

## Recent Publications (last 5 years):

### Journal articles

1. \*X.W. Liu, A.A. Hopgood, **B.F. Usher**, H. Wang and N.St.J. Braithwaite, *Formation of misfit dislocations during growth of  $In_xGa_{1-x}As/GaAs$  strained-layer heterostructures*, Semiconductor Science and Technology, 14, (1999) pp 1154-1160.
2. \*M. Petracic, P.N.K. Deenapanray, G. Comtet, L. Hellner, G. Dujardin and **B.F. Usher**, *Selective Photon-stimulated Desorption of Hydrogen from GaAs Surfaces*, Physical Review Letters, 84, No 10, (2000) pp 2255-2258.
3. A. Yu. Nikulin, J.R. Davies, N.T. Jones, **B.F. Usher**, A. Yu. Souvorov and A. Freund, *Experimental Observation of X-ray Diffraction from a Thin Crystalline Film at a 90 Degrees Bragg Reflection*, Phys. Stat. Sol. (a), vol 179 (2000) p 103.
4. X.W. Liu, A.A Hopgood, **B.F. Usher**, H. Wang and N.S. Braithwaite, *Edge-type misfit dislocations produced by thermal processing of pre-relaxed  $In_xGa_{1-x}As/GaAs$  heterostructures*, Journal of Applied Physics, 88, (2000) pp 5975-5980.
5. A Y Nikulin, K Siu, J R Davis and **B.F. Usher**, *On a possibility of high-resolution characterization of InGaAs/GaAs multilayers using phase-retrieval x-ray diffractometry (PRXRD) technique*, Journal of Physics D: Applied Physics, 33 No. 20 (2000) p2521.
6. A.Y. Nikulin, K. Tamasaku, **B.F. Usher** and T. Ishikawa, *Experimental studies of 90-degree Bragg reflection from a sub-micron single-crystal film deposited on a GaAs substrate*, Jpn. J. Appl. Phys., vol 40 (2001) p464.
7. D. Zhou and **B.F. Usher**, *Deviation of the AlGaAs Lattice Constant from Vegard's Law*, J. Phys. D: Applied Physics, 34 (2001) 1461-5.
8. F.S. Gard, J D Riley, **B.F. Usher**, K Prince and P Burke, *Quantitative study of the thermal diffusion of elements across ZnSe/GaAs interface using SIMS*, Surface Review and Letters, 8, 33-42, (2001).
9. F.S. Gard, J.D. Riley, R. Leckey, **B.F. Usher**, *A RHEED Study of MBE Growth of ZnSe on GaAs (111) A-(2 x 2)*, Surface Review and Letters, 10, No. 4 Aug (2003).
10. T. Dieing and **B.F. Usher**, *Wafer Curvature in Molecular Beam Epitaxy Grown Heterostructures*, Phys. Rev. B., 67, 0941XX (2003).

### Other Publications

10. \***B.F. Usher**, *The Structural and Chemical Characterisation of Semiconductor Multilayers by X-ray Diffraction*, Invited paper presented to the 1998 Condensed Matter and Materials Physics Conference, UMIST, Manchester.
11. **B.F. Usher**, *Mentoring Peer Tutors*, Proceedings of the 10<sup>th</sup> Annual Convention and Conference of the Australasian Association for Engineering Education, Gladstone, pp 469 (1998).
12. \*S.C. Goh, **B.F. Usher** and T. Warminski, *Arsenic Incorporation in InGaAs Grown by MBE at Low Temperatures Under Atomic Hydrogen Irradiation*, Conference on Optoelectronic and Microelectronic Materials and Devices Proceedings, UWA Perth, Australia, pp 102, IEEE, Piscataway NJ (1999).
13. \*J.J. Russell-Harriott, J. Zou, A.R. Moon, D.J.H. Cockayne and **B.F. Usher**, *Investigation of Oval Defects in InGaAs/GaAs Strained-Layer Heterostructures Using Cathodoluminescence and Wavelength Dispersive Spectroscopy*, Conference on Optoelectronic and Microelectronic Materials and Devices Proceedings, UWA Perth, Australia, pp 287, IEEE, Piscataway NJ (1999).
14. \***B.F. Usher**, D. Zou, S.C. Goh, T. Warminski and X.P. Huang, *Poisson's Ratio of GaAs*, Conference on Optoelectronic and Microelectronic Materials and Devices Proceedings, UWA Perth, Australia, pp 290, IEEE, Piscataway NJ (1999).

15. **B.F. Usher** and D. Zhou, *Thickness and Composition Determination of MBE-grown Strained Multiple Quantum Well Structures by X-ray Diffraction*, SPIE Proceedings Vol. 4086 (2000) pp 76-81.
16. D. Zhou, **B.F. Usher**, T. Warminski, R. Absin and M. Madebo, *Poisson's Ratio of AlAs*, SPIE Proceedings Vol. 4086 (2000) pp 168-173.
17. A.Y. Nikulin, J.R. Davis, **B.F. Usher**, A.K. Freund and T. Ishikawa, *90-degree Bragg reflection from a thin crystalline film*, SPIE Conference proceedings, vol 4145 (2000) p129.
18. F.S. Gard, M. May, D. James, J.D. Riley, R. Leckey, **B.F. Usher**, *RHEED investigation of MBE growth of ZnSe epilayer on GaAs(111)B*, 11<sup>th</sup> International Semiconducting and Insulating Materials Conference (SIMC-XI). Eds C. Jagadish, N.J. Welham, pp 322-5, IEEE, Piscataway NJ. (2001).
19. R. Absin, M. Madebo, T. Warminski and **B.F. Usher**, *Interfacial Coherence Criteria for Thick InGaAs Single Heterostructures Grown on GaAs Substrates*, 11<sup>th</sup> International Semiconducting and Insulating Materials Conference (SIMC-XI). Eds C. Jagadish, N.J. Welham, pp 322-5, IEEE, Piscataway NJ. (2001).
20. F. Gard, J. Riley, R. Leckey, K. Prince and **B.F. Usher**, *Elemental Diffusion at the GaAs/ZnSe Interface*, IEEE Conference on Optoelectronic and Microelectronic Materials and Devices Proceedings, La Trobe University Melbourne, Australia, pp 547, IEEE, Piscataway NJ (2002).
21. D. Zhou and **B.F. Usher**, *X-ray Diffraction Simulation of Strained InGaAs/AlGaAs Multiple Quantum Wells Grown by Molecular Beam Epitaxy*, Conference on Optoelectronic and Microelectronic Materials and Devices Proceedings, La Trobe University Melbourne, Australia, pp 210, IEEE, Piscataway NJ (2002).
22. T. Dieing and **B.F. Usher**, *Theory and Measurement of Wafer Curvature in MBE Grown Heterostructures*, IEEE Conference on Optoelectronic and Microelectronic Materials and Devices Proceedings, La Trobe University Melbourne, Australia, pp 214, IEEE, Piscataway NJ (2002).
23. T. Wosinski, T. Figielski, A. Makosa, W. Dobrowolski, O. Pelya, **B.F. Usher** and B. Pecz, *Vertical Transport through GaAs-Based Heterostructures with Misfit Dislocations*, IEEE Conference on Optoelectronic and Microelectronic Materials and Devices Proceedings, La Trobe University Melbourne, Australia, pp 451, IEEE, Piscataway NJ (2002).
24. M. Madebo, **B.F. Usher**, *Dislocation Configurations in Strained Single-Heterostructure Layers*, IEEE Conference on Optoelectronic and Microelectronic Materials and Devices Proceedings, La Trobe University Melbourne, Australia, pp 471, IEEE, Piscataway NJ (2002).
25. M. Madebo, **B.F. Usher** and J.D. Riley, *A Force Balance Approach to Determining Dislocation Configurations*, IEEE Conference on Optoelectronic and Microelectronic Materials and Devices Proceedings, The University of NSW Sydney, Australia, pp 209, IEEE, Piscataway NJ (2003).

**Earlier Publications of Brian Usher (excluding unpublished conference proceedings):**

1. "Correlation of Observed Non-random Nucleation with Adatom Diffusion and Capture", B. F. Usher and J. L. Robins. *Journal of Crystal Growth* 24/25 (1974) 285.
2. "Evidence of the Effect of Nucleus Spatial Distributions on Thin Film Growth Kinetics", J. L. Robins, A. J. Donohoe and B. F. Usher. *Proc. 6th International Vacuum Congress. Kyoto, Japan* (1974).
3. "Adatom Loss Processes in Thin Film Nucleation and Growth", B. F. Usher and J. L. Robins. *Thin Solid Films* 32 (1976) 195.
4. "Controlled Gold Evaporation Under Ultra-High Vacuum Conditions", B. F. Usher. Presented at the Third National Congress, Australian Institute of Physics, Perth (1979).
5. "The Mobility of Gold Clusters on Sodium Chloride at Temperatures Between 123K and Ambient", B. F. Usher and J. L. Robins. *Thin Solid Films* 90 (1982) 15.
6. "The Contribution of Kinetic Nucleation Theories to Studies of Volmer-Weber Thin Film Growth", B. F. Usher, *Applications of Surface Science* 22/23 (1985) 506.

7. "Problems and Progress in Understanding Volmer-Weber Thin Film Growth", B. F. Usher, Presented at the Annual Conference of the South African Institute of Physics, Potchefstroom, South Africa, (1985).
8. "The Initial Nucleation and Growth of Gold on Sodium Chloride for Substrate Temperatures between 123 and 448K" B. F. Usher and J. L. Robins, *Thin solid Films*, 155 (1987) 267.
9. "The Role of Preferred Surface Sites in the Nucleation And Growth of Gold on Sodium Chloride I: The Influence of Low Energy Electrons" B. F. Usher and J. L. Robins, *Thin Solid Films*, 149 (1987) 351.
10. "The Role of Preferred Surface Sites in the Nucleation and Growth of Gold on Sodium Chloride II: Reanalysis of Two Comprehensive Studies" B. F. Usher and J. L. Robins, *Thin Solid Films*, 149 (1987) 363.
11. "Photoluminescence in Strained InGaAs/GaAs Heterostructures" M. Gal, P. C. Taylor, B. F. Usher and P. J. Orders, *J. Appl. Phys.* 62 (1987) 3898.
12. "Determination of Critical Layer Thickness in InGaAs/GaAs Heterostructures by x-ray Diffraction" P. J. Orders and B. F. Usher, *Appl. Phys. Lett.* 50 (1987) 980.
13. "Determination of Critical Thickness in InGaAs Heterostructures by X-ray Diffraction and Photoluminescence Measurements", P. J. Orders, B. F. Usher, M. Gal, P. C. Taylor, *Proc. SPIE Int. Soc. Opt. Eng.* 792 (1987) 309.
14. "Concentration-Dependent Band Offset in InGaAs/GaAs Strained Quantum Wells" M. J. Joyce, M. J. Johnson, M. Gal and B. F. Usher, *Phys. Rev. B* 38 (1988) 10978.
15. "Observation of Compressive and Tensile Strains in InGaAs/GaAs by Photoluminescence Spectroscopy", M. Gal, P. J. Orders, B. F. Usher, M. J. Joyce and J. Tann, *Appl. Phys. Lett.* 53 (1988) 113.
16. "Misfit Dislocations in InGaAs/GaAs heterostructures near the critical thickness", D. J. H. Cockayne, P. J. Orders, A. Sikorski, B. F. Usher and J. Zou, *Evaluation of Advanced Semiconductor Materials by Electron Microscopy*, ed. D. Cherns, (Plenum) (1989) 395.
17. "Passivation of Interface Defects in Lattice-mismatched InGaAs/GaAs Heterostructures with Hydrogen", M. Gal, A. Tavendale, M. J. Johnson and B. F. Usher, *J. Appl. Phys.* 66 (1989) 968.
18. "The Band Structure of InAs-GaAs Superlattices", Y. Q. Chi, J. D. Riley, R. C. G. Leckey, B. F. Usher, J. Fraxedas and L. Ley, *Annual Report 1989, BESSY, Berlin* 33.
19. "Relaxation and Recovery of Highly Strained InGaAs/GaAs Quantum Wells" G. L. Price and B. F. Usher, *Appl. Phys. Lett.* 55 (1989) 1984.
20. "Unusually Strong Excitonic Absorption in MBE-grown, Chemically Lifted GaAs Thin Films", J. M. Dell, M. J. Joyce, B. F. Usher, G. W. Yoffe and P. C. Kemeny, *Phys. Rev. B*, 42 (1990) 9496.
21. "Effect of Strain on the Band Structure of InGaAs", A. Stampfl, G. Kemister, R. C. G. Leckey, J. D. Riley, P. J. Orders, B. F. Usher, F. U. Hillebrecht and L. Ley, *Physica Scripta*, 41 (1990) 617.
22. "Characterisation of II-VI Semiconductor Compounds Grown by Metallo-organic Chemical Vapour Deposition", G.I. Christiansz, S. Georgiou, M.S Kwietniak, G.N. Pain, B.F. Usher, T. Warminski, S.R. Glanvill, C.J. Rossouw, A.W. Stevenson, S.W. Wilkins and L. Wielunski, *X-ray Spectrometry*, 19 (1990) 79.
23. "Application of Epitaxial Liftoff to Optoelectronic Material Studies", G. L. Price and B. F. Usher, Presented at the International Conference on Physical Concepts for Novel Optoelectronic Device Applications at Aachen, GER, October (1990).
24. "Nucleation Mechanism of Misfit Dislocations in Multi-Quantum Well Structures", J. Zou, D. J. H. Cockayne, A. Sikorski and B. F. Usher, *XIIth International Congress for Electron Microscopy*, Seattle, USA (1990).
25. "Exciton Localisation in InGaAs/GaAs Quantum Wells Observed by Temperature Modulated Photoluminescence", M. Gal, Z. Y. Xu, F. Green, B. F. Usher, *Phys. Rev B. Condens. Matter* 43 (1991) 1546.
26. "Photoemission Study of the Electronic Structure of a 2x2 (GaAs)/(AlAs) Superlattice", Y. Q. Cai, J. D. Riley, R. C. G. Leckey, B. F. Usher, J. Fraxedas, L. Ley, *Phys. Rev. B. Condensed Matter* 44 (1991) 3787.

27. "Critical Thickness Determination of InGaAs/GaAs Strained-layer System by transmission Electron Microscopy", J. Zou, B. F. Usher, D. J. H. Cockayne and R. Glaisher, *J. of Electronic Materials*, 20 (1991) 855.
28. "Two-dimensional Electronic Structure  $E_i(k_{\parallel}, k_{\perp})$  of GaAs(001) Studied by Angle-resolved Photoemission", Y. Q. Cai, A. P. J. Stampfl, J. D. Riley, R. C. G. Leckey, B. F. Usher, L. Ley, *Phys. Rev. B, condens. Matter* 46 (1992) 6891.
29. "Ex-situ and in-situ X-ray topography studies of III-V strained-layer relaxation processes", C. R. Whitehouse, S. J. Barnett, A. G. Cullis, A. M. Keir, A. D. Johnston, M. T. Emeny, G. F. Clarke, B. K. Tanner, S. Cottrell, B. F. Usher, B. Lunn, J. C. H. Hogg and W. Hagston, *Proc MRS Spring Meeting, San Francisco U.S.A, April (1992)*.
30. "Effect of Strain on the Band Structure of InGaAs", A. Stampfl, X. D. Zhang, G. Kemister, R. C. G. Leckey, J. D. Riley, B. F. Usher, P. J. Orders, R. Denecke, J. Faul and L. Ley, *Phys. Rev. B* 45 (1992) 4181.
31. "In-Situ Synchrotron X-ray Studies of Epitaxial Strained-layer Growth Processes", C. R. Whitehouse, S. J. Barnett, B. F. Usher, A. G. Cullis, A. M. Keir, A. D. Johnson, G. F. Clark, B. K. Tanner, W. Spirkl, B. Lunn, W. E. Hagston, & J. C. Hogg, *Inst. Phys. Conf. Ser. No 134: Section 9* 563-567 (1993).
32. "X-ray topography of Lattice Relaxation in Strained Layer Semiconductors-Post Growth Studies and a New Facility for in-situ topography During MBE Growth", S. J. Barnett, C. R. Whitehouse, A. M. Keir, G. F. Clarke, B. F. Usher, B. K. Tanner, M. T. Emeny and A. D. Johnston, *J. Phys D:Appl. Phys* 26 (1993) A45.
33. "X-ray Diffraction Determination of a Semiconductor Epilayer Unit Cell Oriented and Distorted Arbitrarily", B. F. Usher, G. W. Smith, S. J. Barnett, A. M. Keir and A. D. Pitt, *J. Phys D:Appl. Phys* 26 (1993) A181.
34. "In-situ Synchrotron X-ray Studies of Epitaxial Semiconductor Strained-layer Growth Processes", C. R. Whitehouse, S. J. Barnett, B. F. Usher, A. G. Cullis, A. M. Keir, A. D. Johnson, G. F. Clarke, B. K. Tanner, W. Spirkl, B. Lunn, W. E. Hagston and J. C. H. Hogg, *Proc. Microscopy of Semiconducting Materials Conf., Oxford April (1993)*.
35. "Misfit Dislocations and Critical Thickness in InGaAs/GaAs Heterostructure Systems", J. Zou, D. J. H. Cockayne and B. F. Usher, *J. Appl. Phys.* 73 (1993) 619.
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40. The Use of a Narrow Gap Pre-Well for the Optical Study of Charge Build-up and the Fermi Energy Edge Singularity in a Double Barrier Resonant Tunnelling Structure, T.A. Fisher, P.D. Buckle, P.E. Simmonds, R.J. Teissier, M.S. Skolnick, C.R.H. White, D.M. Whittaker, L. Eaves, B.F. Usher, P.C. Keeney, R. Grey, G. Hill and M.A. Pate, *Phys. Rev B, Condens. Matter* Vol. 50, No 24 (1994) 18469.
41. "A scanning Tunneling Microscopy Study of the  $\alpha$  and  $\beta$  phases of the GaAs(001)-(2x4) reconstruction", L. D. Broekman, R. C. Leckey, J. D. Riley, A. Stampfl and B. F. Usher, *Phys. Rev. B* 51, (1995) 17795.
42. "Surface Atomic Structure of the GaAs(001) (2x4) Reconstruction", L. D. Broekman, R. Leckey, J. Riley, B. F. Usher and B. Sexton, *Surface Sci.* 331-333 (1995) 1115.

43. "MBE and MOCVD Growth of AlGaAs/AlAs/GaAs Double Barrier Multiple Quantum Well Infrared Detector", T. Osotchan, V. W. L. Chin, T. L. Tansley, B. F. Usher, A. Clarke and R. Egan, Presented at The First International Conference on Low Dimensional Structures & Devices, Singapore, 8-10th May (1995).
44. "In-situ X-ray Imaging of III-V Strained-layer Relaxation Processes", C.R. Whitehouse, G. Lacey, A.G. Cullis, S.J. Barnett, A.M. Keir, B.F. Usher, A.D. Johnson, J.H. Jefferson, G.W. Smith, T. Martin, G.F. Clark, B.K. Tanner, W. Spirkel, B. Lunn, J.C.H. Hogg, P. Ashu & W.E. Hagston", *J. Crystal Growth* 150 (1995) 85.
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47. "In-situ X-ray imaging of III-V strained-layer relaxation processes", C. R. Whitehouse, A. G. Cullis, S. J. Barnett, B. F. Usher, G. F. Clark, A. M. Keir, B. K. Tanner, B. Lunn, J. C. H. Hogg, A. D. Johnson, G. Lacey, W. Spirkel, W. E. Hagston, J. H. Jefferson, P. Ashu, G. W. Smith, T. Martin, *J. Cryst. Growth*, Vol. 150, No 1-4, Pt 1, (1995) 85.
48. "Temperature Dependent Generation of Misfit Dislocations in In<sub>0.2</sub>Ga<sub>0.8</sub>As/GaAs single heterostructures", J. Zou, D. J. H. Cockayne, B. F. Usher, *Appl. Phys. Lett.* Vol. 68, No 5 (1996) 673.
49. "Cathodoluminescence Study of Oval Defects in MBE Grown InGaAs", J. J. Russell-Harriott, J. Zou, D. J. H. Cockayne, A. R. Moon and B. F. Usher, 1996 Conference on Optoelectronic and Microelectronic Materials and Devices Proceedings, A.N.U. Canberra, Australia, pp 138, IEEE, Piscataway NJ (1996).
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51. "Improved Student Performance in 1<sup>st</sup> Year Electronics at La Trobe University", B. F. Usher, Proceedings of the 9<sup>th</sup> Annual Convention and Conference of the Australasian Association for Engineering Education, Ballarat, Australia, pp 237 (1997).