

References

- 【1】 M. I. Nathan, W. P. Dumke, G. Burns, F. H. Dill, and G. Iasher, “Stimulated emission of radiation from GaAs p-n junctions”, *Appl. Phys. Lett.*, Vol. 1, pp. 62-64, 1962.
- 【2】 R. N. Hall, G. E. Fenner, J. D. Kingsley, T. J. Soltys, and R. O. Carlson, “Coherent light emission of radiation from GaAs junctions”, *Phys. Rev. Lett.*, Vol. 9, pp. 366-367, Nov. 1962.
- 【3】 D. Bimberg, K. Ketterer, H. E. Scholl, and H. P. Vollmer, “Generation of 4ps light pulses from directly modulated V-groove lasers”, *Electron. Lett.*, Vol. 20, pp. 343-345, 1984.
- 【4】 S. L. Chuang, *Physics of Optoelectronic Devices*, Wiley, 1995.
- 【5】 K. Iga, “Surface emitting laser-its birth and generation of new optoelectronics field”, *IEEE J Select. Topics Quantum Electron.*, Vol. 6, no. 6, pp. 1201-1215, 2000.
- 【6】 F. Koyama, S. Kinoshita, and K. Iga, “Room-temperature continuous wave lasing characteristics of GaAs vertical-cavity surface-emitting lasers”, *Appl. Phys. Lett.*, Vol. 55, pp. 221-222, 1989.
- 【7】 D. L. Huffaker, D. G. Deppe, K. Kumar, and T. J. Rogers, “Native-oxide defined ring contact for low threshold vertical-cavity lasers”, *Appl. Phys. Lett.*, Vol. 65, pp. 97-99, 1994.
- 【8】 M. H. MacDougal, P. D. Dapkus, V. Pudikov, H. Zhao, and G. M. Yang, “Ultralow threshold current vertical-cavity surface emitting lasers with AlAs-oxide-GaAs distributed Bragg reflectors,” *IEEE Photon. Technol. Lett.*, Vol. 7, pp. 229-231, 1995.
- 【9】 Y. Hayashi, T. Mukaiyara, N. Hatori, N. Ohnoki, A. Matsutani, F. Koyama, and K. Iga, “Record low-threshold index-guided In-GaAs/GaAlAs vertical-cavity surface-emitting laser with a native oxide confinement structure”, *Electron. Lett.*, Vol. 31, pp. 560-561, 1995.

- 【10】 Renaud Stevens, “Modulation properties of vertical cavity light emitters”, Sweden, 2001.
- 【11】 Weng. W. Chow, Kent. D. Choquette, Mary H. Crawford, Kevin L. Lear, and G. Ronald Hadley, “Design, fabrication, and performance of infrared and visible vertical-cavity surface-emitting lasers”, *IEEE J. Quantum Electron.*, Vol. 33, pp. 1810-1824, 1997.
- 【12】 H. E. Li, and K. Iga, Vertical-Cavity Surface-Emitting Laser Devices, Springer-Verlag Berlin Heidelberg New York.
- 【13】 S. F. Yu, Analysis and Design of Vertical Cavity Surface Emitting Lasers, Wiley, 2003.
- 【14】 F. A.P. Tooley, “Challenges in optically interconnecting electronics”, *IEEE Select. Topics Quantum Electron.*, Vol. 2, pp. 3-13, 1996.
- 【15】 S. Eitel, S. J. Fancey, H. P. Gauggel, K. H. Gulden, W. Bachtold, and M. R. Taghizadeh, “Highly uniform vertical cavity surface emitting laser integrated with microlens arrays”, *IEEE Photon. Technol. Lett.*, Vol. 12, no. 5, pp. 459-461, 2000.
- 【16】 S. Y. Hu, J. Ko, E. R. Hegblom, and L. A. Coldren, “Multimode WDM optical data links with monolithically integrated multiple channel VCSEL and photodetector arrays”, *IEEE J. Quantum Electron.*, Vol. 34, no. 8, pp. 1403-1414, 1998.
- 【17】 A. Sherer, J. L. Jewell, Y. H. Lee, J. P. Harbison, and L. T. Florez, “Fabrication of microlasers and microresonator optical switches”, *Appl. Phys. Lett.*, Vol. 55, pp. 2723-2724, 1989.
- 【18】 R. S. Geels, S. W. Corzine, J. W. Scott, D. B. Young, and L. A. Coldren, “Low threshold planarized vertical-cavity surface-emitting lasers”, *IEEE Photon. Technol. Lett.*, Vol. 2, pp. 234-236, 1990.
- 【19】 C. J. Chang-Hasnain, M. Orenstein, A. Von. Lehmen, L. T. Florez, J. P. Harbison, and N. G. Stoffel, “Transverse mode characteristics of vertical-cavity surface-emitting lasers”, *Appl. Phys. Lett.*, Vol. 57, pp. 218-220, 1990.
- 【20】 Y. H. Lee, J. L. Jewell, B. Tell, K. F. Brown-Goebeler, A. Sherer, J. P. Harbison, and L. T. Florez, “Effects of etch depth and ion implantation on surface emitting

microlasers”, *Electron. Lett.*, Vol. 26, pp. 225–227, 1990.

- 【21】 B. J. Thibeault, T. A. Strand, T. Wipiejewski, M. G. Peters, D. B. Young, S. W. Corzine, and L. A. Coldren, “Evaluating the effects of optical and carrier losses in etched-post vertical cavity lasers”, *J. Appl. Phys.*, Vol. 78, pp. 5871–5875, 1995.
- 【22】 W. Jiang, C. Gaw, P. Kiely, B. Lawrence, M. Leiby, and P. R. Claisse, “Effect of proton implantation on the degradation of GaAs/AlGaAs vertical cavity surface emitting lasers”, *Electron. Lett.*, Vol. 33, pp. 137–139, 1997.
- 【23】 C. J. Chang-Hasnain, Y. A. Wu, G. S. Li, G. Hasnain, K. D. Choquette, C. Caneau, and L. T. Florez, “Low threshold buried heterostructure vertical cavity surface emitting laser”, *Appl. Phys. Lett.*, Vol. 63, pp. 1307–1309, 1993.
- 【24】 C. C. Wu, K. Tai, T. C. Huang, and K. F. Huang, “Reliability studies of gain-guided 0.85 μ m GaAs/AlGaAs quantum well surface emitting lasers”, *IEEE Photon. Technol. Lett.*, Vol. 6, pp. 37–39, 1994.
- 【25】 J. K. Guenter, R. A. Hawthorne, III, and D. N. Granville, “Reliability of proton-implanted VCSEL’s for data communications”, in *Proc. SPIE*, 1996, Vol. 2683, pp. 102–113.
- 【26】 K. D. Choquette, R. P. Schneider, Jr., K. L. Lear, and K. M. Geib, “Low threshold voltage vertical-cavity lasers fabricated by selective oxidation”, *Electron. Lett.*, Vol. 30, pp. 2043–2044, 1994.
- 【27】 J. M. Dallesasse, N. Holonyak, Jr., A. R. Sugg, T. A. Richard, and N. El- Zein, “Hydrolyzation oxidation of $\text{Al}_x\text{Ga}_{1-x}\text{As-AlAs-GaAs}$ quantum well heterostructures and superlattices”, *Appl. Phys. Lett.*, Vol. 57, pp. 2844–2846, 1990.
- 【28】 H. Soda, Y. Motegi, and K. Iga, “GaInAsP/InP surface emitting injection lasers with short cavity length”, *IEEE J. Quantum Electron.*, Vol. 19, no. 6, pp. 1035–1041, 1983.
- 【29】 K. Iga, F. Koyama, and S. Kinoshita, “Surface emitting semiconductor lasers”, *IEEE J. Quantum Electron.*, Vol. 24, no. 9, pp. 1845–1854, 1988.
- 【30】 K. Uomi, S. J. B. Yoo, A. Scherer, R. Bhat, N. C. Andreadakis, C. E. Zah, M. A. Koza, and T. P. Lee, “Low threshold, room temperature pulsed operation of 1.5 μ m vertical

cavity surface emitting lasers with an optimized multi quantum well active layer”, *IEEE Photon. Technol. Lett.*, Vol. 6, no. 3, pp. 317-319, 1994.

- 【31】 Y. Arakawa and A. Yariv, “Theory of gain, modulation response and spectral linewidth in AlGaAs QW lasers”, *IEEE J. Quantum Electron.*, Vol. 21, no. 10, pp. 1666-1674, 1985.
- 【32】 T. A. DeTemple and C. M. Herzinger, “On the semiconductor laser logarithmic gain-current density relation”, *IEEE J. Quantum Electron.*, Vol. 29, no. 5, pp. 1246-1252, 1993.
- 【33】 R. Nagarajan and J. E. Bower, “Effects of carrier transport on injection efficiency and wavelength chirping in quantum-well lasers”, *IEEE J. Quantum Electron.*, Vol. 29, no. 6, pp. 1601-1608, 1993.
- 【34】 Y. Yeh, *Optical Waves in Layered Media*, Wiley, New York, 1998.
- 【35】 M. Orenstein, N. G. Stoffel, A. C. Von Lehmen, J. P. Harbison, and L. T. Florez, “Efficient continuous wave operation of vertical-cavity semiconductor lasers using buried-compensation layers to optimize current flow”, *Appl. Phys. Lett.*, Vol. 59, pp. 31-33, 1991.
- 【36】 K. L. Lear, S. P. Kilcoyne, and S. A. Chalmers, “High power conversion efficiencies and scaling issues for multimode vertical-cavity top surface emitting lasers”, *IEEE Photon. Technol. Lett.*, Vol. 6, no. 7, pp. 778-781, 1994.
- 【37】 G. W. Taylor and Q. Yang, “Optimization of the operation point of a vertical cavity surface emitting laser”, *IEEE J. Quantum Electron.*, Vol. 32, no. 8, pp. 1441-1449, 1996.
- 【38】 M. Osinski and W. Nakwaski, “Thermal effects in vertical cavity surface emitting lasers”, *Selected Topics in Electronics and Systems.*, Vol. 3, World Scientific, Singapore, 1995.