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Education Qualification

- B. Sc. (Physics) Mumbai University, India (1987)
- M. Sc. (Physics) Mumbai University, India (1989)
- Ph.D. (Physics) Institute of Chemical Technology (ICT), India (1998)

Postdoctoral Fellow:

- Colorado State University, Fort Collins, Colorado, USA (June 2001-May 2003)
- University of Texas at Arlington, Arlington, Texas, USA (Sept 2007- Dec 2008)

Professional Experience

Teaching Experience in VJTI

- Professor: July 2009-present
- Associate Professor: January 2006 – July 2009
- Assistant Professor: July 2001-December 2005
- Lecturer (Degree): January 1999 -July 2001
- Lecturer (Diploma): July 1990-January 1999

Administrative Experience in VJTI

- Associate Dean of Academics (UG): October 2010-September-2012
- In-charge of First Year Engineering: June 2009-Sept 2012
- Head of Physics Department: November 1999-oct 2019
- Member of grievance committee for teaching and nonteaching (2004-05)

Book Chapter & Books

2017

1. **NANOMEDICINE IN CANCER**, edited by Lajos P Balogh, Pan Stanford Publishing Pte. Ltd., Singapore, 2017, ISBN 978-981-4745-80-2
 - **Chapter 16. Surface Chemistry Influences Cancer Killing Effect of TiO₂ Nanoparticles**, Paul Thevenot, Jai Cho, Dattatray Wavhal, Ashwin Nair, Richard B. Timmons, and Liping Tang
2. **Applied Physics I For Science and Engineering**, Prof Dattatray Wavhal, ISBN 978-93-5268-289-8, SELF Publications, 2017.

2016

3. **Applied Physics II For Science and Engineering**, Prof Dattatray Wavhal, ISBN 978-93-5267-180-9, SELF Publications, 2016.

Research

Development and application of Plasma enhanced chemical vapor deposition (PECVD) technology to provide molecular surface tailoring of materials. PECVD is used to deposit conformal, thin film coatings on a wide variety of substrates. Using a variable duty cycle pulse plasma technique, which provides exceptional control of chemistry during plasma polymerization depositions of thin films. This film chemistry controllability permits variation and adjustment of the surface energies of virtually any solid substrate. This technology provides an unusually simple and versatile approach to introduction of a wide range of surface chemical functionalities. Recently, we have extended this gas phase surface modification technology to include precise surface tailoring of fine powders, including particles as small as 20 nanometres. Among these studies are synthesis of new materials, which focus on achieving improved dispersion, and bonding of inorganic nanoparticles in organic matrices, to provide improved electrical and thermal properties for these interesting new nanocomposites. Other applications include work in biomaterials; controlled drug release; synthesis of novel inorganic organic nanocomposite materials, improved catalysts, and flexible, high dielectric constant films.

Patents

2017

1. **European Patent, No., EP2262851B1 (2017)** “Covalently Functionalized Particles for Synthesis of New Composite Materials”, *Richard B. Timmons, Dattatray Wavhal, Dhiman Bhattacharyya and Narayan Mukharji*,

2015

2. **US patent No., 9051402 (2015)**, “Covalently Functionalized Particles for Synthesis of New Composite Materials II”, *Richard B. Timmons, Dattatray Wavhal, Dhiman Bhattacharyya and Narayan Mukharji*,

2012

3. **US patent No., 8088451 (2012)**, “Covalently Functionalized Particles for Synthesis of New Composite Materials I”, *Richard B. Timmons, Dattatray Wavhal, Dhiman Bhattacharyya and Narayan Mukharji*, (2012)

Publications

International Journals

2023

1. Plasma-Polymerized and Iodine-Doped Polyvinyl Acetate for Volatile Organic Compound Gas Sensing Applications, *B Nadekar, GS Gund, YB Khollam, SF Shaikh, DS Wavhal, DP Dubal, Pravin More, **ACS Applied Polymer Materials 5 (3), 18,82-1890, 2023***
2. Enhanced ammonia/amines sensitivity at room temperature using plasma polymerized polyvinyl acetate-reduced graphene oxide composite film sensors, *Baliram Nadekar, Yogesh B Khollam, Shoyebmohamad F Shaikh, Dattatray Wavhal, Pankaj Varshney, Bidhan Pandit, Pravin S More, **Surfaces and Interfaces Part B (42) 103453, 2023.***

2010

3. Composites of Plasma Surface Functionalized Barium Titanate Nanoparticles Covalently Attached to Epoxide Matrices: Synthesis and Evaluation, *Narayan Mukherjee, Dattatray Wavhal and Richard B Timmons, **Applied Material and Interfaces, 2(2), 397-407 (2010)***

2009

4. Synthesis of Electrical Conducting Films by Plasma Polymerization of Tetramethyltin. Dattatray Wavhal, Swati Goyal and Richard B. Timmons, ***Chemistry of Materials. 21, 4442-4447 (2009).***

2008

5. Surface chemistry influences cancer killing effect of TiO₂ nanoparticles, *Paul Thevenot, Jai Cho, Dattatray Wavhal, Richard B. Timmons, Liping Tang, Nanomedicine: Nanotechnology, Biology, and Medicine 4, 226–236(2008)*

2005

6. Investigation of Gas Phase Species and Deposition of SiO₂ Films from HMDSO/O₂ Plasmas, *Dattatray S. Wavhal, Jianming Zhang, Michelle L. Steen and Ellen R. Fisher, Plasma Processes and Polymers 3, 276-287 (2006)*
7. Modification of Polysulfone Ultrafiltration Membrane by CO₂ Plasma Treatment, *Dattatray S. Wavhal, and Ellen R. Fisher, Desalination 172 189- 205 (2005)*

2004

8. Mechanisms of SiO₂ film deposition from tetramethylcyclotetrasiloxane, dimethyldimethoxysilane, and trimethylsilane plasmas, *Jianming Zhang, Dattatray S. Wavhal, and Ellen R. Fisher Journal of Vacuum science and technology, Part A 22(1), 201-213 (2004).*

2003

9. Membrane Surface Modification by Plasma-Induced Polymerization of Acrylamide for Improved Surface Properties and Reduced Protein Fouling. *Wavhal, Dattatray S.; Fisher, Ellen R. Langmuir, 19, 79-85 (2003).*
10. Hydrophilic Surface Modification of Microporous Polymer Membranes Using a Variety of Low-Temperature Plasma Treatments. *Dattatray S. Wavhal, Kristen R. Kull, Michelle L. Steen, and Ellen R. Fisher, Mat. Res. Soc. Symp. Proc. Vol. 752 © 2003 Materials Research Society AA3.1.1*

2002

11. Modification of porous poly (ether sulfone) membranes by low-temperature CO₂-plasma treatment, *Wavhal, Dattatray S, Fisher, Ellen R., Journal of Polymer Science, Part B: Polymer Physics 40(21), 2473-2488. (2002)*
12. Hydrophilic modification of polyethersulfone membranes by low temperature plasma-induced graft polymerization, *Wavhal, Dattatray S., Fisher, Ellen R., Journal of Membrane Science 209(1), 255-269 (2002)*

2000

13. Preparation of cellulose triacetate pervaporation membrane by ammonia plasma treatment, *Bhat N. V., Wavhal, D. S., Journal of Applied Polymer Science 76(2), 258-265 (2000)*
14. Characterization of plasma-polymerized thiophene onto cellulose acetate membrane and its application to pervaporation, *Bhat, N. V., Wavhal, D. S., Separation Science and Technology 35(2), 227-242 (2000)*

1998

15. Preparation and characterization of plasma-polymerized thiophene films. *Bhat, N. V., Wavhal, D. S., Journal of Applied Polymer Science (1998), 70(1), 203-209.*

Symposiums and Conferences

2013

16. Investigating the Attitudes toward Mathematics of Engineering Students using Fuzzy Measure, *Rekha Rathore and D.S. Wavhal*, All India Conference on “Global Innovations in Mathematics “ 12-13 April 2013 **Chhatrapati Shivaji Institute of Technology, Durg (C.G.), India – 491001 ISBN: 978-81- 923288-1-2**

2010

17. Plasma Surface Functionalized Nanoparticles for Use in Synthesis of Inorganic/Organic Nanocomposites, *Richard B. TIMMONS, Narayan Mukherjee, Dattatray Wavhal* **International Conference on Composites/NANO Engineering (ICCE-18) Technical University of Liberec, Anchorage, Alaska, USA, July 4-10 2010**

2009

18. In vitro Evaluation of Plasma Surface-Modified PLGA Nanoparticles, *Soujanya Kona, Dattatray Wavhal, Richard B. Timmons, Liping Tang and Kytai T. Nguyen* 2009, **Biomedical Engineering Society, Annual Fall Meeting October 7-10, 2009 – Pittsburgh, Pennsylvania, USA, PS B 9B-9, pp-13**
19. Plasma based synthesis of new inorganic / organic nanocomposite materials, *Timmons, R.B., Mukherjee, Wavhal, D.* **11th Pacific Polymer Conference, 6- 10 Dec 2009, Cairns, Australia.**
20. Plasma surface modified nanoparticles for synthesis of chemically bonded inorganic-organic nanocomposites materials, *Mukherjee, N.; Wavhal, D.; Timmons, R. B.,* **Polymer Preprints , 237th ACS National Meeting, 22-26 March, 2009, Salt Lake City, UT, USA**
21. Nanocomposites containing inorganic particles covalently bonded to organic polymeric matrices, *N. Mukherjee, D. Wavhal, and R.B. Timmons*, 15th **International Conference on Composite Structures (ICCS15), 15-17 June 2009 University of Porto, Porto, Portugal**
22. Surface Functionalized Biodegradable Nanoparticles in Cancer Cells, *Anupama Vadla, Soujanya Kona, Dattatray Wavhal, Richard B. Timmons, Liping Tang and Kytai T. Nguyen*, **Biomedical Engineering Society, Annual Fall Meeting -- October 7-10, 2009 – Pittsburgh, Pennsylvania, PS B 9B-10, pp-13**

2003

23. Gas-Phase Diagnostics and Mechanisms of energy transfer in O₂/NH₃ Plasmas *K. R. Kull, D. S. Wavhal and E. R. Fisher*, **50th International Symposium of the American Vacuum Society, Baltimore, Maryland November 2-7, 2003.**
24. The Chemistry Of SiO₂ Deposition From Novel Alkoxysilane Systems, *J. Zhang, D. S. Wavhal, K. L. Williams, and E. R. Fisher*, **16th International Symposium on Plasma Chemistry, Taormina, Italy (June 22-27, 2003).**

2002

25. Hydrophilic Surface Modification of Microporous Polymer membranes using Low-temperature Plasmas; D.S. Wavhal, K.R. Kull, M.L. Steen, Ellen R. Fisher, **2002MRS Fall meeting, Boston, Massachusetts December 2-5, 2002.**
26. Permanent Hydrophilic Modification of Porous Membranes Using Low- Temperature Plasmas, Dattatray S. Wavhal and Ellen R. Fisher, **49th International Symposium of the American Vacuum Society, Denver, CO, November 4-8, 2002**

1999

27. Plasma Polymerization of Acrylonitrile on CTA Films, N. V. Bhat and D. S. Wavhal, **Polymers 99 International Symposium on Polymers Beyond AD 2000, Delhi, India, January 12-15, 1999**

1997

28. Surface Modification of Cellulose Triacetate Films by Plasma Polymerization of Thiophene, N. V. Bhat and D. S. Wavhal, 12th National Symposium on Plasma Science and Technology, **Plasma-97 IPR, Gandhinagar, Gujrath India December 2-5, 1997**
29. Preparation and Characterization of Plasma Polymerized Thiophene Films, N. V. Bhat and D. S. Wavhal, **3rd International Conference on Reactive Plasma Nara, Japan 1997**