

Curriculum Vitae

Professor Gus Hancock BA(Dublin) MA(Dublin, Oxon) PhD(Cantab)

- Date and Place of Birth 17th November 1944, Chell, Staffordshire, England.
- Nationality British.
- Marital Status Married, two children.
- Present Address Physical and Theoretical Chemistry Laboratory, Oxford University, South Parks Road, Oxford OX1 3QZ.
- Present Position Emeritus Professor of Chemistry,
Physical and Theoretical Chemistry Laboratory, Oxford University.
- Schools Harvey Grammar School, Folkestone 1955-56
Dorking County Grammar School 1956-59
Bangor Grammar School, Northern Ireland 1959-63
5 Northern Ireland A-levels, all Distinction.
- University Education Trinity College, Dublin, Ireland, 1963-67
Louis Claude Purser Entrance Scholarship 1963.
Reading Natural Sciences, specialising in Physical Chemistry in final year.
Elected Foundation Scholar 1965.
First Class BA and Gold Medal 1967.
Research Studentship, Peterhouse, Cambridge, 1967.
Shell Petroleum Post-Graduate Research Scholarship, 1967.
October 1967-February 1971:
Postgraduate Research in the Department of Physical Chemistry, Cambridge University, under the supervision of Dr I.W.M. Smith; "A Study of Some Elementary Processes Using Infrared Chemiluminescence".
Ph.D. awarded, February 1971.
- Career History March 1971 - March 1973
Post-Doctoral Research Assistant, Department of Chemistry, University of California, San Diego.
May 1973 - September 1976
Wissenschaftlicher Angestellte (Permanent Research Officer), Fakultät f. Physik, Universität Bielefeld, Germany.
- September 1976 - September 1996
University Lecturer in Physical Chemistry, Oxford University.
Fellow of Trinity College, Oxford.
- September 1996 – September 2012
Professor of Chemistry, Oxford University.

Appointments and Awards

*Corday Morgan Medal and Prize, Royal Society of Chemistry, 1982.
Fulbright Fellow, Stanford University, 1982-83.
Visiting Professor of Chemistry, Stanford University, 1989.
Gas Kinetics Group, Royal Society of Chemistry, Secretary 1986-88, Chairman 1988-90.
SERC Physical Chemistry Panel, 1990-93.
Editor, "Research in Chemical Kinetics", and "Comprehensive Chemical Kinetics", 1992-99.
EPSRC College Member, 1995-2006.
Plasma and Industry Group Committee, 1995-2004.
*Royal Society of Chemistry, Reaction Kinetics Award, 1995.
NERC, Marine and Atmospheric Sciences Panel Member, 1996-97.
Japan Society for the Promotion of Science Fellowship, 1997.
NERC, Atmospheric Sciences Panel Member, 1997-99.
NERC UTLS Steering Group Member, 1999-2005.
NERC College Member 2002 - 2008
*14th Italgas Prize for Science and Technology for the Environment, 2000.
*Polanyi Medal of the Gas Kinetics Group of the Royal Society of Chemistry, 2002.
*Chemical Dynamics Award from the Royal Society of Chemistry, 2010
(* major prizes marked thus)

Publications

Approximately 200 refereed publications in the scientific literature. Three patents.

Teaching

As Tutor in Physical Chemistry at Oxford University, I have taught the whole range of the subject over the three year course leading to the Honours Degree in Chemistry. I have lectured in twelve different undergraduate courses in Oxford, ranging from quantum mechanics to polymer chemistry.

Administration

I have just completed my third spell as Head of Department in the PTCL: I have served on virtually all Departmental Committees and many University Committees (including the Faculty Board and the recently formed Mathematical and Physical Sciences Divisional Board) during the past twenty years. In College I have held the posts of Tutor for Admissions, Dean, Vice President (three times), Pro Proctor and Tutor for Graduates.

Research Group

During the past 36 years as Lecturer and more recently as Professor in the Physical and Theoretical Chemistry Laboratory of Oxford University I have supervised 45 Graduate Students and 90 Part II Students (fourth year undergraduates doing a full year of research). 30 Post-Docs and senior visitors have worked in my laboratory.

Research Grants

I presently hold major research grants from the EPSRC, BRC, and Industry, including being a joint holder of one of the first EPSRC “Programme” grants. I am a joint grant holder with the University of Buenos Aires of a research grant from the Argentinean Ministry of Science.

Thirteen final grant reports in the last six years have resulted in published gradings;

EPSRC, 4 at α 5, 2 at α 4; more recently two “tending to outstanding” and one “outstanding”

NERC, 2 "Excellent", 1 "Good"

Research Presentations

Since 1997 I have given 50 invited research talks and seminars at conferences and Universities in the UK, America, Argentina, France, Germany, Holland, India, Israel, Italy, Japan and Spain.

Research Refereeing

Since 1997 I have refereed papers for the following Journals:

Journal of Chemical Physics; Journal of Physical Chemistry; Chemical Physics Letters; JCS Faraday Transactions (and its successor, PCCP), JCS Faraday Discussions, Plasmas and Polymers, Vibrational Spectroscopy, Journal of Physics D, Chemical Communications, Science, J. Vac. Sci. Technol., J. Photochem. Photobiol.

During the same time I have evaluated research proposals from the following agencies:

EPSRC (Structure, Bonding and Mechanism panel, Technical Plasmas Initiative, Atomic and Molecular Physics), NERC (Atmospheric Sciences, COSMAS, UTLS), National Science Foundation, Department of Energy, FOM (Holland), Australian Research Council, Royal Society of Chemistry, Netherlands Foundation for Chemical Research, National University of Singapore, Research Institute for Innovative Technology of the Earth (Japan), Leverhulme Trust, Marsden Fund, New Zealand.

Commercial

In 2004 I was a founder of the University spinout company Oxford Medical Diagnostics, OMD. The company was sold to Avacta plc in 2007, and bought by a consortium of business angels in 2010. OMD has developed a sensor for acetone in breath, which is being clinically tested as a diagnostic for diabetic ketoacidosis, and as a replacement for finger prick testing in diabetics. I am a director of the company, which operates from the Begbroke Science Park in Oxford:

<http://www.omdiagnostics.com>

Publications

1. "Infrared Chemiluminescence from the Reaction $O + CS \rightarrow CO + S$ ", G. Hancock and I.W.M. Smith, Chem. Phys. Letters 3, 573 (1969).
2. "Vibrational Relaxation Rates for CO ($v \leq 13$) with CO ($v = 0$), OCS, O₂ and He". G. Hancock and I.W.M. Smith, Chem. Phys. Letters 8, 41 (1971).
- 3.* "Quenching of Infrared Chemiluminescence. 1: The Rates of De-excitation of CO ($4 < v < 13$) by He, CO, NO, O₂, OCS, N₂O and CO₂". G. Hancock and I.W.M. Smith, Appl. Optics 10, 1827 (1971).
4. "A Study of Some Elementary Processes using Infrared Chemiluminescence". G. Hancock, Ph.D. thesis, University of Cambridge, February (1971).
5. "Vibrational Excitation of CO in the Reaction: $O + CS \rightarrow CO + S$ ". G. Hancock, C. Morley and I.W.M. Smith, Chem. Phys. Letters 12, 193 (1971).
6. "Infrared Chemiluminescence from Vibrationally Excited CO. Part 1. - The Reaction of Atomic Oxygen with Carbon Disulphide". G. Hancock and I.W.M. Smith, Trans. Faraday Soc. 67, 2586 (1971).
7. "Infrared Chemiluminescence from Vibrationally Excited CO. Part 2. - Product Distribution from the Reaction $O + CS \rightarrow CO + S$ ". G. Hancock, B.A. Ridley and I.W.M. Smith, JCS Faraday Trans. II 68, 2117 (1972).
8. "Photofragment Spectroscopy: Lasers in, Lasers out". G. Hancock and K.R. Wilson, Fundamental and Applied Laser Physics - Proceedings of the Esfahan Symposium, Esfahan, Iran, 1971, eds. M. Field, N. Kurnit and A. Javan (John Wiley and Sons, New York, 1972), p.257.
9. "Photofragment Spectrum of Acetone". G. Hancock and K.R. Wilson, Proceedings of the Fourth International Symposium on Molecular Beams, Cannes, France (Barthelemy, Paris 1973), 510.
10. "Laser Fluorescence of NH₂ and Rate Constant Measurement of NH₂ + NO". G. Hancock, W. Lange, M. Lenzi and K.H. Welge, Chem. Phys. Letters 33, 168 (1975).
11. "Laser Induced Fluorescence from NH₂(²A₁). State Selected Radiative Lifetimes and Collisional De-excitation Rates". J.B. Halpern, G. Hancock, M. Lenzi and K.H. Welge, J. Chem. Phys. 63, 4808 (1975).
- 12.* "Sulphur Isotope Enrichment in SF₆ by High Intensity CO₂ Laser Radiation". G. Hancock, J.D. Campbell and K.H. Welge, Opt. Commun. 16, 177 (1976).
13. "Dissociation of NH₃ to Electronic Ground State Fragments by High Intensity CO₂ Laser Radiation". J.D. Campbell, G. Hancock, J.B. Halpern and K.H. Welge, Opt. Commun. 17, 38 (1976).
14. "Energy Dependence of SF₆ Dissociation by Pulsed CO₂ Laser Radiation". J.D. Campbell, G. Hancock and K.H. Welge, Chem. Phys. Letters 43, 581 (1976).
15. "Infrared Multiple-photon Dissociation into Ground Electronic State Fragments". J.D. Campbell, G. Hancock, J.B. Halpern and K.H. Welge, Opt. Commun. 18, 34 (1976).
16. "Off Resonant Dissociation of NH₃ to Ground State Fragments by Pulsed CO₂ Laser Radiation". J.D. Campbell, G. Hancock, J.B. Halpern and K.H. Welge, Chem. Phys. Letters 44, 404 (1976).
17. "Infrared Multiple Photon Dissociation of CH₃NH₂ and NH₃". G. Hancock, R.J. Hennessy and T. Villis, J. Photochem. 9, 197 (1978).
18. "Wavelength and Fluence Dependences of the IR Multiple Photon Dissociation of CH₃NH₂ to form Ground State NH₂ Radicals". G. Hancock, R.J. Hennessy and T. Villis, J. Photochem. 10, 305 (1979).
19. "Laser Excited Fluorescence Studies of IR Multiple Photon Dissociation Fragments: NH₂(²B₁) from CH₃NH₂ and NH₃". G. Hancock, R.J. Hennessy and T. Villis, Laser

- Induced Processes in Molecules, Springer Series in Chemical Physics Vol. 6 (Eds. K.L. Kompa and S.D. Smith) p.190.
20. "Quenching of $C_2(a^3\Pi_u)$ Produced in an Intense Infrared Laser Field". S.V. Filseth, G. Hancock, J. Fournier and K. Meier, Chem. Phys. Letters, 61, 288 (1979).
 21. "Direct Measurements of (\tilde{a}^1A_1) CH_2 Removal Rates". M.N.R. Ashfold, G. Hancock, G.W. Ketley and J.P. Minshull-Beech, J. Photochem. 12, 75 (1980).
 - 22.* "Infrared Multiple Photon Excitation and Dissociation of Simple Molecules". M.N.R. Ashfold, G. Hancock and G.W. Ketley, J.C.S. Faraday Discussion, 67, 204 (1979). G. Hancock, discussion remarks, ibid. 236, 247, 345.
 23. "Laser Induced Fluorescence of the CHF Radical". M.N.R. Ashfold, F. Castano, G. Hancock and G.W. Ketley, Chem. Phys. Letters, 73, 421 (1980).
 24. "Laser Intensity Effects in the Rotational Distribution of CN Radicals Formed by IR Multiple Photon Dissociation of C_2H_3CN ". M.N.R. Ashfold, G. Hancock and M.L. Hardaker, J. Photochem. 14, 85 (1980).
 25. "Infrared Multiple Photon Excitation and Dissociation: Reaction Kinetics and Radical Formation". M.N.R. Ashfold and G. Hancock, R.S.C. Specialist Periodical Reports "Gas Kinetics and Energy Transfer" Vol. 4, 73 (1980).
 26. "Infrared Multiple Photon Dissociation as a Source of Reactive Free Radicals: Methylene Revisited". M.N.R. Ashfold, M.A. Fullstone, G. Hancock and G.W. Ketley, Il Nuovo Cimento, 63B, 28 (1981).
 27. "Internal Energy Distributions in the Fragments of IR Multiple Photon Dissociation". M.N.R. Ashfold, G. Hancock and M.L. Hardaker, Il Nuovo Cimento, 63B, 15 (1981).
 - 28.* "Singlet Methylene Kinetics: Direct Measurements of Removal Rates of \tilde{a}^1A_1 and 1B_1 CH_2 and CD_2 ". M.N.R. Ashfold, M.A. Fullstone, G. Hancock and G.W. Ketley, Chem. Phys. 55, 245 (1981).
 29. "Laser Intensity Effects in the IR Multiple-photon Absorption of OsO_4 ". M.N.R. Ashfold, C.G. Atkins and G. Hancock, Chem. Phys. Letters 80, 1 (1981).
 30. "Laser Induced Fluorescence from $CO(A^1\Pi)$ ". G. Hancock and H. Zacharias, Chem. Phys. Letters 82, 402 (1981).
 31. "Gas Phase Photoprocesses". G. Hancock, R.S.C. Specialist Periodicals Report "Photochemistry" 11, 190 (1981).
 - 32.* "Quenching of Infrared Chemiluminescence". G. Hancock and I.W.M. Smith, Current Contents Citation Classic 21, 22 (1981).
 33. "Gas Phase Photoprocesses". G. Hancock, RSC Specialist Periodicals Report "Photochemistry", 12, 72 (1982).
 34. "Laser Induced Fluorescence Spectroscopy of the $CD_2(\tilde{a}^1A_1)$ Radical: Renner-Teller Effect in CH_2 and CD_2 ". M.N.R. Ashfold, M.A. Fullstone, G. Hancock and G. Duxbury, Mol. Phys. 45, 887 (1982).
 35. "Laser Intensity Effects in Infrared Multiple Photon Absorption". C.G. Atkins and G. Hancock, Appl. Phys. B. 28, 120 (1982).
 36. "Laser Excited Fluorescence from $CO(A^1\Pi)$ ". C.G. Atkins, G. Hancock and H. Zacharias, Appl. Phys. B. 29, 160 (1982).
 37. "CHF($^1A'$) Radical Kinetics. Part I. Reaction with NO and O_2 ". G. Hancock and G.W. Ketley. J. Chem. Soc. Faraday Trans. 2. 78, 1283 (1982).
 38. "Effect of Reagent Rotational Energy on Product State Distribution in the Reaction $Ca + HF \rightarrow CaF + H$ ". R. Altkorn, F.E. Bartoszek, J. DeHaven, G. Hancock, D.S. Perry and R.N. Zare, Chem. Phys. Lett. 98, 212 (1983).
 39. "Gas Phase Photoprocesses". G. Hancock, R.S.C. Specialist Periodical Reports "Photochemistry", 13, 117 (1983).
 - 40.* "Quantitative and Separate Fluence and Intensity Dependences of Infrared Multiple-

- photon Absorption in SF₆". G. Hancock and A.J. MacRobert, Chem. Phys. Lett. 101, 312 (1983).
41. "Laser Excited Fluorescence from CO(A¹Π)". G. Hancock and H. Zacharias, Quantum Electronics and Electro-Optics ed. P.L. Knight (John Wiley & Sons 1983) p.145.
 42. "Laser Intensity Effects in the IR Multiple-photon Absorption of OsO₄", Quantum Electronics and Electro-optics ed. P.L. Knight (John Wiley & Sons 1983) p.183.
 43. "Energy Distributions in the CN(X ²Σ⁺) Fragment from the Infrared Multiple-photon Dissociation of CF₃CN". J.R. Beresford, G. Hancock and A.J. MacRobert, Faraday Discuss. Chem. Soc. 75, 211 (1983).
 44. "Kinetic Studies of CHF and NCO Radicals Using Laser-Induced Fluorescence". G. Hancock, G.W. Ketley, A.J. MacRobert and K.J. McKendrick, Bull. Soc. Chim. Belges 92, 638 (1983).
 45. "Lasers in Photochemistry", G. Hancock, J. Photochem. 25, 21 (1984).
 46. "CHF(¹A') Radical Kinetics. 2. Reaction with O and N Atoms". G. Hancock, G.W. Ketley and A.J. MacRobert, J. Phys. Chem. 88, 2104 (1984).
 47. "Infrared Photochemistry with Shaped Laser Pulses". M.N.R. Ashfold, C.G. Atkins, G. Hancock and A.J. MacRobert. Israel J. Chem. 24, 197 (1984).
 48. "Alignment Effects in the Multiple Photon Ionization of Nitric Oxide". J.P. Booth, S.L. Bragg and G. Hancock, Chem. Phys. Lett. 113, 509 (1985).
 49. "Reactions of CHF(¹A') and NCO(²Π) Radicals". J.L. Cookson, G. Hancock and K.G. McKendrick, Ber. Bunsenges. Phys. Chem. 89, 335 (1985).
 50. "The Role of Initial Conditions in Elementary Gas Phase Processes Involving Intermediate 'Complexes'". S. Buelow, M. Noble, G. Radhakrishnan, H. Reisler, C. Wittig and G. Hancock, J. Phys. Chem. 90, 1015 (1986).
 51. "Rate-constant Measurement of the O(³P) + CF₂(¹A₁) Reaction". G. Hancock, P.D. Harrison and A.J. MacRobert, J. Chem. Soc. Faraday Trans. 2, 82, 647 (1986).
 52. "Vibrational Relaxation of NCO(X) by Rare Gases and Rate Constant Measurement of the NCO + NO Reaction". G. Hancock and K.G. McKendrick, Chem. Phys. Lett. 127, 125 (1986).
 53. "Laser Induced Fluorescence Detection of CF and CF₂ Radicals in a CF₄/O₂ Plasma". J.P. Booth, G. Hancock and N.D. Perry, Appl. Phys. Lett. 50, 318 (1987).
 54. "A Spectroscopic Study of the Conditions required for Plasma Etching of Aluminium in BCl₃ and Cl₂ Plasmas". J.A. Cairns, R. Smailes, D.C.W. Blaikley, P. Banks, G. Hancock, I. Hussla and W. Katschner, Proc. Mat. Res. Soc. Symp 98, 328 (1987).
 55. "Theories of Elementary Reactions: Application of Theory to Bimolecular Reactions". G. Hancock in Modern Gas Kinetics eds. M.J. Pilling and I.W.M. Smith, Blackwells, 1987.
 56. "Measurements of Thermal Rate Data". G. Hancock in Modern Gas Kinetics eds. M.J. Pilling and I.W.M. Smith, Blackwells, 1987.
 57. "Laser Induced Fluorescence and Optical Emission Studies of Fluorocarbon Plasmas". J.P. Booth, G. Hancock, N.D. Perry, D.C.W. Blaikley, J.A. Cairns and R. Smailes, Proc. Mat. Res. Soc. Symp. 98, 135 (1987).
 58. "Laser-induced Fluorescence and Vibrational Relaxation of the Phenyl Nitrene Radical". G. Hancock and K.G. McKendrick, J. Chem. Soc. Faraday Trans. 2, 83, 2011 (1987).
 59. "Laser Studies of Gas-phase Kinetics and Photochemistry". G. Hancock, J. Chem. Soc. Faraday Trans. 2, 84, 429 (1988).
 60. "Intramolecular Rearrangement in the Infra-red Multiple Photon Dissociation of Dichlorodifluoroethylene". G. Hancock and K.G. McKendrick, J. Phys. Chem. 92, 1838 (1988).
 61. "The Radiative Lifetime of CF(A²Σ⁺)". J.P. Booth and G. Hancock, Chem. Phys.

- Letters, 150, 457 (1988).
62. "Two Photon Dissociation of H₂O at 266 nm". C.G. Atkins, R.G. Briggs, J.B. Halpern and G. Hancock, Chem. Phys. Letters 152, 81 (1988).
 63. "The 355 nm Photolysis of Methyl Nitrite". C.G. Atkins and G. Hancock, Laser Chem. 9, 195 (1988).
 64. "Plasma Diagnostics by Laser Induced Fluorescence". J.P. Booth, G. Hancock, N.D. Perry and M. Toogood, Proc. Mat. Res. Symp. 117, (1988) 47.
 65. "Photodissociation of D₂O in the Second Continuum by Two Photon Absorption at 266 nm". R.G. Briggs, J.B. Halpern, G. Hancock, N. Shafizadeh, J. Rostas, J.L. Lemaire and F. Rostas, Chem. Phys. Letters, 156, (1989) 363.
 66. "Time Resolved Pulsed FTIR Emission Studies of Atom Radical Reactions: Product Chemiluminescence from the O(³P) + CF₂(¹A₁) Reaction". G. Hancock and D.E. Heard, Chem. Phys. Letters. 158, (1989) 167.
 - 67.* "Spatially and Temporally Resolved Laser Induced Fluorescence Measurements of CF₂ and CF Radicals in a CF₄ RF Plasma". J.P. Booth, G. Hancock, N.D. Perry and M.J. Toogood, J. Appl. Phys. 66, (1989) 5251.
 68. "Two-photon Dissociation of H₂O and D₂O at 266 nm". C.G. Atkins, R.G. Briggs, J.B. Halpern and G. Hancock, J. Chem. Soc. Faraday II, 85, (1989) 1987.
 69. "Laser Induced Fluorescence Studies of Plasma Etching Processes". J.P. Booth, G. Hancock, N.D. Perry and M.J. Toogood, in "Plasma Surface Interactions and Processing of Materials", (Kluwer Academic Publishers), Dordrecht, p.167 (1989).
 70. "Lasers in Photochemistry". G. Hancock, J. Photochem. & Photobiol. A51 (1990) 13.
 71. "Plasma Kinetic Measurements using Time-Resolved Actinometry: Comparisons with Laser Induced Fluorescence". G. Hancock, J.P. Sucksmith and M.J. Toogood, J. Phys. Chem. 94, (1990) 3269.
 72. "A Stop-Scan Interferometer used for Time Resolved FTIR Emission Spectroscopy". P. Biggs, G. Hancock, D.E. Heard and R.P. Wayne, Meas. Sci. Technol. 1, (1990) 630.
 73. "Temperature Dependences of CH₂(\tilde{a}^1A_1) Removal Rates by Ar, NO and H₂". P. Biggs, G. Hancock, M.R. Heal, D.J. McGarvey and A.D. Parr, Chem. Phys. Lett. 180, (1991) 533.
 74. "Laser Induced Fluorescence Measurements in Plasma Etching Processes". J.P. Booth, G. Hancock and M.J. Toogood, Proc. ISPC 9, (1990) 458.
 75. "Time-Resolved Fourier-Transform Infrared Emission in the O(³P) + CHF(¹A) Reaction". R.A. Brownsword, G. Hancock and D.E. Heard, J. Chem. Soc. Faraday Trans. 87, (1991) 2283.
 76. "Infrared Chemiluminescence from the O + CF₂ reaction: Part 1. - Kinetics of the Emission near 2000 cm⁻¹". G. Hancock and D.E. Heard, J. Chem. Soc. Faraday Trans. 87, (1991) 1039.
 77. "Infrared Chemiluminescence from the O + CF₂ reaction: Part 2. - Analysis of the Emission near 2000 cm⁻¹". G. Hancock and D.E. Heard, J. Chem. Soc. Faraday Trans. 87, (1991) 1045.
 78. "Laser Studies of the Chemistry of Free Radicals in Plasmas". G. Hancock, M.J. Toogood and J.P. Sucksmith, Proc. Int. Seminar on React. Plasmas, Nagoya, ed. T. Goto, p.459, (1991).
 79. "A Stop-Scan Interferometer used for Time-Resolved FTIR Emission Spectroscopy". P. Biggs, G. Hancock, D.E. Heard and R.P. Wayne, Eng. Optics 3, (1990) 477.
 - 80.* "Measurements of Vector Correlations in Bimolecular Reactions by Laser Pump and Probe Techniques". F. Green, G. Hancock, A.J. Orr-Ewing, M. Brouard, S.P. Duxon, A. Enriques, R. Sayos and J.P. Simons, Chem. Phys. Letters, 182, (1991) 568.
 81. "Laser Measurements of Atoms and Free Radicals In RF Plasmas used for

- Semiconductor Etching". G. Hancock, Proc. Int. Symp. Laser-Aided Plasma Diagnostics 5, (1991), 254.
82. "A Search for the Laser Induced Fluorescence of the FCO(²A') Radical". G. Hancock and D.E. Heard, J. Photochem. Photobiol. A66 (1991) 265.
 - 83.* "Product Rotational Alignment for the Reaction O(³P) + CS(X¹Σ⁺) → CO(X¹Σ⁺) + S(³P)". F. Green, G. Hancock and A.J. Orr-Ewing, J. Chem. Soc. Faraday Disc. 91, (1991), 79.
 84. "Measurements of the Kinetics of Reactive Atoms and Radicals in Plasmas". G. Hancock, M.J. Toogood and J.P. Sucksmith, Proc. Jpn. Symp. Plasma Chem. 4, (1991), 295.
 85. "Removal Rates of CHF($\tilde{A}^1A''(0,0,0)$) by alkenes". A. Ortiz de Zarate, F. Castano, J.A. Fernandez, R. Martinez, M.N. Sanchez-Rayo and G. Hancock, Chem. Phys. Letters. 188, (1992), 265.
 86. "Laser Induced Fluorescence of Oxygen Atoms in a Plasma Reactor". G. Hancock and M.J. Toogood, Appl. Phys. Lett. 60, (1992), 35.
 87. "Preparation of CHF(¹A') by IRMPD and Reactions with Alkenes". A. Ortiz de Zarate, R. Martinez, M.N. Sanchez-Rayo, F. Castano and G. Hancock, J. Chem. Soc. Faraday Trans. 88, (1992), 535.
 88. "Rate Constant for Reaction of CH(X²Π) with Ketene". G. Hancock and M.R. Heal, J. Chem. Soc. Faraday Trans. 88, (1992), 2121.
 89. "Temperature Dependences of CH₂(\tilde{a}^1A_1) Removal Rates by Ar, NO, H₂, and CH₂CO in the Range 295-859K". G. Hancock and M.R. Heal, J. Phys. Chem. 96, (1992), 10316.
 90. "Time Resolved FTIR Emission Studies of Photochemical Reactions". G. Hancock and D.E. Heard, Adv. Photochem. 18, (1993), 1.
 91. "Rate Constants for the De-excitation of the Bending Vibrational Levels of NCO(X) by Helium, Neon, Argon, Krypton and Xenon". C.J. Astbury, G. Hancock and K.J. McKendrick, J. Chem. Soc. Faraday Trans. 89, (1993), 405.
 92. "Research in Chemical Kinetics" eds. R.G. Compton and G. Hancock, 1, (1993).
 - 93.* "The Relative Quantum Yields of O₂($a^1\Delta_g$) from the Photolysis of Ozone in the Wavelength Range 270 nm < λ < 329 nm". S.M. Ball, G. Hancock, I.J. Murphy and S.P. Rayner, Geophys. Res. Letters 20, (1993), 2063.
 94. "Radical Kinetics in Processing Plasmas: Optical Diagnostics of Gas Phase and Surface Reactions". J.P. Booth and G. Hancock, Mat. Sci. Forum 140, (1993), 219.
 95. "Time Resolved Pulsed FTIR Emission Studies of Photochemical Reactions". D.E. Heard, R.A. Brownsword, D.G. Weston and G. Hancock, Appl. Spectrosc. 47, (1993), 1438.
 96. "Vector Correlations in the Reaction O(³P) + CS(X¹Σ⁺) → CO(X¹Σ⁺) + S(³P)". M.L. Costen, G. Hancock, A.J. Orr-Ewing, and D. Summerfield, J. Chem. Phys. 100, (1994), 2754.
 97. "Production of CH(X²Π) from the Multiphoton Dissociation of CH₂CO at Wavelengths of 279.3 and 308 nm". S.M. Ball, G. Hancock and M.R. Heal, J. Chem. Soc. Faraday Trans. 90, (1994), 523.
 98. "Research in Chemical Kinetics" eds. R.G. Compton and G. Hancock, 2, (1994).
 99. "Atoms, Radicals and Ions Observed in Plasmas - their Gas Phase and Surface Chemistry". G. Hancock, L. Lanyi, J.P. Sucksmith, and B.K. Woodcock, Pure and Appl. Chem. 66, (1994), 1207.
 100. "Collisional Behaviour with Ar of the Λ Doublets of CH(X²Π) N"=15 produced in the Two-photon Dissociation of CH₂CO at 279.3 nm". S.M. Ball, G. Hancock and M.R. Heal, J. Chem. Soc Faraday Trans. 90, (1994), 1467.
 101. "Quantum Yields of Excited Singlet Oxygen from the Photolysis of Ozone". S.M. Ball,

- G. Hancock and F. Winterbottom, Proc. 6th Eur. Symp. on Physico-Chemical Behaviour of Atmospheric Pollutants. (1994), 190.
102. "The Relative Quantum Yields of $O_2(a^1\Delta_g)$ from the Photolysis of Ozone at 227 K". S.M. Ball and G. Hancock, Geophys. Res. Letters 22, (1995), 1213.
 103. "Research in Chemical Kinetics" eds. R.G. Compton and G. Hancock, 3, (1995).
 104. "Diagnostics of Active Species in Plasmas". G. Hancock, Surf. Coat. Technol. 74, (1995) 10.
 105. "Time-of flight Measurements of the Kinetic Energies of the $O_2(a^1\Delta_g)$ Fragment from the Photolysis of Ozone between 287 and 331 nm". S.M. Ball, G. Hancock, J.C. Pinot de Moira, C.M. Sadowski and F. Winterbottom, Chem. Phys. Letters 245, (1995) 1.
 106. "Time Resolved FTIR Emission as a Plasma Diagnostic". G. Hancock and J.P. Sucksmith, J. Vac. Sci. Technol. A13, (1995) 2945.
 107. "Product Channels in the Near UV Photodissociation of Ozone". S.M. Ball, G. Hancock and F. Winterbottom, J. Chem. Soc. Far. Disc. 100, 215 (1995).
 108. "Quantitative Laser Induced Spectroscopy of the CF A - X Transition: Electronic Transition Dipole Moment Function and Predissociation". J.P. Booth, G. Hancock, M.J. Toogood and K.G. McKendrick, J. Phys. Chem. 100, 47 (1996).
 109. "Doppler Spectroscopy of Ions in Radiofrequency Plasmas". B.K. Woodcock, J.R. Busby, T.G.M. Freearde and G. Hancock, Proc. Int. Symp. Laser-Aided Plasma Diagnostics 7, 381 (1995).
 110. "Infrared Emission from the Reaction of $CHF(X^1A')$ with NO". R.A. Brownsword, G. Hancock and K.W. Oum, J. Phys. Chem. 100, 4840 (1996).
 - 111.* "A Direct Measurement of the $O(^1D_2)$ Quantum Yields from the Photodissociation of Ozone between 300 and 328 nm". S.M. Ball, G. Hancock, S.E. Martin and J.C. Pinot de Moira, Chem. Phys. Letters 264, 531 (1997).
 - 112.* "Doppler Spectroscopic Measurements of Sheath Ion Velocities in Radio-Frequency Plasmas". B.K. Woodcock, J.R. Busby, T.G.M. Freearde and G. Hancock, J. Appl. Phys. 81, 5945 (1997).
 113. "Infrared Emission from the $CF_3 + NO_2$ Reaction". K.W. Oum and G. Hancock, J. Phys. Chem. 101, 2634 (1997).
 114. "Modern Aspects of Diffusion Controlled Reactions". Comprehensive Chemical Kinetics Vol. 34, eds. R.G. Compton and G. Hancock (1997).
 115. "Time-resolved FTIR Emission Study of Product Dynamics in the NO + NCO Reaction". R.A. Brownsword and G. Hancock, J. Chem. Soc. Faraday Trans. 93, 1279 (1997).
 116. "Kinetics of the N + NCO Reaction at 298 K". R.A. Brownsword, G. Hancock and D.E. Heard, J. Chem. Soc. Faraday Trans. 93, 2473 (1997).
 117. "Low Temperature Combustion and Autoignition". Comprehensive Chemical Kinetics Vol 35, eds. R.G. Compton and G. Hancock (1997).
 118. "The Effect of Reagent Translational Energy on the Dynamics of the Reaction $O(^3P) + CS(X^1\Sigma^+) \rightarrow CO(X^1\Sigma^+) + S(^3P)$ ". D. Summerfield, M.L. Costen, G.A.D. Ritchie and G. Hancock, J. Chem. Phys. 106, 1391 (1997).
 119. "The Determination of Product Branching Ratios by Time Resolved Fourier Transform Infrared Emission". G. Hancock, K.W Oum and E.L. Moore, Res. Chem. Kinetics 4, 97 (1997).
 120. "Time resolved FTIR Study of the 308 nm photolysis of NO_2 . Nascent Vibrational Populations and Quenching of $NO(v=1-3)$ ". A. Doughty, G. Hancock and E.L. Moore, Chem. Phys. Letters 274, 58 (1997).
 121. "Direct Observation of Spin-Forbidden Formation of $O(^1D)$ in the Near-UV Photolysis of Ozone". W. Denzer, G. Hancock, J.C. Pinot de Moira and P.L. Tyley, Chem. Phys.

- Letters 280, 496 (1997).
122. "Research in Chemical Kinetics" eds. R.G. Compton and G. Hancock, 4, (1993).
 123. "Laser Induced Fluorescence Diagnostics in Polymer Deposition and Processing". G. Hancock, *Plasmas and Polymers* 2, 71 (1997).
 124. "A Guide to Laser Induced Fluorescence Diagnostics in Plasmas". T.G.M. Freearge and G. Hancock, *J. Phys. IV* 7, 15 (1997).
 - 125.* "The Sequential Two Photon Dissociation of NO as a Source of Aligned N(²D), N(⁴S) and O(³P) Atoms". B.L.G. Bakker, A.T.J.B. Eppink, D.H. Parker, M.L. Costen, G. Hancock and G.A.D. Ritchie, *Chem. Phys. Letters* 283, 319 (1998).
 126. "Spin-Forbidden Dissociation of Ozone in the Huggins Bands". W. Denzer, G. Hancock, J.C. Pinot de Moira and P.L. Tyley, *Chem. Phys.* 231, 109 (1998).
 127. "Photokinetics: Theoretical Fundamentals and Applications". *Comprehensive Chemical Kinetics Vol.36*, eds. R.G. Compton and G. Hancock (1998).
 - 128.* "Photochemistry of Ozone: Surprises and Recent Lessons". A.R. Ravishankara, G. Hancock, M. Kawasaki and Y. Matsumi, *Science* 280, 60 (1998).
 129. "Two Photon Dissociation of NO near 275 nm Investigated by Velocity Map Imaging". B.L.G. Bakker, D.H. Parker, G. Hancock and G.A.D. Ritchie, *Chem. Phys. Letters* 294, 565 (1998).
 130. "Vibrational Relaxation of NO($v=1-3$) and NO₂(0,0,1) with Atmospheric Gases". B. Bohn, A. Doughty, G. Hancock, E.L. Moore and C. Morrell, *Phys. Chem. Chem. Phys.* 1, 1883 (1999).
 131. "Applications of Kinetic Modelling". *Comprehensive Chemical Kinetics Vol.37*, eds. R.G. Compton and G. Hancock (1999).
 132. "Optical Absorption and Scattering in Plasmas". G. Hancock, in *"Plasma Technology Training School"*, (Institute of Electrical Engineers, London), Chapter 18 (1999).
 133. "Dynamics of the Reaction O(³P) + H₂S → OH + SH. 1. Rotational, Lambda Doublet and Fine Structure Distributions in the OH ($v=1$) Product". M.L. Costen, G. Hancock and G.A.D. Ritchie, *J. Phys. Chem. A* 103, 10644 (1999).
 - 134.* "Dynamics of the Reaction O(³P) + H₂S → OH + SH. 2. State Resolved Differential Cross Sections and Angular Momentum Correlations". M.L. Costen, G. Hancock and G.A.D. Ritchie, *J. Phys. Chem. A* 103, 10651 (1999).
 135. "Vector Correlations in the 355 nm Photolysis of Thermal NO₂". R.P. Baker, M.L. Costen, G. Hancock, G.A.D. Ritchie and D. Summerfield, *Phys. Chem. Chem. Phys.* 2, 661 (2000).
 136. "OH Detection by Absorption of Frequency Doubled Diode Laser Radiation at 308 nm". H.R. Barry, B. Bakowski, L. Corner, T. Freearge, O.T.W. Hawkins, G. Hancock, R.M.J. Jacobs, R. Peverall and G.A.D. Ritchie, *Chem. Phys. Letters* 319, 125 (2000).
 137. "The CF₃ + NO₂ Rate Constant Measured between 1.5 and 110 Torr and between 251 and 295 K by Time Resolved Infrared Emission". C. Breheny, G. Hancock and C. Morrell, *Phys. Chem. Chem. Phys.* 2, 5105 (2000).
 138. "Cavity Enhanced Absorption Spectroscopy of Methane at 1.73 μm". H.R. Barry, L. Corner, G. Hancock, R. Peverall and G.A.D. Ritchie, *Chem. Phys. Letters* 333, 285 (2001).
 139. "The Photodissociation Dynamics of Tropospheric Ozone". G. Hancock, R.D. Johnson, J.C. Pinot de Moira, G.A.D. Ritchie and P.L. Tyley, in *Atomic and Molecular Beams*, ed. R. Campargue (Springer 2000) p. 331.
 140. "The Rate Constant for the Recombination Reaction Between CF₃ and O₂ Measured Between 2 and 110 Torr". C. Breheny, G. Hancock and C. Morrell, *Zeit. Phys. Chem.* 215, 305 (2001).
 141. "The near uv photolysis of ozone: quantum yields of O(¹D) between 305 and 329 nm at

- temperatures from 227-298 K, and the room temperature quantum yield of $O(^3P_2)$ between 303 and 310 nm, measured by Resonance Enhanced Multiphoton Ionisation". G. Hancock and P.L. Tyley, *Phys. Chem. Chem. Phys.* **3**, 4984 (2001).
142. "A simple interlocked controller for research vacuum systems". T. Freearde, J. Jessup and G. Hancock, *Meas. Sci. Technol.* **12**, 43 (2001).
 143. "Spectroscopic Breath Analysis". UK Patent 0120027.8, August 2001.
 144. "Cross sections in the $2\nu_5$ band of formaldehyde studied by cavity enhanced absorption spectroscopy near 1.76 μm ". H. Barry, L. Corner, G. Hancock, R. Peverall and G.A.D. Ritchie, *Phys. Chem. Chem. Phys.* **4**, 445 (2002).
 145. "A UV tunable diode laser source based on an external resonant cavity for OH absorption detection". J.S. Gibb, G. Hancock, V.L. Kasyutich and G.A.D. Ritchie, *Proc. SPIE* **4729**, 192 (2002).
 146. "Optical diagnostics of radio-frequency plasmas containing CHF_3 and CHF_3/O_2 : laser induced fluorescence of CF_2 , CF and O atoms, and optical emission from H , F and O ". G. Hancock and J.P. Sucksmith, *J. Vac. Sci. Technol.* **A20**, 270 (2002).
 147. "Sum frequency generation at 309 nm using a violet and a near IR DFB diode laser for detection of OH". L. Corner, J.S. Gibb, G. Hancock, A. Hutchinson, V.L. Kasyutich, R. Peverall and G.A.D. Ritchie, *Appl. Phys. B* **74**, 441 (2002).
 148. "Single tone frequency modulation spectroscopy with frequency doubled current modulated diode laser light". G. Hancock, V.L. Kasyutich and G.A.D. Ritchie, *Opt. Letters* **27**, 763 (2002).
 149. "Quantum yields for production of $O(^1D)$ in the ultraviolet photolysis of ozone: recommendation based on evaluation of laboratory data". Y. Matsumi, F.J. Comes, G. Hancock, A. Hofzumahaus, A.J. Hynes, M. Kawasaki and A.R. Ravishankara, *J. Geophys. Res.* **107**, art. no. 4024 (2002).
 150. "Wavelength modulation spectroscopy using a frequency doubled current modulated diode laser". G. Hancock, V.L. Kasyutich and G.A.D. Ritchie, *Appl. Phys. B* **74**, 569 (2002).
 151. "Cavity enhanced absorption spectroscopy with a rapidly swept diode laser". B. Bakowski, L. Corner, G. Hancock, R. Kitchie, R. Peverall and G.A.D. Ritchie, *Appl. Phys. B*, **75**, 745-750 (2002).
 152. "The 248 nm photolysis of $\text{NO}_2/\text{N}_2\text{O}_4$: time resolved FTIR emission from NO and NO_2 , and quenching of NO ($\nu=5-8$)". C. Morrell, C. Breheny, V. Haverd, A. Cawley and G. Hancock, *J. Chem. Phys.* **117**, 11121-11130, (2002).
 153. "Atmospheric chemistry of $\text{CF}_3\text{CH}_2\text{OCHF}_2$ and $\text{CF}_3\text{CHClOCHF}_2$: kinetics and mechanism for reactions with Cl atoms and OH radicals and atmospheric fate of $\text{CF}_3\text{C}(\text{O})\text{HOCHF}_2$ and $\text{CF}_3\text{C}(\text{O})\text{ClOCHF}_2$ radicals". T.J. Wallington, M.D. Hurley, V. Fedotov, C. Morrell and G. Hancock, *J. Phys. Chem. A*, **106**, 8391-8398 (2002).
 154. "On the accurate determination of pressure induced line shifts in the $2\nu_3$ band of H_2O at 1320 nm". J.S. Gibb, G. Hancock, A. Hutchinson, R. Peverall and G.A.D. Ritchie, *Appl. Phys. B*, **76**, 97-105, (2003).
 155. "A time-resolved FTIR emission study of the gas phase removal processes of $\text{CH}_2(X^3B_1)$ and $\text{CH}_2(a^1A_1)$ in collisions with O_2 ". G. Hancock and V. Haverd, *Chem. Phys. Lett.* **372**, 288-294, (2003).
 156. "Time resolved FTIR emission measurements of the internal energies of NO formed in the $\text{O}(^1D) + \text{N}_2\text{O}$ reaction, and energy transfer processes to N_2O ". G. Hancock and V. Haverd, *Phys. Chem. Chem. Phys.* **5**, 2369-2375, (2003).
 - 157.* "Infrared emission accompanying the gas phase recombination of alkyl radicals". G. Hancock, V. Haverd and M. Morrison, *Phys. Chem. Chem. Phys.* **5**, 2981-2987, (2003).
 158. "Measurements of pressure broadening coefficients of selected transitions in the $2\nu_5$ band

- of formaldehyde". H.R. Barry, L. Corner, G. Hancock, R. Peverall, T.L. Ranson and G.A.D. Ritchie, *Phys. Chem. Chem. Phys.* **5**, 3106-3112, (2003).
159. "Comparison of cross section measurements of the $2\nu_5$ overtone band of formaldehyde determined by cavity ringdown and cavity enhanced spectroscopy". L. Corner, H.R. Barry and G. Hancock, *Chem. Phys. Lett.* **374**, 28-32, (2003).
 160. "Molecular reaction dynamics". G. Hancock in "100 Years of Physical Chemistry", Royal Society of Chemistry, 123-140 (2003).
 - 161.* "Measurements of molecular fragment alignment and orientation in the UV photodissociation of NO_2 and O_3 ". G. Hancock, P.J. Pearson, G.A.D. Ritchie and D.F. Tibbetts, *Phys. Chem. Chem. Phys.* **5**, 5386-5391 (2003).
 162. Diode laser based detection and determination of pressure induced broadening coefficients in the $\nu_1 + \nu_3$ combination band of ammonia. J.S. Gibb, G. Hancock, R. Peverall, G.A.D. Ritchie and L.J. Russell, *Eur. Phys. J. D*, **28**, 59-66 (2004).
 163. "Characterisation of an inductively coupled N_2 plasma using sensitive diode laser spectroscopy". B. Bakowski, G. Hancock, R. Peverall, G.A.D. Ritchie and L.J. Thornton, *J. Phys. D* **37**, 2064-2072 (2004).
 - 164.* "UV cavity enhanced absorption spectroscopy of the hydroxyl radical". G. Hancock and V.L. Kasyutich, *Appl. Phys. B* **79**, 383-388 (2004).
 165. "Rotational quantum state dependent alternations in the angular momentum polarisation of $\text{O}_2(a^1\Delta_g)$ formed in the UV photodissociation of ozone". G. Hancock, P.J. Pearson, G.A.D. Ritchie and D.F. Tibbetts, *Chem. Phys. Lett.* **393**, 425-431 (2004).
 166. "Difference frequency generation in periodically poled lithium niobate and its use in the detection of atmospheric methane". H.Y. Clark, L. Corner, W. Denzer, G. Hancock, A. Hutchinson, M. Islam, R. Peverall and G.A.D. Ritchie, *Chem. Phys. Lett.* **399**, 102-108 (2004).
 - 167.* "The 193 nm photolysis of NO_2 : $\text{NO}(v)$ vibrational distribution, $\text{O}(^1\text{D})$ quantum yield and emission from vibrationally excited NO_2 ". G. Hancock and M. Morrison, *Mol. Phys.* **103**, 1727-1733 (2005).
 - 168.* "Diode laser measurements of the $\text{Ar } 3p^5 4s^1$ excited states in an inductively coupled RF plasma". B. Bakowski, G. Hancock, R. Peverall, S.E Prince, G.A.D. Ritchie and L.J. Thornton, *J. Phys. D* **38**, 2769-2777 (2005).
 - 169.* "Photolysis wavelength dependence of the translational anisotropy and the angular momentum polarisation of $\text{O}_2(a^1\Delta_g)$ formed from the UV photodissociation of ozone". G. Hancock, S.J. Horrocks, P.J. Pearson, G.A.D. Ritchie and D.F. Tibbetts, *J. Chem. Phys.* **122**, art 244321 (2005).
 170. "Nascent vibrational distributions and relaxation rates of diatomic products of the reactions of $\text{O}(^1\text{D})$ with CH_4 , C_2H_6 , CH_3F , CH_2F_2 and CHF_3 studied by time resolved Fourier transform infrared emission." G. Hancock, M. Morrison, and M. Saunders, *J. Photochem. Photobiol. A* **176**, 191-198, (2005).
 171. "Number density and temperature measurements obtained using sensitive diode laser spectroscopy in an argon plasma." B. Bakowski. G. Hancock, R. Peverall and G.A.D. Ritchie, *Appl. Phys. B* **82**, 123-131 (2006).
 172. "Absolute number densities of vibrationally excited $\text{N}_2 (A(^3\Sigma_u^+))$ produced in a low pressure rf plasma." G. Hancock, R. Peverall, G.A.D. Ritchie and L.J. Thornton, *J. Phys. D, Applied Phys.* **39**, 1846-1852, (2006).
 173. "Vibrational relaxation of $\text{NO} (v=1-16)$ in collisions with O_2 studied by time resolved Fourier transform infrared emission." G. Hancock, M. Morrison and M. Saunders, *Chem. Phys. Letters* **425**, 216-220 (2006).

174. The photodissociation dynamics of ozone at 193 nm: An O(1D_2) angular momentum polarization study” M. Brouard, R. Cireasa, A.P. Clark, G.C. Groenenboom, G. Hancock, S.J. Horrocks, F. Quadrini, G.A.D. Ritchie and C. Vallance, *J. Chem. Phys.* 125 Art. No. 133308 (2006).
175. [“The reaction products of the 193 nm photolysis of vinyl bromide and vinyl chloride studied by time-resolved Fourier transform infrared emission spectroscopy”](#). A. Carvalho, G. Hancock and M. Saunders, *Phys. Chem. Chem. Phys.* 8 4337-4346 (2006).
176. “Mid-infrared generation and spectroscopy with a PPLN ridge waveguide” W. Denzer, G. Hancock, A. Hutchinson, M. Munday, R. Peverall and G.A.D. Ritchie, *Appl. Phys. B.* 86 437-441 (2007).
177. “266 nm photolysis of CF₃I and C₂F₅I studied by diode laser gain FM spectroscopy”. G. Hancock, A. Hutchinson, R. Peverall, G. Richmond, G. A. D. Ritchie and S. Taylor, *Phys. Chem. Chem. Phys.*, 9 2234 – 2239 (2007) DOI: 10.1039/b617414k.
178. “Rotational analysis of the 2v₅ band of formaldehyde.” S. Saha, H. Barry, G. Hancock, G. A. D. Ritchie, and C. M. Western *Mol. Phys.* 105, 797 – 805 (2007).
179. [“Dependence of the nascent vibrational distribution of NO\(v\) on the photolysis wavelength of NO₂ in the range \$\lambda=266-327\$ nm measured by time-resolved Fourier transform infrared emission.”](#) C. Brooks, G. Hancock and M.Saunders, *Phys. Chem. Chem. Phys.* 9, 5232-5240 (2007).
180. “Vibrational distribution in NO(X²Π) formed by self quenching of NO A ²Σ⁺ (v = 0)”. G. Hancock and M. Saunders, *Phys. Chem. Chem. Phys.* 10, 2014-2018 (2008).
181. “Methyl iodide photodissociation at 193 nm: The I²P_{1/2} quantum yield”. A. Gilchrist, G. Hancock, R. Peverall, G. Richmond, G.A.D. Ritchie, and S. Taylor, *J. Phys. Chem. A* 112, 4531-4536 (2008).
182. “Time-resolved detection of the CF₃ photofragment using chirped QCL radiation”. G. Hancock, S.J. Horrocks, G.A.D Ritchie, J.H. van Helden, and R.J. Walker, *J. Phys. Chem. A* 112, 9751-9757 (2008).
183. “Cavity enhanced absorption spectroscopy measurements of pressure-induced broadening and shift coefficients in the v₁ + v₃ combination band of ammonia”. C.L. Bell, M. Dhib, G. Hancock, G.A.D Ritchie, J.H. van Helden, and N.J. van Leeuwen, *Appl. Phys. B* 94, 327-336 (2009).
184. “Optical feedback cavity enhanced absorption spectroscopy with diode lasers”. S.G. Baran, G. Hancock, R. Peverall, G.A.D Ritchie, and N.J van Leeuwen, *Analyst*, 134, 243-249 (2009).
185. “3.5 μm high resolution gas sensing employing a LiNbO₃ QPM-DFG waveguide module”. L. Ciaffoni, R. Grilli, G. Hancock, A.J. Orr-Ewing, R. Peverall, and G.A.D. Ritchie, *Appl. Phys. B*, 94, 517-525 (2009).

186. "Direct and wavelength modulation spectroscopy using a cw external cavity quantum cascade laser". G. Hancock, J.H. van Helden, R. Peverall, G.A.D. Ritchie, and R.J. Walker, *Appl. Phys. Lett.* 94, Art. 201110 (2009).
187. "High resolution absorption studies of the $\tilde{A}^1A_2-X^1A_1 2_0^2 4_0^1$ band of formaldehyde". M. B. Crow, A. Gilchrist, G. Hancock, R. Peverall, G. Richmond, G. A. D. Ritchie and S.R. Taylor, *J. Phys. Chem. A* 113, 6689-6696 (2009).
188. "Characterisation of an external cavity diode laser based ring cavity NICE-OHMS system". C.L. Bell, G. Hancock, R. Peverall, G.A.D. Ritchie, J.H. van Helden, and N.J. van Leeuwen, *Optics Express* 17, 9834-9839 (2009).
189. "Diode laser based studies of the UV photolysis of molecular iodine". G. Hancock, G. Richmond, G.A.D. Ritchie, and S. Taylor, *Phys. Chem. Chem. Phys.* 11, 6415-6423 (2009).
190. "Vibrational relaxation of NO ($v = 1-16$) with NO, N₂O, NO₂, He and Ar studied by time-resolved Fourier transform emission". G. Hancock, M. Morrison and M. Saunders, *Phys. Chem. Chem. Phys.* 11, 8507-8515 (2009).
191. "Near-infrared broad-band cavity enhanced absorption spectroscopy using a superluminescent light emitting diode". W. Denzer, M.L. Hamilton, G. Hancock, M. Islam, C.E. Langley, R. Peverall, and G.A.D. Ritchie, *Analyst* 134, 2220-2223 (2009).
192. "Applications of Cavity Ring Down Spectroscopy in Atmospheric Chemistry", G. Hancock, and A.J. Orr-Ewing, in "*Cavity Ring Down Spectroscopy, Techniques and Applications*", Eds G. Berden and R. Engeln, Wiley Blackwell (2009), 181-211.
193. "Mid-IR ethene detection using difference frequency generation in a quasi-phase matched LiNbO₃ waveguide" L. Ciaffoni, R. Grilli, G. Hancock, A.J. Orr-Ewing, R. Peverall, G.A.D. Ritchie, *Applied Optics* 48 5696 (2009).
194. "A chemometric study on human breath mass spectra for biomarker identification in cystic fibrosis" L. Bennett, L. Ciaffoni, W. Denzer, G. Hancock, A.D. Lunn, R. Peverall, G.A.D. Ritchie, *J. Breath Res.* 3 046002 (2009).
195. "Optical feedback cavity-enhanced absorption spectroscopy (OF-CEAS) in a ring cavity". D.J. Hamilton, M.G.D. Nix, S.G. Baran, G. Hancock and A.J. Orr-Ewing, *Appl. Phys. B* 100 233-242 (2010).
196. "Following interfacial kinetics in real time using broad-band evanescent-wave cavity-enhanced absorption spectroscopy: A comparison of light-emitting diodes and supercontinuum sources". L. van der Sneppen, G. Hancock, C. Kaminski, T. Laurila, S.R. Mackenzie, S.R.T. Neil, R. Peverall, and G.A.D. Ritchie, *The Analyst* 135 133(2010).
197. "Frequency modulated circular dichroism spectroscopy: application to ICN photodissociation" G. Hancock, G. Richmond, G.A.D. Ritchie, S.E. Taylor, M.L. Costen, and G.E. Hall, *Mol. Phys.* 108 1083 (2010).

198. "Applications of midinfrared quantum cascade lasers to spectroscopy" G. Hancock, G.A.D. Ritchie, J.P. van Helden, R. Walker and D. Weidmann. *Opt. Eng.* 49, 111121 (2010).
199. "Trace species detection in the near infrared using Fourier transform broadband cavity enhanced absorption spectroscopy: initial studies on potential breath analytes." W. Denzer, G. Hancock, M. Islam, C.E. Langley, R. Peverall, G.A.D. Ritchie and D. Taylor, *Analyst* 136, 801-806 (2011).
200. "A 3 μm difference frequency laser source for probing hydrocarbon plasmas" J.P. van Helden, G. Hancock, R. Peverall and G.A.D. Ritchie. *J Phys D Appl. Phys* 44 125202 (2011).
201. "Laser-based absorption spectroscopy as a technique for rapid in-line analysis of respired gas concentrations of O_2 and CO_2 " B. Cummings, M.L. Hamilton, L. Ciaffoni, T.R. Pragnell, R. Peverall, G.A.D. Ritchie, G. Hancock, and P.A. Robbins, *J. Appl. Physiol.* 111, 303-307, (2011).
202. "Noise-Immune Cavity-Enhanced Optical Heterodyne Detection of HO_2 in the Near-Infrared Range" C.L. Bell, J-P. H. van Helden, T.P.J. Blaikie, G. Hancock, N.J. van Leeuwen, R. Peverall, and G.A.D. Ritchie, *J. Phys. Chem. A*, 116, 5090-5099, (2012).

Patents



1. [APPARATUS FOR MEASUREMENT OF GAS CONCENTRATIONS IN BREATH](#)

Inventor:	Applicant:	EC:	IPC:	Publication info:	Priority date:
ROBBINS PETER ALISTAIR [GB] HANCOCK GRAHAM [GB] PEVERALL ROBERT [GB] RITCHIE GRANT [GB]	ISIS INNOVATION [GB]	A61B5/083 G01N21/05 G01N21/35B (+1)	G01N33/497	US2011302992 (A1) WO2010058150 (A1) EP2348994 (A1)	2008-11-19



3. [ANALYSIS OF BREATH](#)

Inventor:	Applicant:	EC:	IPC:	Publication info:	Priority date:
HANCOCK GRAHAM [GB] PEVERALL ROBERT [GB] RITCHIE GRANT [GB]	ISIS INNOVATION [GB] HANCOCK GRAHAM [GB] (+2)	A61B5/08 G01N33/497	A61B5/08 G01N33/497	WO2011117572 (A1)	2010-03-25



4. [SPECTROSCOPIC BREATH ANALYSIS](#)

Inventor:	Applicant:	EC:	IPC:	Publication info:	Priority date:
HANCOCK GRAHAM [GB] PEVERALL ROBERT [GB] RITCHIE GRANT [GB]		A61B5/083 G01N21/39 G01N33/497 (+1)	A61B5/08 A61B5/083 G01J3/00 (+5)	US2008064975 (A1) US7300408(B2) EP1418842(B1)	2001-08-16
