

CURRICULUM VITAE OF PROF SIVA UMAPATHY

NAME: Siva Umapathy, Ph D
Chairman,
Dept. of Inorganic and Physical Chemistry and
Professor, Dept. of Instrumentation and Applied Physics
Indian Institute of Science,
Bangalore – 560 012. India.

ALSO AS: Honorary Professor (from Aug 2010 to July 2019)
Department of Chemistry,
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DATE OF BIRTH: 10 JUNE 1959

AWARDS and RECOGNITIONS:

- | | |
|-------------|---|
| 1989 | Young Investigator Award
(ICORS, University of South Carolina, USA) |
| 1993 | Subbarao Memorial Lecture,
Osmania University, India |
| 1996 | J W T Jones Fellow,
The Royal Society of Chemistry,
London, England |
| 1998 | Hollemen Chair Professor,
University of Groningen
Groningen, Netherlands |
| 2000 | Swarna Jayanthi Young Scientist Award
Govt. of India (Award by the Prime Minister of India) |
| 2003 | Sir C V Raman Young Scientist Award
Govt. of Karnataka (Award by the Chief Minister of Karnataka) |
| 2004 | Bronze Medal,
Chemical Research Society of India |
| 2004 | Elected Fellow
Indian Academy of Sciences |
| 2004 | Shanti Swarup Bhatnagar Award (Most Prestigious Award) |

Govt. of India (**Award by the Prime Minister of India**)

- 2008** **Kipping Visiting Professor Fellow**
Department of Chemistry, University of Nottingham
United Kingdom
- 2008** **Visiting Professor**
Global Center for Excellence in Chemistry,
University of Tokyo, Japan
- 2010 J C Bose Fellow Professorship,
Department of Science and Technology, India
- 2010 Honorary Professor (Invited by the University)
Department of Chemistry
University of Nottingham
Nottingham, United Kingdom
- 2012** **Raman-Mishishuma Award**
India-Japan Science Promotion Council
Department of Science and Technology, India
- 2012 Visiting Professor
Swinburne University of Technology,
Melbourne, Australia

INTERNATIONAL ENGAGEMENTS:

Partner, European Metrology Research Programme (EMR)

Node Leader (India), Biophotonics World, USA

Co-Chair : 2015 Faraday Discussion meeting on “Structure and Dynamical Molecular Science”, Organized by the Royal Society of Chemistry, United Kingdom

INTERNATIONAL EDITORIAL ASSIGNMENTS:

Advisory Board Member, Faraday Discussions, The Royal Society of Chemistry,

Editor, Spectrochimica Acta A: Molecular and Biomolecular Spectroscopy

Member, Editorial Board, Nature Scientific Reports,

Member, Editorial Board, Frontiers in Physics,

Member, Editorial Board, Journal of Biophotonics

Member, Editorial Board, Journal of Raman Spectroscopy

Member, Editorial Board, Chemical Physics

ACADEMIC INTERNATIONAL RECOGNITIONS:

Co-Chair: Faraday Discussions 2015, Royal Society of Chemistry

Chairman, International Conference on Raman Spectroscopy, 2012

Member, International Steering Committee on Asian Spectroscopy

Member, International Steering Committee on Raman Spectroscopy

Member, International Committee on Time Resolved Vibrational Spectroscopy

Member, International Steering Committee on Bio-applications of Raman Spectroscopy

Member, International Programmes Committee, Biophotonics, Photonics Europe (2010 onwards), SPIE Conference, Belgium



PATENTS:

PCT (PCT/IN2009/000405) Ultrafast Raman Loss Spectroscopy
(WO/2010/007630) (2008)

2312/CHE/2013 A Method and an Apparatus For
Obtaining Sample Specific Signatures (2013)

2311/CHE/2013 A Method and a System for Detection of
Hazardous Chemicals in a Non-Metallic
Container (2013)

6626/CHE/2014 Chemical Signature Resolved Detection of Concealed
Objects

INDUSTRIAL CONSULTANCY:

ITC Research and Development Laboratory, Bangalore (ongoing)

BOEING Corporation, USA (on going)

Unilever India Pvt Ltd., Bangalore

Procter and Gamble India, Bangalore

INVITED LECTURES AT INTERNATIONAL CONFERENCES:

- Aug 2014 Invited Speaker, International Conference on Raman Spectroscopy.
Jena, Germany
- Aug 2014 **Plenary Lecture**, European Conference on Molecular Spectroscopy.
Dusseldorf, Germany.
- June 2014 **Plenary Lecture**, Taiwan International Symposium on Raman
Spectroscopy, Haulien, Taiwan.
- Dec 2013 **Keynote Speaker**, Asian Spectroscopy Conference,
National Technological University, Singapore.
- Sep 2013 Invited Lecture, Symposium on Structural Dynamics Science,
Biophysical Institute, Durham University, United Kingdom
- Aug 2013 Invited Lecture, International Conference on Applications of
Vibrational Spectroscopy (ICAVS), Kobe, Japan
- May 2013 Resource Person two lectures, Erice School on “The Future of
Structure and Dynamics”, Erice, Italy
- Feb 2013 Invited Lecture, Dead sea Workshop on Exciton dynamics, Ein-Gedi,
Israel
- Dec 2012 **Opening keynote speaker**, Non-linear Raman microscopy conference,
Swinburne University of Technology, Melbourne, Australia
- Apr 2012 Invited Lecture, SPIE Conference on “Bio-photonics”, Photonics
Europe, Brussels, Belgium
- Nov 2011 **Plenary Lecture**, Asian Spectroscopy Conference, Xiamen
University, Xiamen, China
- Dec 2011 **Plenary Lecture**, Brazilian Conference on Raman Spectroscopy, Belo
Horizonte, Brazil
- July 2011 Invited Lecture, International Conference on “New Techniques in
Spectroscopy”, National Physical Laboratory, London, United
Kingdom
- June 2011 Invited Lecture, International Conference on Time Resolved
Vibrational Spectroscopy, Switzerland
- Aug 2010 **Plenary Lecture**, International Conference on Raman Spectroscopy,
Boston, USA.

- July 2010 Invited Lecture, International Conference on “Biomedical Applications of Raman Spectroscopy”, State University of New York, Albany, USA
- June 2010 Invited Lecture, European Conference on Non-linear Spectroscopy, Bremen, Germany
- July 2009 **Plenary Lecture**, Telluride Research Conference on Vibrational Dynamics, Telluride, Colorado, USA
- Aug 2008 **Plenary Lecture**, International Conference on Raman Spectroscopy London, United Kingdom
- Aug 2006 Invited Lecture at the International Conference on Raman Spectroscopy, Yokohama, Japan
- Aug 2005 Invited Lecture at the International Conference on Advanced Vibrational Spectroscopy, Chicago, USA
- July 2005 Invited Lecture at the International Conference on Time Resolved Vibrational Spectroscopy, Washington, USA
- Aug 2004 Invited Lecture at the International Conference on Raman Spectroscopy, Brisbane, Australia
- Oct 2003 **Plenary Lecture** at the Australian Conference on Vibrational Spectroscopy, Melbourne, Australia
- July 2003 Invited Lecture, International Conference on Advanced Vibrational Spectroscopy, University of Nottingham, United Kingdom
- Jan 2003 Invited Lecture, Indo – Japan meeting on Chemical Dynamics, University of Tokyo, Japan
- Aug 2002 **Plenary Lecture**, International Conference on Raman Spectroscopy, Budapest, Hungary
- Jul 2002 Invited Talk, Gordon Conference on Vibrational Spectroscopy and Dynamics, Newport, USA
- May 2001 Invited Lecture, Time Resolved Vibrational Spectroscopy Conference, Okazaki, Japan
- Apr 1997 Invited Talk, Time Resolved Vibrational Spectroscopy Conference, Oxford University, UK
- Aug 1996 Chairman of session, International Conference on Raman Spectroscopy, Pittsburgh, USA
- Jun 1996 **Plenary Lecture**, Asian Photochemistry Conference, Hong Kong

- Jun 1995 Invited Lecture, Time resolved vibrational spectroscopy conference,
Los Alamos, USA
- Jun 1991 Invited lecture, International Young Scientists Workshop, Kawasaki,
Japan

**INVITED LECTURES AT INTERNATIONAL UNIVERSITIES/
INSTITUTIONS:**

- 1991 International Young Scientists Workshop,
Kanagawa Academy of Science and Technology,
Kawasaki, Japan
- 1993 Department of Physics, University of Regensburg, Germany
- 1993 Faculty of Science, National University of Singapore,
Singapore
- 1994 Department of Chemistry, Rutgers University, USA
- 1997 Ecole Polytechnique, Laussane, Switzerland
- 1997 Fritz Haber Institute, Berlin, Germany
- 1998 Faculty of Arts and Science, University of Groningen,
Netherlands
- 1999 University of Tokyo, Japan
- 2000 Princeton University, USA
- 2001 Institute of Molecular Science, Japan
- 2002 Hahn-Meitner Institute, Berlin, Germany
- 2003 University of Nottingham, UK
- 2004 National University of Singapore, Singapore
- 2003 Advanced Institute for Science and Technology, Tsukuba, Japan
- 2003 University of Tokyo, Japan
- 2005 University of Bordeaux, France
- 2004 Georgia Institute of Technology, Atlanta, USA
- 2006 University of Newcastle-upon-Tyne, Newcastle, UK
- 2005 Rail Research Institute, Tokyo, Japan
- 2005 National Institute of Standards and Technology, Washington, USA
- 2007 University of Jena, Jena, Germany
- 2008 Nottingham University, Nottingham, UK
- 2009 Institute of Physical Chemistry, University of Jena, Jena, Germany
- 2010 Department of Physics, University of Fortaleza, Fortaleza, Brazil
- 2011 Helmholtz Center, Berlin, Germany

2012 University of Tokyo, Japan
2012 University of Kyoto, Japan
2012 Institute of Molecular Science, Okazaki, Japan
2012 University of Osaka, Japan
2012 Tokyo Institute of Technology, Japan
2012 Swinburne University of Technology, Melbourne, Australia
2012 University of Auckland, New Zealand
2012 University of Massey, New Zealand
2012 University of Wellington, New Zealand
2012 University of Otago, New Zealand
2013 University of Durham, United Kingdom
2013 University of Nottingham, United Kingdom
2014 National Physical Laboratory, London, United Kingdom

LIST OF PUBLICATIONS OF PROF SIVA UMAPATHY

- 1) Raman and Infrared Microspectroscopy: Towards quantitative evaluation for clinical research by ratio metric analysis, S Kumar, T Verma, R Mukherjee, F Ariese, K Somasundaram and S Umapathy, *Chem. Soc. Revs.*, (2016) 45, 1879. DOI: 10.1039/C5CS00540J
- 2) Time-Resolved Spectroscopy. F. Ariese, K. R., V. Ravi Kumar, H. C. Sudeeksha, K Surajit and S. Umapathy, *Encyclopedia of Analytical Chemistry*, John Wiley and Sons, In Press, **2016**
- 3) Molecular profiling of Salmonella Typhimurium induced sepsis using Fourier Transform Infrared Microspectroscopy, R Gautam, M Deobagkar-Lele, B Chandrashekar, E Victor, S Majumdar, S Umapathy and D Nandi, Submitted to *J Biophotonics*, 9,67 (2016).
- 4) Solvent effects on the structure of the triplet excited state of xanthone: a time-resolved resonance Raman study. Ravi Kumar, V.; Umapathy, S., *Journal of Raman Spectroscopy*, In Press **2016**, DOI: **10.1002/jrs.4954**.
- 5) Triplet excited electronic state switching induced by hydrogen bonding: A transient absorption spectroscopy and time-dependent DFT study. Ravi Kumar, V.; Ariese, F.; Umapathy, S., *The Journal of Chemical Physics* **2016**, 144 (11), 114301.
- 6) Molecular dynamics and simulations study on the vibrational and electronic solvatochromism of benzophenone. Ravi Kumar, V.; Verma, C.; Umapathy, S., *The Journal of Chemical Physics* **2016**, 144 (6), 064302.
- 7) Ascorbate protects neurons against oxidative stress: A Raman microspectroscopic study, A Dutta, R Gautam, S Chatterjee, S K Sikdar , F Ariese , and S Umapathy, *ACS Chemical neuroscience*, (2015) 6, 1794. DOI:10.1021/acschemneuro.5b00106
- 8) Direct Observation of thermal equilibrium of excited triplet states of 9,10-phenanthrenequinone: A time resolved resonance Raman study, R Venkatraman, N Rajakumar, F Ariese, and S Umapathy, *J. Physical Chemistry,A.* (2015) 119, 10147. DOI: 10.1021/acs.jpca.5b07972.
- 9) Raman and Infrared Imaging: Applications to materials and biology, R Gautam, A Z Samuel, S Sil, D Chaturvedi, A Dutta, F Ariese, S Vanga, , and S Umapathy, *Current Science*, 108, 341 (2015).
- 10) Nuclear magnetic resonance, vibrational spectroscopic studies, physiochemical properties and computational calculations on (nitrophenyl)octa hydroquinolindione by DFT method, M A Pasha, A Siddekha, S Mishra, S H S Azzam and S Umapathy, *Spectrochimica Acta A*, 136, 221 (2015).

- 11) Solvatochromism of 9,10-phenanthrenequinone: An electronic and resonance Raman spectroscopic study, V Ravikumar, N Rajkumar and S Umapathy, *J Chem. Phys.*, 142, 24305 (2015).
- 12) Linking carbon metabolism to carotenoid production in mycobacteria using Raman spectroscopy, S Kumar, N Matange, S Umapathy and S S Visweswaraiyah, *FEMS Microbiology Letters*, 362, 1 (2015).
- 13) Experimentally validated Raman Monte Carlo Simulation for a cuboid object to substantiate Universal Multiple Angle Raman Spectroscopy for finding hidden/concealed material in containers, V Periasamy, S Sil, G Dhal, F Ariese, S Umapathy, and M Pramanik, *J Raman Spectroscopy*, 46, 669 (2015).
- 14) Approaches to data processing methods for multidimensional data from Raman and Infrared spectroscopy, R Gautam, S Vanga, F Ariese and S Umapathy, *European Journal of Instrumentation*, 2, 1, (2015), doi:10.1140 /epjti/s40485-015-0018-6
- 15) Raman spectroscopic studies on facilitating the screening of myopathies, R Gautam, V Sandeep, A Madan, G Narayanappa, U Nangthomba, and S Umapathy, *Analytical Chemistry*, 87, 2187 (2015).
- 16) Surface enhanced Raman spectroscopic studies on biosynthesized silver nanoparticles: observation of picomolar sensitivity to explosives, S Sil, D Chaturvedi, B Keerthi, S Kumar, S N Asthana and S Umapathy, *J. Phys. Chem. A*, 118, 2904 (2014).
- 17) Raman spectroscopy explores molecules hidden in depth: Universal Multiple Angle Spectroscopy, S Sil and S Umapathy, Revised submitted to *Nature Scientific reports*, 4, 2014. (DOI:10.1038/srep05308).
- 18) Energy funneling and macromolecular conformational dynamics: a 2D Raman correlation study, A Z Samuel and S Umapathy, *Nature (Polymer Journal)*, 1 (2014).
- 19) Structure and Dynamics from time resolved absorption and Raman spectroscopy, S Umapathy, K Roy, S Kayal and Nilesh Rai, Chapter 3, *NATO Series A: Chemistry and Biology*, Ed. Judith Howard, Springer, (2014).
- 20) Surface enhanced Raman spectroscopic studies of analytes using various approaches, D R Nayak, S Sil, R Gautam, N Bhatt and S Umapathy, *ISRAPS Bulletin*, vol.26, 1 (2014).
- 21) Surface enhanced Raman scattering on anodized alumina templates for bio-sensing applications, D R Nayak, N Bhatt and S Umapathy, *Physics of Semiconductors, Part IV*, 577, Springer International Publishing, Switzerland, (2014). DOI: 10.1007/978-3-319-03002-9_145.

- 22) Is chemically synthesized graphene “really” a SERS substrate? A comparative study with other carbonaceous materials. S Sil, N Kuhar, S Chatterjee, and S Umapathy, Nature Scientific reports, 3:3336 and DOI: 10.1038/srep03336 (2013).
- 23) Solvent induced changes on the polarity of the triplet excited state of 2-chlorothioxanthone from time resolved absorption and resonance Raman spectroscopy, R Pandey and S Umapathy, Chem. Phys. 478, 175-180 (2014).
- 24) Detection of explosives and hazardous chemicals: various facets of Raman spectroscopy, S Sil and S Umapathy, Chapter in book titled: Spectroscopic techniques for Security, Forensic and Environmental Applications, Eds. Rai, Singh and Dwivedi, Nova Publishers, NewYork, (2013)
- 25) Loss and Gain signals in broadband stimulated Raman spectra, U Harbola, S Umapathy and S Mukamel, Phys. Rev. A,(Rapid Commn.), 88, 11801, (2013).
- 26) Operating temperature effect on WO₃ thin films for gas sensing, M Givender, B W Mwakikunga, A K Prasad, S Umapathy, S Sil, D E Motaung, A G J Machatine and H W Kunert, IEEE sensors, 274 (2013).
- 27) Effect of chlorine substitution on the triplet state structure of thioxanthone: A time resolved Raman study, R Pandey, N Rajkumar, and S Umapathy, J. Raman Spectrosc. 44, 270 (2013).
- 28) Identification of early biomarkers during acetaminophen-induced hepatotoxicity in mice by Fourier transform infrared microspectroscopy, R Gautam, B Chandrasekar, M Deobagkar, S Rakshit, B N Vinaykumar, S Umapathy and D Nandi, PloS ONE, 7, e45521 (2012).
- 29) Infrared spectroscopic studies to understand the effect of drugs at molecular level, B Singh, R Gautam, B Chandrasekar, S Rakshit, B N Vinaykumar, D Nandi, K Somasundaram and S Umapathy, Proc. SPIE 8427, Biophotonics, DOI:10.1117/12.922402 (2012).
- 30) Simultaneous detection of two triplets: A time resolved Raman study, R Pandey and S Umapathy, J. Phys. Chem. A, 116, 8484 (2012).
- 31) Solvatochromic effect on the photophysical properties of two coumarins, R M Melavanki, H D Patil, S Umapathy and J S Kadadevarmath, J. Fluoresce. 22, 137 (2012).
- 32) Solvent effect on the fluorescence quenching of biologically active carboxamide by aniline and carbon tetrachloride in different solvent using S-V plots, N R Patil, R M Melavanki, B Kapatkar, K Chandrasekhar, N H Ayachit and S Umapathy, J. Lumin. 132, 558 (2012).

- 33) Application of vibrational microspectroscopy to biology and medicine, B Singh, R Gautam, S Kumar, B N Vinaykumar, U Nongthomba, D Nandi, G Mukherjee, V Santosh, K Somasundaram and S Umapathy, *Curr. Sci.* 102, 232 (2012).
- 34) Fourier transform infrared microspectroscopy identifies protein propionylation in histone deacetylase inhibitor treated glioma cells, B Singh, S Boopathy, K Somasundaram and S Umapathy, *J. Biophotonics*, 5, 230 (2012).
- 35) Basic principles of non-linear spectroscopy: an introduction to stimulated Raman spectroscopy, N Rai, A Lakshmana, B Mallick, V Namboodri and S Umapathy, *J. Chem. Sci.* 124, 177 (2012).
- 36) Time-resolved resonance Raman spectroscopy: exploring reactive intermediates, S Sahoo, S Umapathy and A W Parker, *Appl. Spectrosc.* 65, 282A-312A and 1087-1221 (2011).
- 37) Functionalized and post functionalizable porous polymeric films through Evaporation induced phase separation using mixed solvents, A Z Samuel, S Umapathy and S Ramakrishnan, *ACS Appl. Mater. Interfaces*, 3, 9, 3293 (2011).
- 38) Fluorescence quenching of biologically active carboxamide by aniline and carbon tetrachloride in different solvents using Stern–Volmer plots, N R Patil, R M Melavanki, S B Kapatkar, K Chandrashekar, H D Patil, and S Umapathy, *Spectrochim. Acta Part A*, 79, 1985 (2011).
- 39) Time resolved Raman study of triplet-excited state of thio-xanthone, R Pandey and S Umapathy, *J. Phy. Chem. A.*, 115, 7566 (2011).
- 40) Ultrafast Raman Loss spectroscopy(URLS): instrumentation and principle, B Mallick, A Lakshmana, and S Umapathy, *J. Raman Spectrosc.* 42, 1883 (2011).
- 41) Effect of SDS on human hair: study of structure and morphology, B Singh and S Umapathy, *J. Biophotonics*, 4, 315, (2011).
- 42) Solvent effect on the spectroscopic properties of 6MAMC and 7MAMC dyes, R M Melavanki, N R Patil, S B Kapatkar, N H Ayachit, S Umapathy, J Thipperudrappa and A R Nataraju, *J. Mol. Liq.* 158, 105 (2011).
- 43) Understanding Solvent Effect on Thioxanthone Using Time Resolved Resonance Raman Spectroscopy, R Pandey and S Umapathy, *AIP Conf. Proc.* 1267, 1223 (2010).
- 44) Mode-dependent dispersion in Raman line shapes: observation and implications from ultrafast Raman loss spectroscopy, S Umapathy, B Mallick and A Lakshmana, *J. Chem. Phys.* 143, 24505 (2010).

- 45) Raman spectroscopic study of muscles related disorders using *Drosophila Melanogaster* as a model system, R Gautam, U Nongthomba, S Umapathy, AIP Conf. Proc. 1267, 402 (2010).
- 46) Time-resolved resonance Raman studies on proton-induced electron-transfer reaction from triplet excited state of 2-Methoxynaphthalene to Decafluorobenzophenone, H Mohapatra and S Umapathy, J. Phys. Chem. A, 114, 12447 (2010).
- 47) Exploring the resonance excitation wavelength dependence of Raman lineshapes in ultrafast Raman loss spectroscopy, A Lakshmana, S Umapathy, AIP Conf. Proc. 1267, 476 (2010).
- 48) 2D Correlation Raman Spectroscopy of Hyperbranched Polymer, A Z Samuel, S Ramakrishnan, and S Umapathy, AIP Conf. Proc. 1267, 693 (2010).
- 49) Understanding solvent effect on structure and reactivity of organic intermediates: a Raman study, G Balakrishnan, S K Sahoo, B K Chowdhury and S Umapathy, Faraday Discuss. 145, 433 (2010).
- 50) Raman spectroscopic studies of temperature dependent conformational changes in fatty acids, P R Vijayakumar, S S Umapathy, B Vishwanathan, et al. AIP Conf. Proc. 1267, 564 (2010).
- 51) Raman and infrared spectroscopic studies to understand the efficacy of HDAC inhibitor drugs, B Singh, S Boopathy, K Somasundaram, S Umapathy, et al. AIP Conf. Proc. 1267, 394 (2010).
- 52) Ultrafast non-adiabatic dynamics: a resonance Raman intensities approach to conical intersections, P D Chowdary and S Umapathy, J. Raman Spectrosc. 41, 310 (2010).
- 53) Ultrafast Raman loss spectroscopy: a new approach to vibrational structure determination, A Lakshmana, B Mallick and S Umapathy, Curr. Sci. 97, 210 (2009).
- 54) Influence of solvent on photo-induced electron transfer: time resolved resonance Raman Study, H Mohapatra and S Umapathy, J. Phys. Chem. A, 113, 6904 (2009).
- 55) Ultrafast Raman Loss Spectroscopy, S Umapathy, A Lakshmana and B Mallick, J. Raman Spectrosc. (Rapid Comm.), 40, 235 (2009).
- 56) Raman spectroscopy at the beginning of the twenty-first century II. V Deckert, M W George, and S Umapathy, J. Raman Spectrosc. 39, 1508 (2008).

- 57) Design and development of Raman spectroscopy apparatus using a femtosecond laser system, B Mallick, A Lakshmana and S Umapathy, *Curr. Sci.* 95, 1551 (2008).
- 58) Ultrafast dynamics and photochemistry of π - π^* excited trans-azobenzene: a comprehensive analyses of resonance Raman intensities, P D Chowdhary and S Umapathy, *J. Raman Spectrosc.* 39, 1538 (2008).
- 59) Solvent effects on excited state reactivity from time resolved resonance Raman study, S K Sahoo, B K Chowdhry, and S Umapathy, *Proceedings of International Raman Conference*, 25 (2006).
- 60) Ultrafast nonadiabatic dynamics at conical intersections: a resonance Raman study, P D Chowdary and S Umapathy, *Proceedings of Time resolved Vibrational Spectroscopy*, 38 (2005).
- 61) Structure reactivity of aromatic ketones: A time resolved Raman study, S K Sahoo, B K Chowdhry, S Umapathy, *Advanced Vibrational Spectroscopy Proceedings*, 97, (2005).
- 62) Resonance Raman spectroscopic studies of $[\text{Ru}(\text{phen})_2\text{qdpz}]^{2+}$ and its interaction with calf thymus-DNA, B Abraham, C V Shastri, B G Maiya and S Umapathy, *J. Raman Spectrosc.* 35, 13 (2004).
- 63) Time resolved resonance Raman studies on triplet excited state of 2-methoxy naphthalene, H Mohapatra and S Umapathy, *Chem. Phys. Lett.* 390, 427 (2004).
- 64) Understanding solvent effects from resonance Raman intensities, S Umapathy, *Advanced Vibrational Spectroscopy Proceedings*, 47 (2003).
- 65) Resonance Raman study of the solvent dynamics for ultrafast charge transfer transition in 4-nitro-4-dimethylamino-azobenzene, N Biswas and S Umapathy, *J. Chem. Phys.* 118, 12, 5526 (2003).
- 66) Investigation of short time isomerization dynamics in p-nitro azobenzene from resonance Raman intensity analyses, N Biswas, B Abraham and S Umapathy, *J. Phys. Chem. A.* 106, 41, 9397 (2002).
- 67) Excited state structure and dynamics from time resolved resonance Raman spectra and simulation, M Puranik, S Umapathy, *Bull. Chem. Soc. Japan*, 75, 5, 1057 (2002).
- 68) Time-resolved resonance Raman spectroscopic studies on the radical anions of methyl-1,4-benzoquinone and 2,6-dimethyl-1,4-benzoquinone, H Mohapatra and S Umapathy, *J. Phys. Chem. A*, 106, 18, 4513 (2002).
- 69) Time Resolved resonance Raman spectroscopy, S Umapathy, *Recent Trends in Chemistry*, Ed., M M Srivastava, (2002).

- 70) Understanding solvent effects from resonance Raman intensities, N Biswas, G Balakrishnan, H Mohapatra and S Umapathy, Proceedings of XVIII international conference on Raman spectroscopy, Eds. J Mink, G Jalsovszky and G Keresztury, John Wiley and sons Ltd, New York. 21 (2002).
- 71) Solvent-controlled acceleration of electron transfer in binary mixtures, A Pugzlys, H P den-Hartog, A Baltuska, M S Pshenichnikov, D A Wiersma and S Umapathy, J. Phys. Chem. A. (2001).
- 72) Time resolved resonance Raman and density functional studies on the ground state and short lived intermediates of tetrabromo-*p*-benzoquinone, M Puranik, J Chandrasekhar, J G Sneijders, S Umapathy, J. Phys. Chem. A, 105, 10621 (2001).
- 73) Structure of the triplet excited state of bromanil from time-resolved resonance Raman spectra and simulation, M Puranik, S Umapathy, J G Snijders and J Chandrasekhar, J. Chem. Phys. 115, 13, 6106 (2001).
- 74) Time-resolved resonance Raman, Ab initio Hartree Fock and density functional studies on the transient states of perfluoro-*p*-benzoquinone, G Balakrishnan, P Mohandas and S Umapathy, J. Phys. Chem. A, 105, 7778 (2001).
- 75) Study of solvent effects on the molecular structure and the reorganization energies of 4-nitro-4-dimethyl-aminoazobenzene using resonance Raman intensities, N Biswas and S Umapathy, J. Raman Spectrosc., 32, 471 (2001).
- 76) Structure of the triplet excited state of tetrabromo-*p*-benzoquinone from time-resolved resonance Raman spectra and ab initio calculations, M Puranik, J Chandrasekar, S Umapathy, Chem. Phys. Lett. 337, 224 (2001).
- 77) Vibrational studies of ground state 4-dimethylaminobenzonitrile (DMABN) and its ring deuterated isotopomer DMABN-d₄, W M Kwok, I Gould, C Ma, M Puranik, S Umapathy, P Matousek, A W Parker, D Phillips, W T Toner, M Towrie, Phys. Chem. Chem. Phys. 3, 2424 (2001).
- 78) A determination of the structure of the intramolecular charge transfer state of 4-dimethylaminobenzonitriledimethyl aminobenzonitrile (DMABN) by time-resolved resonance Raman spectroscopy, W M Kwok, C Ma, P Matousek, A W Parker, D Phillips, W T Toner, M Towrie and S Umapathy, J. Phys. Chem. A, 105, 984-990 (2001).
- 79) Structures, vibrational frequencies and normal modes of substituted azo dyes: infrared, Raman and density functional calculation, N Biswas and S Umapathy, J. Phys. Chem. 104, 2734 (2000).

- 80) Intermolecular hydrogen abstraction from triplet excited states of decafluorobenzophenone - a Raman investigation, R Anandhi and S Umapathy, *J. Raman. Spectrosc.* 31, 331 (2000).
- 81) Time resolved resonance Raman studies on vitamin-K, G Balakrishnan and S Umapathy, *J. Mol. Struct.* 475, 5 (1999).
- 82) Structure and reactivity of perfluorocompounds from time resolved resonance Raman studies, G Balakrishnan, P Mohandas, R Anandhi and S Umapathy, *Laser Chemistry*, 19, 343 (1999).
- 83) Resonance Raman spectroscopic studies on the conducting state of polyvinylcarbazole and its model compounds, R Anandhi and S Umapathy, *J. Raman. Spectrosc.* 1998, 29, 10/11, 901 (1998).
- 84) Factorizing inertial solvation energy from total reorganization energy of intramolecular charge transfer process from resonance Raman intensities, N Biswas and S Umapathy, *Chem. Phys. Lett.* 294, 181 (1998).
- 85) Resonance Raman and infrared spectral studies on radical anions of model photosynthetic reaction centre quinones (naphthoquinone derivatives), G Balakrishnan, A Babaei, A J McQuillan and S Umapathy, *J. Biomol. Struct. Dynamics*, 16, 123 (1998).
- 86) Effect of halogen substitution on the structure and vibrational spectra of radical anions of benzoquinones, M Puranik, H Mohapatra, G Balakrishnan, J Chandrasekhar and S Umapathy, *Asian Journal of Physics*, 2, 189, (1998).
- 87) Femtosecond time-resolved UV-visible absorption spectroscopy of trans-azobenzene dependence on excitation wavelength, I K Lednev, T Q Ye, P Matousek, P Foggi, F V R Neuwahl, S Umapathy, R E Hester and J N Moore, *Chem. Phys. Lett.* 290, 68 (1998).
- 88) A simple approach to measuring absolute Raman cross sections using optical parametric oscillators, N Biswas and S Umapathy, *Appl. Spectrosc.* 52, 496 (1998).
- 89) Resonance Raman spectroscopy and chemical dynamics, N Biswas and S Umapathy, *Curr. Sci.* 74, 328 (1998).
- 90) Early time isomerization dynamics of trans-azobenzene from resonance Raman intensity analysis, N Biswas and S Umapathy, *J. Chem. Phys.* 107, 7849 (1997).
- 91) Structure and vibrational spectra of photogenerated intermediates of *p*-Benzoquinone investigated by density functional calculations, P Mohandas and S Umapathy, *J. Phys. Chem. A*, 101, 4449 (1997).

- 92) Density functional studies on the vibrational spectra and normal modes of trans and cis-azobenzene, N Biswas and S Umapathy, *J. Phys. Chem. A*, 101, 5555 (1997).
- 93) Resonance Raman spectroscopic studies of triplet excited state of fluoranil. G Balakrishnan and S Umapathy, *J. Chem. Soc. Faraday Trans. 93*, 4125 (1997).
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