

9 Literatur

- [1] Pearsall, T.P. : *Ga_{0.47}In_{0.53}As. A ternary semiconductor for photodetector applications.* In: IEEE Journal of Quantum Electronics, Vol.QE-16 No.7, (1980), S.709-720
- [2] Houston, P.A. : *Growth and characterization of InGaAsP lattice-matched to InP.* In: Journal of Material Science, Vol.16 No.11, (1981), S.2935-2961
- [3] Morkoç, H., Unlu, H., Ji, G. : *Principles and Technology of MODFETs.* Wiley, New York, 1991
- [4] Adachi, S. : *Material parameters of In_{1-x}Ga_xAs_yP_{1-y} and related binaries.* In: Journal of Applied Physics, Vol.53 No.12, (1982), S.8775-8792
- [5] Nahory, R.E., Pollack, M.A., Johnston, W.D., Barns, R.L. : *Band gap versus composition and demonstration of Vegard's law for In_{1-x}Ga_xAs_yP_{1-y} lattice matched to InP.* In: Applied Physics Letters, 33 7, (1978), S.659-661
- [6] Müller, G. : *InP- The Basic Material of Integrated Optoelectronics for Fiber Communication Systems.* In: Physica Scripta T35, (1991), S.201-209
- [7] Garbuzov, D.Z., Antonishkis, N.Y., Bondarev, A.D., Gulakov, A.B., Zhigulin, S.N., Kochchergin, A.V., Katsavets, N.I., Rafailov, E.V. : *High-power 0.8 μm InGaAsP-GaAs SCH SQW lasers.* In: IEEE Journal of Quantum Electronics, Vol.27 No.6, (1991), S.1531-1536
- [8] Stringfellow, G.B. : *Miscibility gaps in quaternary III/V alloys.* In: Journal of Crystal Growth, 58, (1982), S.194-202
- [9] Onabe, K. : *Unstable regions in III-V quaternary solid solutions composition plane calculated with strictly regular solution approximation.* In: Japanese Journal of Applied Physics, Part 1-Regular Papers Short Notes & Review Papers, Vol.21 No.6, (1982), L323-L325

- [10] Cremoux de, B., Hirtz, P., Ricciardi, J. : *On the presence of a solid immiscibility domain in the GaInAsP phase diagram*. In: Inst. Phys. Conf. Ser. 56, (1980), S.115-124
- [11] Mahajan, S., Zunger, A. : *Atomic Ordering and Phase Separation in Epitaxial III-V Alloys*. In: Handbook on semiconductors Vol.3, Materials, properties and preparation. Editor: S. Mahajan (1994), S.1399-1514
- [12] Pennycook, S.J., Boatner, L.A. : *Chemically sensitive structure-imaging with a scanning transmission electron microscope*. In: Nature 336 (1988), S.565-567
- [13] Reimer, Ludwig; Pfefferkorn, G. : *Raster-Elektronenmikroskopie*. 2. Auflage, Springer Verlag, Berlin Heidelberg New York, 1977
- [14] Reimer, Ludwig : *Scanning Electron Microscopy*. Springer Verlag, Berlin Heidelberg New York Tokyo, 1985
- [15] Langmore, J.P.; Wall, J.; Isaacson, M.S. : *The Collection of Scattered Electrons in Dark Field Electron Microscopy, I. Elastic Scattering*. In: Optik 38 (4), (1973), S.335-350
- [16] Mott, N.F.; Massey, H.W.W. : *The Theory of Atomic Collision*. Oxford University Press, Oxford 1965
- [17] International Tables for X-Ray-Crystallography IV, Revised and Supplementary Tables. In: (Hrsg.): International Union of Crystallography. Keynoch Press, Birmingham 1976
- [18] Egerton, R.F. : *Electron Energy Loss Spectroscopy in the Electron Microscope*. Plenum Press, New York 1986
- [19] Inokuti, M. : *Inelastic collisions of fast charged particles with atoms and molecules - The Bethe theory revisited*. In: Rev. Mod. Phys. 43, (1971), S.297-347

- [20] Reimer, Ludwig : *Transmission Electron Microscopy*. Springer Verlag, 4. Auflage, Berlin Heidelberg New York Tokyo 1997
- [21] Hirsch, P., Howie, A., Nicholson, R., Pashley, D.W., Whelan, M.J. : *Electron Microscopy of Thin Crystals*. Robert E. Krieger Publishing Co. Inc., Malabar, Florida 1977
- [22] Cowley, John M. : *Diffraction physics*. 2. Reviewed Edition, Amsterdam 1990
- [23] Wang, Zhong L. : *Elastic and Inelastic Scattering in Electron Diffraction and Imaging*. Plenum Press, New York 1995
- [24] Bethe, H. : *Theorie der Beugung von Elektronen an Kristallen*. In: *Analalen der Physik Ser. 4, 87*, (1928), S.55-129
- [25] Humphreys, C.J. : *The Scattering of fast Electrons by Crystals*. In: *Rep. Prog. Phys.* 42, (1979), S.1825-1887
- [26] Cowley, John M.; Moodie, A.F. : *The Scattering of Electrons by Atoms and Crystals - I. A New Theoretical Approach*. In: *Acta Cryst.* 10, (1957), S.609-619
- [27] Kirkland, A.; Loane, R.F.; Silcox, J. : *Simulation of Annular Dark Field STEM Images Using Modified Multislice Method*. In: *Ultramicroscopy* 23, (1987), S.77-96
- [28] Bollig, Bernd : *Raster-Transmissionselektronenmikroskopie an ZnS_xSe_{1-x} / ZnSe-Heteroschichten*. Shaker Verlag. Dissertation 1995, Universität Duisburg
- [29] Radefeld, Andreas : *Simulation von Elektronenbeugungsmustern für mesoskopische Halbleiterheterostrukturen*. Dissertation 2000, Universität Duisburg
- [30] Delong, A. : *Electron Sources for Electron Microscopes*. In: *European Microsc. Analysis*, 26, (1993), S.9-11

- [31] McMullan, D., Rodenburg, J.M., Pike, J.M. : *Post-Spectrometer instrumentation for STEM*. In: Proceedings of the 12th Int. Congress for Electron Microscopy (1990), S.104-105
- [32] Scherzer, O. : *The theoretical resolution limit of the electron microscope*. In: Journal of Applied Physics, 20, (1949), S.20-29
- [33] Crewe, J. Wall : *A Scanning Microscope with 5Å Resolution*. In: J. Mol. Bio., 48, (1970), S.375-393
- [34] Pennycook S.J., Jesson D.E. : *High-Resolution Z-contrast Imaging Of Crystals*. In: Ultramicroscopy, 37, (1991), S.14-38
- [35] Pennycook S.J. : *Z-Contrast STEM For Materials Science*. In: Ultramicroscopy, 30, (1989), S.58-69
- [36] Fertig J, Rose H. : *Resolution and contrast of crystalline objects in high-resolution scanning transmission electron microscopy*. In: Optik, 59 (5), (1981), S.407-429
- [37] Yilmaz, Murat : *Nanocharakterisierung von InGaAs-Quantendrähten im Raster-Transmissionselektronenmikroskop*. Studienarbeit 1998, Universität Duisburg
- [38] Rafferty, B. : *Probing electronic structure near the bandgap region using electron energy loss spectroscopy*. PHD Thesis 1997, University of Cambridge, UK
- [39] Budd, P.J. Goodhew : *Light element analysis in the transmission electron microscope : WEDX and EELS*. Oxford University Press, Oxford 1988
- [40] Lakner, Hubert : *Ortsaufgelöste Charakterisierung von AlGaAs/InGaAs-Heteroschichten im Raster-Transmissionselektronenmikroskop (RTEM)*. Dissertation 1993, Universität Duisburg
- [41] Brown, L. M., Rodenburg, J. M., Pike, W. T. : *Microdiffraction*. In: Inst. Phys. Conf. Ser. No.93 Volume 2, Chapter 1, (1988), S.3-8

- [42] Twigg, M. E., Chu, S. N. G. : *CBED measurement of lattice mismatch for sub-micron quaternary structures grown on indium phosphide substrates*. In: Ultramicroscopy, 26, (1988), S.51-58
- [43] McGibbon, A.J., Pennycook, S.J., Jesson, D.E. : *Crystal structure retrieval by maximum entropy analysis of atomic resolution incoherent images*. In: Journal of Microscopy, 195 (1), (1999), S.44-57
- [44] Gull, S.F., Skilling, J. : *Quantified Maximum Entropy*. MemSyS5 Users' Manual, Ver. 1.2, 1999
- [45] Browning, N.D., Pennycook, S.J., Chisholm, M.F., McGibbon, M.M., McGibbon, A.J.: *Observation of Structural Units at Symmetric [001] Tilt Boundaries in SrTiO₃*. In: Interface Science, 2, (1995), S.397-423
- [46] Stringfellow, G.B. : *Miscibility gaps and spinodal decomposition in III/V quaternary alloys of the type A_xB_yC_{1-x-y}D*. In: Journal of Applied Physics, 54 (1), (1983), S.404-409
- [47] Swalin, Richard A. : *Thermodynamics of solids*. Wiley-Interscience Publication, New York 1972
- [48] Onabe, K. : *Immiscibility in type A_{1-x}B_xC_{1-y}D_y strictly regular quaternary solid solutions. I. Unstable regions*. In: Jap. Journal of Applied Physics, 22 (4), (1983), S.663-673
- [49] Onabe, K. : *Immiscibility analysis for III-V quaternary solid solutions*. In: NEC Research and Development, No.72, (1984), S.1-7.
- [50] Unger, Konrad : *Verbindungshalbleiter*. Akademische Verlags-Gesellschaft Geest & Portig, Leipzig 1986
- [51] Moss, T.S. : *Handbook on semiconductors*. Compl. rev. and enl. ed. North-Holland Amsterdam, 1992

- [52] Zhang, G., Ovitchinnikov, A., Nappi, J., Asonen, H., Pessa, M. : *Optimization and characteristics of Al-free strained-layer InGaAs/GaInAsP/GaInP SCH-QW lasers (λ approximately 980 nm) grown by gas-source MBE*. In: IEEE Journal of Quantum Electronics, 29 (6), (1993), S.1943-1949
- [53] Schlachetzki, A. : *InGaAsP - ein Halbleiter für die optische Nachrichtentechnik*. In: Physikalische Blätter, 37 (11), (1981), S.337-343
- [54] Prost, Werner : *Technologie der III/V-Halbleiter*. Springer-Verlag Berlin, 1997
- [55] Opitz, B. : *Wannier-Stark-Effekt in verspannten GaInAs(P)-Übergittern für optoelektrische Modulatoren*. Dissertation 1996, RWTH Aachen
- [56] Stringfellow, G.B. : *Organometallic Vapor-Phase Epitaxy: Theory and Practice*. Academic Press, Boston 1989
- [57] Mahajan, S., Dutt, B.V., Temkin, H., Cava, R.J., Bonner, W.A. : *Spinodal decomposition in InGaAsP epitaxial layers*. In: Journal of Crystal Growth, 68, (1984), S.589-595
- [58] LaPierre, R.R., Okada, T., Robinson, B.J., Thompson, D.A., Weatherly, G.C. : *Spinodal-like decomposition of InGaAsP/(100) InP grown by source molecular beam epitaxy*. In: Journal of Crystal Growth, 155, (1995), S.1-15
- [59] Bangert, U., Harvey, A.J., Wilkinson, V.A., Dieker, C., Jowett, J.M., Smith, A.D., Perrin, S.D., Gibbins, C.J. : *Evidence for strain relaxation via composition fluctions in strained quaternary/ternary and quaternary/ternary multiple quantum well structures*. In: Journal of Crystal Growth, 132, (1993), S.231-240
- [60] McDevitt, T.L., Turco, F.S., Tamargo, M.C., Mahajan, S., Laughlin, D.E., Keramidas, V.G., Bonner, W.A. : *Effects of substrate orientation in phase separation in InGaAs and InGaAsP epitaxial layers*. In: Inst. Phys. Conf. Ser. No.100, (1989), S.173-180
- [61] Glas, F. : *Composition Variations, Clustering and Composition Fluctuations in III-V alloys*. In: Inst. Phys. Conf. Ser. No.134, (1993), S.269-278

- [62] Glas, F. : *Effect of Static Atomic Displacement on the HREM Images of Disordered III-V Alloys*. In: Electron Microscopy, 1, (1994), S.363-372
- [63] Lakner, H., Mendorf, C., Bollig, B., Prost, W., Tegude, F.J. : *Determination of Interface Composition in III-V Heterojunction Devices (HBT and RTD) with Atomic Resolution using STEM Techniques*. In: Materials Science and Engineering, B44, (1997), S.52-56
- [64] Zuo, J.M. : *Automated Lattice Parameter Measurements from HOLZ Lines and their Use for the Measurement of Oxygen Content in YBaCuO from Nanometer Sized Region*. In: Ultramicroscopy, Vol.41 No.1-3, (1992), S.211-223
- [65] Spence, J.H.C. , Zuo, J.M. : *Quantitative Convergent Beam Electron Diffraction*. In: MSA Bulletin, Vol.23, (1993), S.80-90
- [66] Pennycook, S.J., Browning, N.D., McGibbon, M.M., McGibbon, A.J., Chisholm, M.F. Jesson, D.E. : *Determination of interface structure and bonding by Z-contrast STEM*. In: Solid State Phenomena, Vol.47-48, (1996), S.561-572
- [67] Nellist, P.D., Pennycook, S.J. : *Accurate structure determination from image reconstruction in ADF STEM*. In: Journal of Microscopy, Vol.190 Pt.1-2, (1998), S.159-170
- [68] McGibbon, A.J., Pennycook, S.J., Chisholm, M.F. : *Crystal structure retrieval by maximum entropy analysis of atomic resolution incoherent images*. In: Journal of Microscopy, Vol.195 Pt.1, (1999), S.44-57
- [69] Colliex, C.; Mory, C. : *Quantitative Aspects of Scanning Transmission Electron Microscopy*. In: Quantitative Electron Microscopy, (1984), S.149-187
- [70] VG Scientific. : *MAXENT Operating Instructions*. V1.3, 1993
- [71] Mendorf, C. : *Ortsaufgelöste Materialanalyse von ternären und quaternären Halbleitern*. Diplomarbeit 1996, Universität Duisburg

- [72] Bauer, S.; Rosenauer, A.; Skorsetz, J.; Kuhn, W.; Wagner, H.P.; Zweck, J.; Gebhardt, W. : *Investigation of strained ZnTe epilayers by high resolution electron microscopy*. In: Journal of Crystal Growth, 117, (1992), S.297-302
- [73] Vogel, H. : *Gerthsen Physik*. 19. Auflage, Springer Verlag, Berlin Heidelberg New York 1995
- [74] Pennycook, S.J., Jesson, D.E., Chisholm, M.F., Ferridge, A.G., Seddon, M.J. : *Sub-Angstrom Microscopy through Incoherent Imaging and Image Reconstruction*. In: Scanning Microscopy Supplement 6, (1992), S.233-243
- [75] Okada, T.; LaPierre, R.; Mullan, C.; Weatherly, G.C.; Robinson, B.J.; Thompson, D.A. : *Transmission electron microscopy and photoluminescence studies of $In_{1-x}Ga_xAs_yP_{1-y}$ films grown on <100> InP substrates*. In: Inst. Phys. Conf. Ser. No.146, (1995), S.253-256
- [76] Tanaka, S.; Ishikawa, T.; Hibino, M. : *Transmission electron microscopy study of InGaAsP/InGaP thin-layer structure grown by liquid phase epitaxy*. In: Journal of Crystal Growth, 166 ,(1996), S.334-338
- [77] Norman, A.G.; Booker, G.R. : *TEM and TED studies of alloy clustering in GaInAsP, GaInAs and GaInP epitaxial layers*. In: Inst. Phys. Conf. Ser. No 76, (1985), S.257-262
- [78] Henoc, P.; Izrael, A.; Quillec, M.; Launois, H. : *Composition modulation in liquid phase epitaxial $In_xGa_{1-x}As_yP_{1-y}$ layers lattice matched to InP substrates*. In: Applied Physics Letters, Vol.40 No.11, (1982), S.963-965
- [79] Knauer, A.; Erbert, G.; Gramlich, S.; Oster, A.; Richter, E.; Zeimer, U.; Weyers, M. : *Metalorganic Vapor Phase Epitaxial Growth Of GaInAsP/GaAs*. In: Journal of Electronic Materials, Vol.24, No.11, (1995), S.1655-1658
- [80] Ahn, C.C., Krivanek, O.L. : *EELS Atlas*. Gatan Inc., Warrendale (PA), USA

- [81] Schulze, Folkert : *Charakterisierung von Halbleiter-Heteroschichten mittels quantitativer Elektronenbeugung*. Diplomarbeit 1997, Universität Duisburg
- [82] Treacy, M. M. J., Gibson, J. M., Howie, A. : *Relaxation and microstructure in $In_xGa_{1-x}As_yP_{1-y}$ epitaxial layers*. In: Philosophical Magazine A, Vol.51 No.3, (1985), S.389-417
- [83] Cowley, J.M., Huang, Yi : *De-channeling contrast in annular dark-field STEM*. In: Ultramicroscopy, 40, (1992), S.171-180
- [84] Meinert, Andreas : *Mikrocharakterisierung von quaternären Halbleiter-Heteroschichten für Leuchtdioden mittels Kathodolumineszenz (KL)*. Diplomarbeit 1997, Universität Duisburg
- [85] Streubel, K. , Wallin, J., Landgren, G., Öhlander, U., Lourdudoss, S., Kjebon, O. : *Importance of metalorganic vapor phase epitaxy growth conditions for the fabrication of GaInAsP strained quantum well lasers*. In: Journal of Crystal Growth, Vol.143 No.1-2, (1994), S.7-14
- [86] Ponchet, A., Rocher, A., Emery, J.Y., Starck, C., Goldstein, L. : *TEM observation of modulations in strained GaInAsP multilayers grown by gas source molecular beam epitaxy*. In: Inst. Phys. Conf. Ser. No 134, (1993), S.485-488
- [87] Ungerechts, Stefan : *Optimierung der quantitativen Bestimmung der Verspannung in Halbleiter-Heteroschichten*. Studienarbeit 1995, Universität Duisburg
- [88] Lakner, H., Ungerechts, S., Behres, A., Kohl, A., Opitz, B., Heime K., Woitok, J. : *Characterization of MOVPE grown InGaAsP superlattices for modulators by electron diffraction, X-ray diffraction and Z-contrast imaging*. In: Journal of Crystal Growth, 170, (1997), S.732-737
- [89] Schulze-Kraasch, F., Lakner, H. : *Strain-mapping in quaternary InGaAsP superlattices using CBED*. In: Electron Microscopy, Vol.III, (1998), S.781-782

- [90] Opitz, B., Kohl, A., Behres, A., Mertens, K., Heime, K., Schmitt, H.J. : *Wannier-Stark effect in $Ga_x In_{1-x} As_z P_{1-z}$ / $Ga_y In_{1-y} As_z P_{1-z}$ superlattices on InP*. In: Conf. Proc. Of the 8th Int. Conf. On InP and Related Materials IEEE, (1996), S.248-251
- [91] Behres, Alexander : *Epitaktische Herstellung aluminiumfreier III-V-Halbleiterstrukturen für Leuchtdioden und Laser im infraroten Wellenlängenbereich*. Shaker Verlag. Dissertation 2000, RWTH Aachen.
- [92] Lakner, H., Bollig, B., Ungerechts, S., Kubalek, E. : *Characterization of III-V-semiconductor interfaces by Z-contrast imaging, EELS and CBED*. In: Journal Physics D: Applied Physics, 29, (1996), S.1767-1778
- [93] Brockt, G., Mendorf, C., Radefeld, A., Scholz, F., Lakner, H. : *STEM characterisation of MOVPE-grown (In, Ga) N quantum wells*. Inst. Phys. Conf. Ser. No.157, (1997), S.221-226
- [94] Pennycook, S.J., Nellist, P.D., Chisholm, M.F., Browning, N.D., Wallis, D.J., Dickey E.C. : *Determination of atomic structure at surfaces and interfaces by high-resolution STEM*. In: Atomic Resolution Microscopy of Surfaces and Interfaces. Symposium Mater. Res. Soc., (1997), S.3-11
- [95] Xin, Y., Pennycook, S.J., Browning, N.D., Nellist, P.D., Sivananthan, S., Beaumont, B., Faurie, P., Gibart, P. : *Direct observations of atomic structures of defects in GaN by high resolution Z-contrast STEM*. In: Nitride Semiconductors Symposium. Mater. Res. Soc., (1998), S.781-786
- [96] Risch, L. : *Nanoelektronik*. In: Siemens-Zeitschrift Special, FuE, (1996), S.32-35
- [97] Aschmoneit, E. : *Quantenfalle. Kernphysikalische Effekte in Bauelementen der Zukunft*. In: Elektronik Praxis Nr.11, (1997), S.88-94