

## Santosh K. Haram,

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### Academic Background:

- Ph.D. [TIFR, Mumbai](#), India (1988-94)
- M.Sc. [IIT, Bombay](#), Mumbai, India (1988)

[A Research Group home page](#) **NEW**

### Professional Experience:

#### Post Doc:

- [University of Texas at Austin](#), USA (2000-01) in Prof. A.J. Bard's Group.
- UDCT golden Jubilee Post Doctoral Fellow, [UICIT](#), Mumbai, India (1994-95)

#### Visiting Professor,

- Wurzburg University, Germany (2005)
- Visiting Professor, University of Paris at Orsay (2006)

#### Previous Employment:

- Assistant Professor, Department of Chemistry, University of Mumbai (1995-2003)

### Current Research Interests: (Electrochemical Science and Nanotechnology Group:)

A motto of the research group is to use the electrochemical methods for the development of nanophase systems having applications in the field of energy and environment. The current research interests are

- Voltammetric and Scanning Electrochemical Microscopy (SECM) Measurements on a Single Strand of Carbon Fiber.
- The Electrocatalytic Activity of Graphene(oxide)/Metal/Semiconductor Composites Using Scanning Electrochemical Probe Techniques.
- Conjugation of engineered cytochrome P450 enzyme onto functionalized carbon nanotubes for bioelectrochemical degradation of pollutants (in collaboration with TIFR)
- Integrated electrochemical systems, based on carbon nanotubes-cytochrome-c composites (in Collaboration with TIFR)
- Determination of band structure parameters of semiconductor quantum dots and their composites by voltametric techniques. size quantization effects associated with Q-dots are being investigated in more details.
- Development of Pt-MWCNTs composites for direct methanol oxidation fuel cells.

### Awards and Fellowships:

- Elected as a Fellow of Maharashtra Academy of Sciences (2009).
- Elected as a Member of National Academy of Sciences, Allahabad (NASI). (2009).
- Recipient of BOYSCAST fellowship(2000-01)
- Recipient of 'DAE Young Scientist Research Award in Basic Sciences' (1998)
- Recipient of 'Golden Jubilee Fellowship' U.D.C.T., Mumbai (1994)
- Recipient of fellowship from TIFR to pursue doctoral research as a Research Scholar (1988-94).
- Recipient of MCMS scholarship from IIT Bombay to Pursue M.Sc. (1986-88).

### Research Schemes, collaborative ventures and consultancy:

- DBT, Government of India (Rs. 79 Lakhs)
- European Commission(Rs. 38.00 Lakhs)
- ISRO Government of India (Rs. 10.00 Lakhs)
- BRNS-DAE, Government of India (Rs. 26.00 Lakhs)
- BRNS-DAE Government of India (Rs. 5.00 Lakhs)
- Nuclear Science Centre, New Delhi (Rs. 5.00 Lakhs)

### Research Publications (ISI citation index 846 and H-index 13 May 2011 )

1. Electrode of methanol oxidation on Pt-f-multiwalled carbon nanotubes composite, prepared by  $\gamma$ -radiolysis, Kanchan M. Samant, Vrushali S. Joshi Geeta Sharma, Sudhir Kapoor, Santosh K. Haram\*, **Electrochimica Acta** 56 (2011) 2081–2086.
2. Quantum Confinement in CdTe Quantum Dots: Investigation through Cyclic Voltammetry Supported by Density Functional Theory (DFT) Santosh K. Haram\*, Anjali Kshirsagar, Yogini D. Gujarathi, Pravin P. Ingole, Omkar A. Nene, Ganesh B. Markad, and Sachin P . Nanavati. **J. Phys. Chem. C** 115 (2011) 6243–6249.
3. Fabrication, Characterization and Electrochemical Performance of Single Strand Carbon Fiber Prepared by Catalytic Chemical Vapor Decomposition Method, V.S. Joshi, S.P. Gokhale, K.R. Patil, S.K. Haram\*, **Electrochimica Acta** 55 (2010), 2022- 2028.
4. Citrate-capped Quantum dots of CdSe for the Selective Photometric Detection of Silver Ions in Aqueous Solutions. Pravin P Ingole, Rajiv M Abhyankar, BLV Prasad, and S. K. Haram\*, **Materials Science and Engineering B** 68 (2010) 60–65
5. A Facile Methodology for the Design of Functionalized Hollow Silica Spheres, Ambrose Melvin, R. Vijay, Vijay R. Chaudhari, Bhavna Gupta, Rajiv Prakash, Santosh Haram, Geetha Baskar and Deepa Khushalani, **J. Colloids and Interface Science**, 346 (2010) 265–269
6. Self Electro-catalysis of Hydroquinone on Gold Electrode in Aqueous un-buffered Media. Electrochemistry Communications,. Vijay R. Chaudhari, Mohsin A. Bhat, Pravin P. Ingole, and Santosh Krishna Haram\*, **Electrochem. Comm**, 11 (2009) 994-996
7. Mechanistic Aspects of Nitrate Ion Reduction on Silver Electrode: Estimation of O-NO<sub>2</sub>- Bond Dissociation Energy using Cyclic Voltammetry, Mohsin A. Bhat, Pravin P. Ingole, Vijay R. Chaudhari and Santosh K. Haram\*, **New Journal of Chemistry**, 33, (2009) 207.
8. Outer Sphere Electro-reduction of CCl<sub>4</sub> in 1-butyl-3-methylimidazolium Tetrafluoroborate: An

Example of Solvent Specific Effect of Ionic Liquid" Mohsin Bhat; Pravin Ingole; Vijay Chaudhari; Santosh K. Haram\*, **J. Physical Chemistry B**, 113 (2009) 2848.

9. Room Temperature Synthesis of 1-hexanethiolate Capped Cu<sub>2</sub>-xSe Quantum Dots, in Triton X-100 Water-in-Oil Microemulsions , Pravin P. Ingole, Prashant P. Joshi, and Santosh K. Haram\*, **Colloids and Surfaces A: Physicochemical and Engineering Aspects**, 337 (2009) 136.
10. Construction of Ag/AgCl Reference Electrode from Used Felt-Tipped Pen Barrel for Undergraduate Laboratory Shaukatali N. Inamdar, Mohsin A. Bhat, and Santosh K. Haram\*, **J. Chemical Education**, 86, (2009) 355.
11. Determination of Band Structure Parameters and the Quasi-Particle Gap of CdSe Quantum Dots by Cyclic Voltammetry Shaukatali N. Inamdar, Pravin P. Ingole, and Santosh K. Haram\*, **ChemPhysChem**. 9, (2008) 2574.
12. Shaukatali N. Inamdar and Santosh K. Haram\* **Mossbauer Effect Reference and Data Journal**, 31(4), (2008), 06I007.
13. New Route For the Preparation of Luminescent Mercaptoethanoate capped CdSe Quantum Dots, Manoj E. Wankhede, Shaukatali N. Inamdar, Aparna Deshpande, Aniket R. Thete, Renu Pasricha, Sulabha K. Kulkarni, and Santosh K. Haram\*, **Bull. Mater. Sci.**, 31, (2008) 291.
14. Filling and coating of multi walled carbon nanotubes with silver by DC electrophoresis, Kanchan M. Samant, Vijay R. Chaudhari, Sudhir Kapoor, Santosh K. Haram\*, **Carbon**, 45 (2007) 2126.
15. Micelle assisted morphological evolution of silver nanoparticles, Vijay R. Chaudhari, Santosh K. Haram, S.K. Kulshreshtha, J.R. Bellare, P.A. Hassan, **Colloids and Surfaces A: Physicochem. Eng. Aspects**, 301, (2007) 475.
16. Synthesis of Carbon Nanotubes by Catalytic Vapor Decomposition (CVD) Method: Optimization of Various Parameters for the Maximum Yield, Kanchan M. Samant, Santosh K. Haram\* and Sudhir Kapoor, **Pramana-Journal of Physics**, 68, (2007) 51.
17. Electrochemical biosensor for catechol using agarose-guar gum entrapped tyrosinase, Sanket Tembe, Meena Karve, Shaukatali Inamdar, Santosh K. Haram, Jose Melo and Stanislaus F. D Souza, **J. Biotechnology**, 128 (2007) 80.
18. Synthesis and Characterization of Stable Organosols of Silver Nanoparticles by Electrophoretic Dissolution of Silver in DMSO. Mihir M. Wadkar, Santosh K. Haram\* and Vijay R. Chaudhari, **Journal of Physical Chemistry B**, 110 (2006) 20889.
19. Synthesis and Characterization of Uncapped -Fe<sub>2</sub>O<sub>3</sub> Nanoparticles Prepared by Flame Pyrolysis of Ferrocene in Ethanol, Shaukatali N. Inamdar and Santosh K. Haram\*, **J. Nanoscience and Nanotechnology**, 6, (2006) 2155.
20. Development of electrochemical biosensor based on tyrosinase immobilized in composite biopolymeric film, Sanket Tembe, Meena Karve, Shaukat Inamdar, Santosh K. Haram, Jose Melo and Stanislaus F. D'Souza, **Analytical Bio-chemistry**, 349 (2006), 72.
21. Synthesis and analysis of ZnO and CdSe nanoparticles, S. S. Ashtaputre, A. Deshpande, S. Marathe, M. E. Wankhede, J. Chimanpure, R. Pasricha, J. Urban, Santosh K. Haram\*, S. W. Gosavi and S. K. Kulkarni, **Pramana: Journal of Physics**, 65, (2005) 615.
22. Controlled synthesis of Cu nanoparticles in fused silica and BK7 glasses using ion beam induced defects, M. K. Patel, B. J. Nagare, D. M. Bagul, Santosh K. Haram\*, D. C. Kothari, **Surface and Coating Technology**, 196 (2005) 96.
23. Highly resolved quantized double layer charging of relatively larger dodecane thiol passivated gold quantum dots, Nirmalya K. Chaki, Bhalachandra Kakade, Jadab Sharma, Subhramannia Mahima,

- Kunjukrishna P. Vijayamohan and Santosh K. Haram, **J. of Applied Physics**, 96 (2004) 5032.
24. Synthesis and Characterization of Cd-DMSO Complex Capped CdS Nanoparticles, Manoj E. Wankhede and Santosh K. Haram\*, **Chem. Mater.**, 15 (2003) 1296.
  25. Electrochemistry and Electrogenerated Chemiluminescence from Silicon Nanocrystal Quantum dots, Zhifeng Ding, Bernadette M. Quinn, Santosh K. Haram, Lindsay E. Pell, Brian A. Korgel, Allen J. Bard\*, **Science**, 286, (2002) 1293.
  26. Electrochemistry of CdS Nanoparticles: A Correlation Between Optical and Electrochemical Bandgaps, Santosh K. Haram, Bernadette M. Quinn and Allen J. Bard\*, **J. Am. Chem. Soc.**, 123 (2001) 8860.
  27. Scanning Electrochemical Microscopy. 42. Studies of the Kinetics and Photoelectrochemistry of Thin Film CdS/Electrolyte Interfaces, Santosh K. Haram and Allen J. Bard, **J. Physical Chemistry B** 105(34), (2001), 8192-8195.
  28. Electrochemical Observation of a Metal/Insulator Transition by Scanning Electrochemical Microscopy, Bernadette M. Quinn, Inmaculada Prieto, Santosh K. Haram and Allen J. Bard\*, **J. Physical Chemistry B**, 105 (2001) 7474.
  29. Effect of Nonionic Surfactants on the Kinetics of Disproportion of Copper Sulfide Nanoparticles in the Aqueous Sols, Roshan H. Kore, Jaideep S. Kulkarni, and Santosh K. Haram\*, **Chemistry of Materials**, 13 (2001) 1789.
  30. Synthesis and characterization of copper sulfide nanoparticles in aqueous surfactant solutions, Santosh K Haram\*; Mahadeshwar, Anand R.; Dixit, Sharad G. *Adsorpt. Sci. Technol.*, 16(8) (1998), 667-677
  31. Some aspects of the role of surfactants in the formation of nanoparticles., Dixit, Sharad G.; Mahadeshwar, Anand R.; Haram Santosh K., *Colloids Surf., A*, 133(1/2) (1998), 69-75
  32. Chemical bath deposition of cubic copper (I) selenide and its room temperature transformation to the orthorhombic phase. Levy-Clement, Claude; Neumann-Spallart, M.; Haram, S. K.; Santhanam, K. S. V. *Thin Solid Films*, 302(1,2) (1997), 12-16.
  33. Synthesis and Characterization of Copper Sulfide Nanoparticles in Triton-X 100 water-in-Oil Microemulsions. Haram, Santosh K.; Mahadeshwar, Anand R.; Dixit, Sharad G., *J. Phys. Chem. B*, 100(14) (1996), 5868-5873.
  34. Semiconductor Nanoparticles: The World of Neglected Dimensions', Santosh K. Haram\* and Sharad G. Dixit, *Bombay Technologist; Journal of Technological Association* 44 (1995), 6-9.
  35. Photoelectrochemical responses of orthorhombic and cubic copper selenides. Haram, Santosh K., Santhanam, K. S. V. *J. Electroanal. Chem.*, 396 (1-2) (1995), 63-68
  36. Electroless deposition of orthorhombic copper (I) selenide and its room temperature phase transformation to cubic structure, Haram Santosh K. and K.S.V. Santhanam, *Thin Solid Films*, 238 (1994), 21-26.
  37. Electroless deposition on copper substrates and characterization of thin films of copper (I) selenide. Haram Santosh K.; Santhanam, K. S. V.; Neumann-Spallart, M.; Levy-Clement, C., *Mater. Res. Bull.* (10) (1992), 1185-1191.
  38. Chemical deposition of cadmium sulfide in the presence of an external magnetic field. Mondal, K. C.; Haram, S. K.; Santhanam, K. S. V. *Mater. Sci. Monogr.*, 65(Chem. Energy-1), (1991) 225-233.27.
  39. Loss in conformational rigidity of bradykinin on replacement of the Phe-8 by tyrosine. Srivastava, Sudha; Haram, S. K.; Phadke, Ratna S. *Magn. Reson. Chem.*, 29 (4) (1991), 333-337.
  40. Excess enthalpy during electrolysis of deuterium oxide., Santhanam, K. S. V.; Rangarajan, J.; Mandal,

K. C.; Haram, S. K., *Curr. Sci.* 58(20) (1989), 1139-41.

41. Electrochemically initiated cold fusion of deuterium. Santhanam, K. S. V Rangarajan, J.; Braganza, O'Neil; Haram, S. K.; Limaye, N. M.; Mandal, K. C. *Indian J. Technol.*, 27(4) (1989), 175-7

### Monographs:

1. Semiconductor Electrodes, in **Handbook of Electrochemistry**, edited, Cynthia Zoski, Elsevier Netherlands, (2007) 329-389 ISBN 0 444 51958 0
2. Prospective usage of photoelectrochemistry for environmental control., Haram, S. . K.; Santhanam, K. S. V., **Stud. Environ. Sci.** 59 (Environmental Oriented Electrochemistry), (1994), 445-467.

### Text-book:

1. Electrochemistry: A modern Approach, **Universities Press (India) Private Limited** *in process*

### Invited Talks

#### **International Level:**

1. "Synergistic Effect of Carbon Nanotubes Support on Electrocatalytic Properties of Silver in the Nitrate Ions Reduction" Ertl first International Conference at GIST, **South Korea**, April 11, **2010**.
2. "Electrochemistry with Nanophase Materials" in "International conference on nanomaterials and applications (ICNAMA-2008), Shivaji University, **Kolhapur**, Dec. 9-11, **2008**.
3. "University of Paris, Orsay, **France** on 'Electrochemistry with nanophase materials.'" Jun. **2006**.
4. "CNRS, Paris, **France** on 'Electrochemistry with nanophase materials.'" Jun. **2006**.

#### **National Level:**

5. "Determination of Band Structure Parameter of Semiconductor Quantum Dots and their Alloys by Cyclic Voltammetry", National Seminar on Nanomaterials for Devices: Characterization and Application, June 24, **2010**
6. "Voltammetry on semiconductor Q-dots" at IISER, Trivendrum, May 5, **2010**.
7. "Electrochemistry of Nanophase Materials, at NIIST (CSIR), Trivendrum, May 3, **2010**.
8. "Nanophase materials", in State level Conference, "Recent trends in Physico-Chemical Sciences, Biotechnology and Biodiversity", at D.Y. Patil College of Arts, Science and Commerce, Pimpri, Pune-411018, Feb 12-13, **2010**.
9. "My Electrochemical Odyssey with Nanophase Materials" in State level Conference on Recent Trends in Material Science", at Department of Physics, Poona College of Arts, Science and Commerce, Camp, Pune 411001 on Feb 5-6, **2010**.
10. "Electrochemistry of Nanoparticles", in "National Symposium on Materials" G.M.D. Arts B.W. Commerce and Science College, Sinnar, Nashik, January 23, **2010**.
11. "Electrochemistry with Nanophase materials" in Workshop, "Chemistry of Nanomaterials and its applications" on November 13, **2009**.
12. Invited lecture on, "Electrochemistry of Nanophase materials" at Analytical Chemistry division, BARC, July 24th **2009**.
13. Invited lecture on, "Electrochemistry of Nanophase materials" in "State Level seminar on Advances in Chemical Synthesis" University of Goa, March 14, **2009**.

14. Refresher course in Physics, Department of Physics, University of Pune, March 13, 2009.
15. Invited talk on Nanoscience and Nanotechnology at, Abeda Inamdar College, Pune, March 9, **2009**.
16. UGC sponsored National Level Seminar on "Modern methods in Chemistry", St. Aloysius College, Mangalore-575003, 20-21 Feb. **2009**.
17. "Nanoparticles: World of Negligible Dimension", in "State level Workshop on Nanoscience" G.M.D. Arts B.W. Commerce and Science College, Sinnar, Nashik, Dec 13, **2008**.
18. "How to Present" in 'Scientific and Technical Communication Skills (STCS08)" at Maharashtra Academy of Engineering, Alandi (D), Pune, Nov 8, **2008**.
19. "Electrochemical Investigations on Nanophase Materials", at Department of Chemistry, Indian Institute of Technology, Bombay, Mumbai, April 15, **2008**.
20. "My Electrochemical 'Odyssey' with Nanophase Materials" in National seminar on Nanomaterials?", at Department of Chemistry, University of Mumbai, March 28- 29, **2008**.
21. "Electrochemistry with Nanophase Materials" in "First Indo-Danish DU-SDU Seminar" at Department of Chemistry, University of Delhi, March 17-18, **2008**.
22. "Scanning Electrochemical Microscopy (SECM)": A probe to study electroincs and electro-active topography " Dicussion Meet on Electroanalytical Techniques and Their Applications (DM-ELANTE-2008), organized by Indian Society for Electroanalytical Chemistry, Munnar. Feb 25-28 **2008**.
23. 'Scanning Electrochemical Microscopy (SECM)' 14th National Conventions for Electrochemists, Organized by SAEST, IGCAR, Kalpakum, Dec 6-7, **2007**.
24. Short Term Training Programme on Current Advances and Trends in Physics and Chemistry, at Maharashtra Academy of Engineering, Alandi, Pune, Jan **2007**.
25. State level workshop on Analytical Instrumental Techniques, KTHM college, Nasik, Dec **2006**.
26. "Indian Council for Chemists" at Birla institute of Technology, Ranchi, Dec **2005**.
27. 'Radiation and Photochemical Research in Nanoscience' organized by ISRAPS at IIT Bombay, Dec **2005**.
28. National Workshop on Nano Technology Nano-2005, on 'Nanoparticles: World of Negligible Dimensions', organized by Chhattisgarh Swami Vivekanand Technical University, Bhilai, Aug **2005**.