radiation*. 2021. doi: 10.1201/9781003009849.
- [2] A. Owens and A. Peacock, "Compound semiconductor radiation detectors," in *Nuclear Instruments and Methods in Physics Research, Section A: Accelerators, Spectrometers, Detectors and Associated Equipment*, Sep. 2004, pp. 18–37. doi: 10.1016/j.nima.2004.05.071.
- [3] Ge. Lutz, *Semiconductor radiation detectors. Device Physics*, vol. 170. Springer Berlin, Heidelberg, 1999. doi: doi.org/10.1007/978-3-540-71679-2.
- [4] A. Owens and A. Peacock, "Compound semiconductor radiation detectors," in *Nuclear Instruments and Methods in Physics Research, Section A: Accelerators, Spectrometers, Detectors and Associated Equipment*, Sep. 2004, pp. 18–37. doi: 10.1016/j.nima.2004.05.071.
- [5] Stephen E. Sadow and A Agarwal, *Advances in Silicon Carbide Processing and Applications*. Artech, 2004.
- [6] T. Kimoto and J. A. Cooper, "Fundamentals of Silicon Carbide Technology," in *Fundamentals of Silicon Carbide Technology*, Wiley, 2014. doi: 10.1002/9781118313534.fmatter.
- [7] Y. Sun *et al.*, "Investigation of total ionizing dose effects in 4H-SiC power MOSFET under gamma ray radiation," *Radiation Physics and Chemistry*, vol. 197, Aug. 2022, doi: 10.1016/j.radphyschem.2022.110219.
- [8] A. Akturk *et al.*, "Terrestrial Neutron-Induced Failures in Silicon Carbide Power MOSFETs and Diodes," *IEEE Trans. Nucl. Sci.*, vol. 65, no. 6, pp. 1248–1254, Jun. 2018, doi: 10.1109/TNS.2018.2833741.
- [9] Y. feng Lu, H. He, S. xiong Liu, and Z. zhan Chen, "Effects of annealing treatment on the high temperature performance of 4H-SiC metal-semiconductor-metal ultraviolet photodiodes," Nov. 15, 2017, *Elsevier Ltd*. doi: 10.1016/j.mssp.2017.07.018.
- [10] M. Mukherjee, *Silicon Carbide-Materials, Processing and Applications in Electronic Devices Edited*. InTech, 2011. [Online]. Available: [www.intechopen.com](http://www.intechopen.com)
- [11] Z. Li *et al.*, "The performance of 4H-SiC detector at high temperature after gamma irradiation," *Radiation Physics and Chemistry*, vol. 162, pp. 153–156, Sep. 2019, doi: 10.1016/j.radphyschem.2019.05.004.





- [12] A. Itoh, T. Kimoto, and H. Matsunami, "High Performance of High-Voltage 4H-SiC Schottky Barrier Diodes," 1995.
- [13] E. V. Kalinina, A. M. Ivanov, and N. B. Strokan, "Performance of p-n 4H-SiC film nuclear radiation detectors for operation at elevated temperatures (375 °c)," *Technical Physics Letters*, vol. 34, no. 3, pp. 210–212, 2008, doi: 10.1134/s1063785008030103.
- [14] I. Capan, "4H-SiC Schottky Barrier Diodes as Radiation Detectors: A Review," Feb. 01, 2022, *MDPI*. doi: 10.3390/electronics11040532.
- [15] B. Zařko *et al.*, "Study of Schottky barrier detectors based on a high quality 4H-SiC epitaxial layer with different thickness," *Appl. Surf. Sci.*, vol. 536, Jan. 2021, doi: 10.1016/j.apsusc.2020.147801.
- [16] B. Zařko *et al.*, "Schottky barrier detectors based on high quality 4H-SiC semiconductor: Electrical and detection properties," *Appl. Surf. Sci.*, vol. 461, pp. 276–280, Dec. 2018, doi: 10.1016/j.apsusc.2018.07.008.
- [17] A. Lo Giudice *et al.*, "Performances of 4H-SiC Schottky diodes as neutron detectors," *Nucl. Instrum. Methods Phys. Res. A*, vol. 583, no. 1, pp. 177–180, Dec. 2007, doi: 10.1016/j.nima.2007.08.241.
- [18] B. J. Baliga, *Silicon Carbide Power Devices*. 2006. doi: 10.1142/5986.
- [19] F. Nava *et al.*, "Radiation tolerance of epitaxial silicon carbide detectors for electrons, protons and gamma-rays," *Nucl. Instrum. Methods Phys. Res. A*, vol. 505, no. 3, 2003, doi: 10.1016/S0168-9002(02)01558-9.
- [20] P. Vigneshwara Raja and N. V. L. Narasimha Murty, "Thermally stimulated capacitance in gamma irradiated epitaxial 4H-SiC Schottky barrier diodes," *J. Appl. Phys.*, vol. 123, no. 16, Apr. 2018, doi: 10.1063/1.5003068.
- [21] T. Miyazaki *et al.*, "Effect of gamma-ray irradiation on the device process-induced defects in 4H-SiC epilayers," *Superlattices Microstruct.*, vol. 99, pp. 197–201, Nov. 2016, doi: 10.1016/j.spmi.2016.03.005.
- [22] L. Y. Liu *et al.*, "Performance degradation and defect characterization of Ni/4H-SiC Schottky diode neutron detector in high fluence rate neutron irradiation," *Diam. Relat. Mater.*, vol. 88, pp. 256–261, Sep. 2018, doi: 10.1016/j.diamond.2018.07.019.
- [23] Z. Long *et al.*, "Neutron irradiation and polarization effect of 4H-SiC Schottky detector," *Nucl. Instrum. Methods Phys. Res. A*, vol. 1064, Jul. 2024, doi: 10.1016/j.nima.2024.169326.





- [24] P. Hazdra, V. Zählava, and J. Vobecký, “Point defects in 4H-SiC epilayers introduced by neutron irradiation,” *Nucl. Instrum. Methods Phys. Res. B*, vol. 327, no. 1, pp. 124–127, May 2014, doi: 10.1016/j.nimb.2013.09.051.
- [25] K. Çinar, C. Coşkun, Ş. Aydoğan, H. Asil, and E. Gür, “The effect of the electron irradiation on the series resistance of Au/Ni/6H-SiC and Au/Ni/4H-SiC Schottky contacts,” *Nucl. Instrum. Methods Phys. Res. B*, vol. 268, no. 6, 2010, doi: 10.1016/j.nimb.2009.12.019.
- [26] G. Izzo, G. Litrico, L. Calcagno, G. Foti, and F. La Via, “Electrical properties of high energy ion irradiated 4H-SiC Schottky diodes,” *J. Appl. Phys.*, vol. 104, no. 9, 2008, doi: 10.1063/1.3018456.
- [27] F. Roccaforte, S. Libertino, V. Raineri, A. Ruggiero, V. Massimino, and L. Calcagno, “Defects and electrical behavior in 1 MeV Si<sup>+</sup>-ion-irradiated 4H-SiC Schottky diodes,” *J. Appl. Phys.*, vol. 99, no. 1, 2006, doi: 10.1063/1.2158501.
- [28] I. P. Vali *et al.*, “Gamma irradiation effects on Al/n-Si Schottky junction properties,” *Nucl. Instrum. Methods Phys. Res. B*, vol. 436, 2018, doi: 10.1016/j.nimb.2018.09.035.
- [29] Ş. Karataş, A. Türüt, and Ş. Altındal, “Effects of <sup>60</sup>Co  $\gamma$ -ray irradiation on the electrical characteristics of Au/n-GaAs (MS) structures,” *Nucl. Instrum. Methods Phys. Res. A*, vol. 555, no. 1–2, 2005, doi: 10.1016/j.nima.2005.09.017.
- [30] M. Liu *et al.*, “Effect of gamma irradiation on  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> vertical Schottky barrier diode,” *Appl. Phys. Lett.*, vol. 123, no. 21, 2023, doi: 10.1063/5.0170417.
- [31] K. Çinar, C. Coşkun, Ş. Aydoğan, H. Asil, and E. Gür, “The effect of the electron irradiation on the series resistance of Au/Ni/6H-SiC and Au/Ni/4H-SiC Schottky contacts,” *Nucl. Instrum. Methods Phys. Res. B*, vol. 268, no. 6, pp. 616–621, Mar. 2010, doi: 10.1016/j.nimb.2009.12.019.
- [32] I. P. Vali, P. K. Shetty, M. G. Mahesha, V. G. Sathe, D. M. Phase, and R. J. Choudhary, “Structural and optical studies of gamma irradiated N-doped 4H-SiC,” *Nucl. Instrum. Methods Phys. Res. B*, vol. 440, pp. 101–106, Feb. 2019, doi: 10.1016/j.nimb.2018.12.016.
- [33] A. Kinoshita *et al.*, “Radiation effect on pn-SiC diode as a detector,” in *Nuclear Instruments and Methods in Physics Research, Section A: Accelerators, Spectrometers, Detectors and Associated Equipment*, 2005, doi: 10.1016/j.nima.2005.01.059.





- [34] S. M. Kang, J. H. Ha, S. H. Park, H. S. Kim, S. D. Chun, and Y. K. Kim, "Study of the current-voltage characteristics of a SiC radiation detector irradiated by Co-60 gamma-rays," *Nucl. Instrum. Methods Phys. Res. A*, vol. 579, no. 1, 2007, doi: 10.1016/j.nima.2007.04.025.
- [35] A. Kaya, Sevgili, Altindal, and M. K. Öztürk, "Current-conduction mechanism in Au/n-4H-SiC Schottky barrier diodes," *Indian Journal of Pure and Applied Physics*, vol. 53, no. 1, 2015.
- [36] M. Gülnahar, "Temperature dependence of current-and capacitance-voltage characteristics of an Au/4H-SiC Schottky diode," *Superlattices Microstruct.*, vol. 76, 2014, doi: 10.1016/j.spmi.2014.09.035.
- [37] F. A. Frasetya, "S1-2025-Efek Temperatur Annealing terhadap Kinerja Dioda Schottky Au/4H-SiC, Skripsi Sarjana-complete-Farhan," Universitas Gadjah Mada, Yogyakarta, 2025.
- [38] W. D. Callister and D. G. Rethwisch, *Materials Science and Engineering 9th Edition*. 2014. doi: 10.1016/j.str.2011.03.005.
- [39] G. L. Harris, *Properties of Silicon Carbide*. 1995.
- [40] Nikhil Karkhanis, "Fabrication, Electrical Characterization, and Annealing of Al/, Cu/, and Au/4H-SiC Schottky Diodes," Clemson University, 2007. [Online]. Available: [https://tigerprints.clemson.edu/all\\_theses/280](https://tigerprints.clemson.edu/all_theses/280)
- [41] S. Verma, K. C. Praveen, A. Bobby, and D. Kanjilal, "Recovery of electrical characteristics of Au/n-Si schottky junction under 60Co gamma irradiation," *IEEE Transactions on Device and Materials Reliability*, vol. 14, no. 2, pp. 721–725, 2014, doi: 10.1109/TDMR.2014.2312753.
- [42] G.F. Knoll, *Radiation Detection and Measurement*, Third. New York: Wiley, 1999.
- [43] R Eisberg and R Resnick, *Quantum Physics of Atoms, Molecules, Solids, Nuclei, and Particles*. Wiley, 1985.
- [44] A. M. Cowley and S. M. Sze, "Surface states and barrier height of metal-semiconductor systems," *J. Appl. Phys.*, vol. 36, no. 10, pp. 3212–3220, 1965, doi: 10.1063/1.1702952.
- [45] R. T. Tung, "Formation of an electric dipole at metal-semiconductor interfaces," *Phys. Rev. B Condens. Matter Mater. Phys.*, vol. 64, no. 20, 2001, doi: 10.1103/PhysRevB.64.205310.
- [46] M. S. Tyagi, *Metal-Semiconductor Schottky Barrier Junctions and Their Applications*, 1st ed. Springer, 1984. doi: doi.org/10.1007/978-1-4684-4655-5.





- [47] S. Helmuth, *Semiconductor Detector Systems*. Oxford, 2005.
- [48] M. M. Gao, T. T. Hu, and Z. Z. Chen, "Insight Into Ni/4H-SiC Schottky Barrier Inhomogeneity at Microscale Level," *IEEE Trans. Electron Devices*, vol. 66, no. 9, pp. 3929–3934, Sep. 2019, doi: 10.1109/TED.2019.2929827.
- [49] "Ronald E. Walpole - Probability & Statistics for Engineers & Scientists, MyLab Statistics Update - libgen.li-756-765".
- [50] D. E. Yıldız, S. Karadeniz, and H. H. Gullu, "A study on electrical properties of Au/4H-SiC Schottky diode under illumination," *Journal of Materials Science: Materials in Electronics*, vol. 32, no. 15, 2021, doi: 10.1007/s10854-021-06480-7.
- [51] L. C. Han *et al.*, "Annealing temperature influence on the degree of inhomogeneity of the Schottky barrier in Ti/4H-SiC contacts," *Chinese Physics B*, vol. 23, no. 12, Dec. 2014, doi: 10.1088/1674-1056/23/12/127302.
- [52] S. Khanna, A. Noor, S. Neeleshwar, and M. S. Tyagi, "Effect of annealing temperature on the electrical characteristics of Platinum/4H-SiC Schottky barrier diodes," *International Journal of Electronics*, vol. 98, no. 12, pp. 1733–1741, Dec. 2011, doi: 10.1080/00207217.2011.609963.
- [53] C. K. Ramesha and V. Rajagopal Reddy, "Influence of annealing temperature on the electrical and structural properties of palladium Schottky contacts on n-type 4H-SiC," *Superlattices Microstruct.*, vol. 76, pp. 55–65, 2014, doi: 10.1016/j.spmi.2014.09.026.
- [54] S. Duman, A. Turut, and S. Doğan, "Thermal sensitivity and barrier height inhomogeneity in thermally annealed and un-annealed Ni/n-6H-SiC Schottky diodes," *Sens. Actuators A Phys.*, vol. 338, May 2022, doi: 10.1016/j.sna.2022.113457.
- [55] Y. H. Cho *et al.*, "Effects of post-deposition annealing on temperature-dependent electrical characteristics of Ni/(Al<sub>0.1</sub>Ga<sub>0.9</sub>)<sub>2</sub>O<sub>3</sub>/4H-SiC Schottky barrier diodes," *Journal of Materials Science: Materials in Electronics*, vol. 35, no. 14, May 2024, doi: 10.1007/s10854-024-12551-2.
- [56] P. Vigneshwara Raja and N. V. L. Narasimha Murty, "Thermal annealing studies in epitaxial 4H-SiC Schottky barrier diodes over wide temperature range," *Microelectronics Reliability*, vol. 87, pp. 213–221, Aug. 2018, doi: 10.1016/j.microrel.2018.06.021.
- [57] Q. Zhang and T. S. Sudarshan, "The influence of high-temperature annealing on SiC Schottky diode characteristics," *J. Electron. Mater.*, vol. 30, no. 11, 2001, doi: 10.1007/s11664-001-0203-z.





- [58] E. Omotoso *et al.*, “The effects of high-energy proton irradiation on the electrical characteristics of Au/Ni/4H-SiC Schottky barrier diodes,” *Nucl. Instrum. Methods Phys. Res. B*, vol. 409, pp. 241–245, Oct. 2017, doi: 10.1016/j.nimb.2017.05.055.
- [59] E. Omotoso *et al.*, “Effects of 5.4 MeV alpha-particle irradiation on the electrical properties of nickel Schottky diodes on 4H-SiC,” *Nucl. Instrum. Methods Phys. Res. B*, vol. 365, pp. 264–268, Dec. 2015, doi: 10.1016/j.nimb.2015.07.019.
- [60] E. Omotoso *et al.*, “The influence of high energy electron irradiation on the schottky barrier height and the richardson constant of Ni/4H-SiC schottky diodes,” *Mater. Sci. Semicond. Process.*, vol. 39, pp. 112–118, May 2015, doi: 10.1016/j.mssp.2015.04.031.
- [61] A. Kaymaz, E. Evcin Baydilli, H. Uslu Tecimer, Ş. Altındal, and Y. Azizian-Kalendaragh, “Evaluation of gamma-irradiation effects on the electrical properties of Al/(ZnO-PVA)/p-Si type Schottky diodes using current-voltage measurements,” *Radiation Physics and Chemistry*, vol. 183, Jun. 2021, doi: 10.1016/j.radphyschem.2021.109430.
- [62] R. Singh, S. K. Arora, J. P. Singh, and D. Kanjilal, “In situ current-voltage characterization of swift heavy ion irradiated Au/n-GaAs schottky diode at low temperature,” *Radiation Effects and Defects in Solids*, vol. 157, no. 4, 2002, doi: 10.1080/10420150214035.
- [63] M. Sochacki, J. Szmids, M. Bakowski, and A. Werbowy, “Influence of annealing on reverse current of 4H-SiC Schottky diodes,” 2002.
- [64] S. Kyoung, E. S. Jung, and M. Y. Sung, “Post-annealing processes to improve inhomogeneity of Schottky barrier height in Ti/Al 4H-SiC Schottky barrier diode,” *Microelectron. Eng.*, vol. 154, pp. 69–73, Mar. 2016, doi: 10.1016/j.mee.2016.01.013.
- [65] N. YILDIRIM, M. GÖNDÜK, and İ. ORAK, “The Effects of Thermal Annealing and Sample Temperature on Current-Voltage Characteristics of Au/n-Si/Al Schottky Diodes,” *Cumhuriyet Science Journal*, vol. 38, no. 2, pp. 275–275, Apr. 2017, doi: 10.17776/cumusci.298666.
- [66] F. Roccaforte, F. La Via, V. Raineri, P. Musumeci, L. Calcagno, and G. G. Condorelli, “Highly reproducible ideal SiC Schottky rectifiers: Effects of surface preparation and thermal annealing on the Ni/6H-SiC barrier height,” *Appl. Phys. A Mater. Sci. Process.*, vol. 77, no. 6, pp. 827–833, Nov. 2003, doi: 10.1007/s00339-002-1981-8.
- [67] A. T. Paradzah, E. Omotoso, M. J. Legodi, F. D. Auret, W. E. Meyer, and M. Diale, “Electrical Characterization of High Energy Electron Irradiated





- Ni/4H-SiC Schottky Barrier Diodes,” *J. Electron. Mater.*, vol. 45, no. 8, pp. 4177–4182, Aug. 2016, doi: 10.1007/s11664-016-4609-z.
- [68] S. Wang *et al.*, “Investigation of 4H-SiC Schottky barrier diodes irradiated with 6 MeV Au ions at low temperature,” *Nucl. Instrum. Methods Phys. Res. B*, vol. 494–495, pp. 53–58, May 2021, doi: 10.1016/j.nimb.2021.03.009.
- [69] S. Gupta, M. Muralikiran, J. Farmer, L. R. Cao, and R. G. Downing, “The effect of boron doping and gamma irradiation on the structure and properties of microwave chemical vapor deposited boron-doped diamond films,” *J. Mater. Res.*, vol. 24, no. 4, 2009, doi: 10.1557/jmr.2009.0170.
- [70] D. A. Neamen, *Semiconductor physics and devices: basic principles*. McGraw-Hill, 2012.
- [71] S. M. Sze and K. K. Ng, “Physics of Semiconductor Devices, 3rd Edition - Simon M. Sze, Kwok K. Ng,” *Physics of Semiconductor Devices, 3rd Edition.*; John Wiley & Sons, Inc.; NJ, 2007.

