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## Resume of Aadesh P. Singh, Dr.

### Research Activity

Conversion of solar energy into the chemical fuel (solar hydrogen) by solar water splitting provides safe, eco-friendly and world's most abundant source of energy. For this purpose a leading approach for the production of hydrogen is the use of renewable source of energy, such as solar radiation, to oxidize water however, the (photo) oxidation of water is a challenging electrochemical reaction demanding robust but inexpensive electrode materials. In this context, applicant is fully involved in comprehensive experimental investigations on visible-light active nanostructured metal oxide photocatalysts for photoelectrochemical water splitting for solar hydrogen production. The main focus of his research is synthesis of nanostructure metal oxide semiconductor in the form of thin films and modify the properties of thin films by various techniques like doping, making heterostructures of different metal oxides, by disorder engineering, conductive carbon incorporation and high energy ion bombardment. Conducting carbon nano-architecture is also introduced in nano-catalysts for the efficient and swift separation of photogenerated electrons and holes which will improve the photoelectrochemical activity.



### Contact

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### Research Areas

- Scaled-up Synthesis of Nanoparticles, Assembly and Architectures
- Large Area Nanostructured Functional Coatings
- Plasma-CVD, CVD, Spray Pyrolysis, Sol-Gel and Hydrothermal Techniques
- Photoelectrochemical water splitting for solar hydrogen production

### Thesis Work:

- Master thesis in Microwaves on the topic: “**Design and Fabrication of Square Open Loop Resonator**” from Dayalbagh Educational Institute, Dayalbagh, Agra, India (December, 2004).
- Doctorate thesis in Material Science on the topic “**Preparation and Characterization of some Nanostructured Metal Oxides for PEC Generation of Hydrogen**” from Dayalbagh Educational Institute, Dayalbagh, Agra, India (October, 2010).

### Academic Employment

- Researcher at Chemical Physics, Department of Physics, Chalmers University of Technology, Gothenburg, Sweden (September 2016 to till date).
- INSPIRE Faculty, Department of Physics, Indian Institute of Technology, New Delhi (Nov. 2010-September 2016).
- Post-Doctoral Fellow, University of Cologne, Cologne, Germany (Nov. 2010-to Oct 2012).
- Senior Research Fellow, University Grant Commission, New Delhi, India (March 2008-October 2010).
- Junior Research Fellow, University Grant Commission, New Delhi, India (March 2006-March 2008).

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- Junior Research Fellow, Department of Science and Technology, New Delhi, India (April 2005-February 2006).

#### **Professional Affiliations and Community Service**

- Member of the Material Research Society, USA.
- Member of the American Ceramics Society, USA.

#### **Awards, Scholarships and Prizes**

- Young Scientist Award 2014 in the area of “Hydrogen Energy and Advance materials” from University of Kerala, India.
- INSPIRE Faculty award from DST-INSA, New Delhi, Government of India (2012).
- Fellowship of the University Grant Commission, New Delhi, India for performing doctoral research (2005-2010).
- Best poster presentation award in International Conference on Nanotechnology in Chemistry, Health & Environment, NATCHEE 2010, DEI, Agra, India (7-9, January 2010).
- Best poster presentation award in 36<sup>th</sup> International Conference and Exposition on Advanced Ceramics and Composites, Daytona Beach, Florida, USA, (January 22-27, 2012).

#### **Workshop/Symposium Organized**

1. Workshop on “Nano Probe Techniques” at Indian Institute of Technology Delhi, New Delhi, India along with CAMECA on 14th July 2014.
2. Workshop on “Electrochemical Technologies in Hydrogen Production and Utilization for Electrical Energy” at Indian Institute of Technology Delhi, New Delhi, India during 8-9th October 2015.
3. Symposium on “Carbon and Material for Energy Application” in EMRS-2016 Fall meeting at Warsaw University of Technology, Warsaw, Poland during September 19-22<sup>nd</sup> 2016.

#### **Invited Talks**

1. “Metal Oxide Semiconductor Based Photoelectrochemical Cell for Hydrogen Production” 4<sup>th</sup> National Convention on Hydrogen energy and Advanced materials at MANIT, Bhopal during 28-29<sup>th</sup> November 2015.
2. “Solar Hydrogen Production: Metal Oxide Semiconductors Based Photoelectrochemical Cell” at TEQIP-II Sponsored Workshop on “Electrochemical Technologies in Hydrogen Production and Utilization for Electrical Energy” during 8<sup>th</sup> to 9<sup>th</sup> October 2015.
3. “Metal Oxide Semiconductors Based Photoelectrochemical Cell for Hydrogen Production” at E-MRS 2015 Fall Meeting at the Warsaw University of Technology during 15<sup>th</sup> to 18<sup>th</sup> September 2015.
4. “Solar Hydrogen: The Fuel for Future” at “Fraunhofer Institute for Mechanics of Materials, Physical Modelling of Materials, Freiburg, Germany” on 25<sup>th</sup> October 2013.
5. “Photoelectrochemical Water Splitting for Hydrogen Production” Nanotage 2011, Altenberg, Dresden, Germany (25<sup>th</sup> -28<sup>th</sup> August 2011).

#### **International Experience**

1. Working at “**Chemical Physics, Department of Physics, Chalmers University of Technology**”, Gothenburg, Sweden.
2. Worked at “**Institute of Inorganic Chemistry, University of Cologne, Cologne, Germany**” as Post-Doctoral Researcher from November 2010 to October 2012.

3. Worked at “**Department of Chemical and Biomolecular Engineering, University of Maryland**”, College Park, USA as an “Exchange Visitor” from February – May, 2009, under the DST-NSF Collaborative Research Project No. NSF DMR086610.
4. Visited “**Lawrence Berkeley National Laboratory**”, Berkeley, California, USA during April 2009 and had discussion and interaction with many scientists working on high energy ion beam of Advance Light Source laboratory.
5. Visited “**Fraunhofer Institute for Mechanics of Materials**”, Physical Modelling of Materials, Wöhlerstr. 11, D-79108 Freiburg, Germany for collaborative research work on hydrogen treated TiO<sub>2</sub> thin films for solar hydrogen production during 13th October to 28th October 2013.
6. Visited “**University of Freiburg**, Freiburg, Germany for Kick-off meeting of collaborative research project entitled “**Innovative Material Systems for Solar Energy Harvesting in Photoelectrochemical Cells (InSOL)**,” during October 2014.
7. Visited “**University of Freiburg**, Freiburg, Germany for Mid-term project meeting of collaborative research project entitled “**Innovative Material Systems for Solar Energy Harvesting in Photoelectrochemical Cells (InSOL)**,” during 20<sup>th</sup> June-6<sup>th</sup> July 2016.
8. Visited “**University College of London**, under the DST-UKIERI collaborative research project entitled “**Nanoscale Surface Engineering in Inorganic Hetero-structures with Enhancement Photocatalysts Activity for Sustainable Solar Hydrogen Production**,” during July 2016.

#### Research Projects

1. Project Title: **Visible-Light Active Metal Oxide Nano-catalysts for Sustainable Solar Hydrogen Production (CLEAN-SOLAR)**, Funding agency: DST India, Total Cost: 35 Lakh , Duration: 5 Years
2. Project Title: **Nanoscale Surface Engineering in Inorganic Hetero-structures with Enhancement Photocatalysts Activity for Sustainable Solar Hydrogen Production**, Funding agency: DST-UKIERI, Total Cost: 20.5 Lakh, Duration: 2 Years
3. Project Title: **Innovative Material Systems for Solar Energy Harvesting in Photoelectrochemical Cells (InSOL)**, Funding agency: DST-EU New-Indigo, Delhi, Total Cost: 68.52 Lakh, Duration: 3 Years

#### List of Publications

1. Praduman Arora, **Aadesh P. Singh**, B.R. Mehta, Suddhasatwa Basu, Bodh R. Mehta, “Metal doped tubular carbon nitride (M-tC<sub>3</sub>N<sub>4</sub>) as an effective photocatalyst for surface sensitization of hematite thin films for photoelectrochemical water splitting under visible-light”, *RSC Advances*, 2016 (**Submitted**).
2. Nimai Bhandary, **Aadesh P. Singh**, Pravin P. Ingole, Suddhasatwa Basu, “CoFeOx modified hematite dendrites/g-C<sub>3</sub>N<sub>4</sub> composite for improved photoelectrochemical water splitting” *ChemPhotoChem*, (2016) (**Under Review**).
3. **Aadesh P Singh**, Nishant Saini, Bodh R Mehta, “Enhanced Photoelectrochemical Water Splitting Performances of Hydrogen Treated Hematite Thin Films Coupled with an Iron Oxyhydroxide Oxygen Evolution Catalyst” *Chemistry Select*, 2016 (**Under Review**).
4. Sandeep Kumar, R. Parthasarathy, **Aadesh P Singh**, Meganathan Thirumal, and Ashok K. Ganguli, "Facet-selective synthesis of NaNbO<sub>3</sub>/CdS core/shell heterostructures for photoelectrochemical and photocatalytic applications”, *Green Chemistry*, 2016, (**Under Review**).
5. Sandeep Kumar, **Aadesh P Singh**, R. Parthasarathy, Meganathan Thirumal, B.R. Mehta and Ashok K. Ganguli, “Fabrication of TiO<sub>2</sub>/CdS/Ag<sub>2</sub>S nano-heterostructured photoanode for enhancing the photoelectrochemical and photocatalytic activity under visible light”, *Chemistry Select*, 2016, 1, 4891-4900.

6. Nimai Bhandarya, **Aadesh P. Singh**, Sandeep Kumar, Pravin P. Ingole, Gohil S. Thakur, Ashok K. Ganguli, Suddhasatwa Basu, In Situ Solid-State Synthesis of a AgNi/g-C<sub>3</sub>N<sub>4</sub> Nanocomposite for Enhanced Photoelectrochemical and Photocatalytic Activity, *ChemSusChem*, 2016, (In Press).
7. **Aadesh P. Singh**, Nisha Kodan, Bodh R. Mehta, Alexander Held, Leonhard Mayrhofer, Michael Moseler, “Band Re-alignment in BiVO<sub>4</sub>/TiO<sub>2</sub> Heterojunction Photoanode for Efficient Photoelectrochemical Water Splitting” *ACS Catalysis*, 2016, 6, 5311–5318.
8. Sandeep Kumar, **Aadesh P. Singh**, Chandan Bera, Meganathan Thirumal, B. R. Mehta and Ashok K. Ganguli, “Enhanced Photoelectrochemical and Photocatalytic Performance of Ag<sub>2</sub>S Sensitized NaNbO<sub>3</sub> Nanorods”, *ChemSusChem*, 2016, 9, 1850 – 1858.
9. Nimai Bhandarya, **Aadesh P. Singh**, Pravin P. Ingole, Suddhasatwa Basu, Enhanced photoelectrochemical performance of electrodeposited hematite films decorated with nanostructured NiMnOx, *RSC Advances*, 6, 2016, 35239-35247.
10. **Aadesh P. Singh**, Nisha Kodan, Bodh R. Mehta, “Enhancing the Photoelectrochemical Properties of Titanium Dioxide by Thermal Treatment in Oxygen Deficient Environment” *Applied Surface Science*, 372, (2016), 63–69.
11. **Aadesh P. Singh**, Praduman Arora, Suddhasatwa Basu, Bodh R. Mehta, “Enhanced photocatalytic performance of g-C<sub>3</sub>N<sub>4</sub> loaded α-TiO<sub>2</sub>/c-TiO<sub>2</sub> core-shell homojunction photocatalyst” *International Journal of Hydrogen Energy*, 41 (2016), 5617-5628.
12. Manan Mehta, Nisha Kodan, Sandeep Kumar, Akshey Kaushal, Leonhard Mayrhofer, Michael Walter, Michael Moseler, Avishek Dey, Satheesh Krishnamurthy, Suddhasatwa Basu, and **Aadesh P. Singh**, “Vacuum Hydrogen Annealed Titanium Dioxide Nanocrystal for Enhanced Photoelectrochemical and Photocatalytic Performance”, *J. Material Chemistry A*, 4, (2016) 2670-2681.
13. **Aadesh P. Singh**, Nisha Kodan, Avishek Dey, Satheesh Krishnamurthy, Bodh R. Mehta, “In-situ plasma hydrogenated TiO<sub>2</sub> thin films for enhanced photoelectrochemical properties”, *Material Research Bulletin*, 76 (2016) 284–291.
14. **Aadesh P. Singh**, Nisha Kodan, Avishek Dey, Satheesh Krishnamurthy, Bodh R. Mehta “Improvement in the structural, optical, electronic and photoelectrochemical properties of hydrogen treated bismuth vanadate thin films” *International Journal of Hydrogen Energy*, 40(2015) 4311–4319.
15. Andreas Mettenbörger, Trilok Singh, **Aadesh P. Singh**, Tommi T. Järvi, Martin Valldor and Sanjay Mathur, “Hydrogen Plasma-modification of Hematite Photoanodes for Efficient Solar Hydrogen Generation”, *International Journal of Hydrogen Energy*, 39 (2014), 4828–4835.
16. Davide Barreca, Giorgio Carraro, Alberto Gasparotto, Chiara Maccato, Cinzia Sada, **Aadesh P. Singh**, Sanjay Mathur, Andreas Mettenbörger, Elza Bontempi, Laura E. Depero, “Columnar Fe<sub>2</sub>O<sub>3</sub> arrays via plasma-enhanced growth: interplay of fluorine substitution and photoelectrochemical properties”, *International Journal of Hydrogen Energy*, 38 (2013) 14189-14199.
17. Osman Arslan, **Aadesh P. Singh**, Lhoussaine Belkoura and Sanjay Mathur, “Cysteine Functionalized Zwitterionic ZnO Quantum Dots”, *Journal of Materials Research* 28 (14), (2013) 1947-1954.
18. Andreas Mettenbörger, Vanessa Merod, **Aadesh P. Singh**, Helge Lemmetyinen and Sanjay Mathur, Plasma-Assisted Chemical Vapor Deposition of Fe:TiO<sub>2</sub> Films For photoelectrochemical Hydrogen Production, *Ceramic Engineering and Science Proceedings*, 33 (7), (2013), 81-88.
19. Yu-Min Shen, Raquel Fiz, Andreas Mettenbörger, **Aadesh P. Singh**, Sheng-Chang Wang, Sanjay Mathur, Jow-Lay Huang, *YMS-IEEE-2013*.
20. **Aadesh P. Singh**, Andreas Mettenbörger, Peter Golus and Sanjay Mathur, “Photoelectrochemical Properties of Hematite Films Grown by Plasma Enhanced Chemical Vapor Deposition”, *International Journal of Hydrogen Energy*, 37, (2012) 13983-13988.
21. **Aadesh P. Singh**, Saroj Kumari, Rohit Shrivastav, Sahab Dass, Vibha R. Satsangi “Structural, Morphological and Photoelectrochemical Behavior of Hematite Modified by 120 MeV Ag<sup>9+</sup> Ions”, *Material Research Society Symposium Proceeding*, 1217, (2010), Y3-60.

22. **Aadesh P. Singh**, Saroj Kumari, A. Tripathi, F. Singh, Karen J. Gaskell, Rohit Shrivastav, Sahab Dass, S. H. Ehrman, Vibha R. Satsangi “Improved Photoelectrochemical Response of Titanium Dioxide Irradiated with 120 MeV Ag<sup>9+</sup> Ion”, *Journal of Physical Chemistry C*, **114** (1), (2010), 622–626.
23. Praveen Kumar, Poonam Sharma, **Aadesh P. Singh**, Rohit Shrivastav, Sahab Dass, Vibha R. Satsangi, “Morphological, Optical and Photoelectrochemical Study of Electrodeposited Nanostructured Hematite Thin Films”, *Proceedings of International Conference on Nanotechnology in Chemistry, Health, Energy and Environment*, 2010, 445-451.
24. Arti Prasad, Poonam Sharma, Saroj Kumari, **Aadesh P. Singh**, Rohit Shrivastav, Sahab Dass, Vibha R. Satsangi, “PEC System for Hydrogen Generation Using Zn Doped Fe<sub>2</sub>O<sub>3</sub>/TiO<sub>2</sub>Bicomponent”, *Proceedings of International Conference on Nanotechnology in Chemistry, Health, Energy and Environment*, 2010,438-444.
25. Saroj Kumari, **Aadesh P. Singh**, Sonal, Dinesh Deva, Rohit Shrivastav, Sahab Dass, Vibha R. Satsangi, “Spray pyrolytically deposited Nanoporous Ti<sup>4+</sup> Doped Hematite Thin Films for Efficient Photoelectrochemical Splitting of Water” *International Journal of Hydrogen Energy*, 35, 2010, 3985-3990.
26. **Aadesh P. Singh**, Saroj Kumari, R. Shrivastav, S. Dass, Vibha R. Satsangi, “Improved Photoelectrochemical Response in Hematite by High Energy Ag<sup>9+</sup> Ions Irradiation”, *Journal of Physics D: Applied Physics*, **42**, (2009), 085303 (5pp).
27. **Aadesh P. Singh**, Saroj Kumari, Sonal, Rohit Shrivastav, Sahab Dass, Vibha R. Satsangi “Bandgap Tailoring in Nanocrystalline TiO<sub>2</sub> by Ammonia Treatment”, *Journal of Scientific Conference Proceedings*, **1**(1), (2009), 82-85.
28. Monika Gupta, Vidhika Sharma, Jaya Shrivastava, Anjana Solanki, **Aadesh P. Singh**, Vibha R. Satsangi, S. Dass and Rohit Shrivastav, “Preparation and Characterization of Nanostructured ZnO Thin Films for Photoelectrochemical Splitting of Water”, *Bulletin of Materials Science*, **32**(1), (2009), 1-8.
29. **Aadesh P. Singh**, Saroj Kumari, Rohit Shrivastav, Sahab Dass, Vibha R. Satsangi, “Nanocrystalline Fe<sub>2</sub>O<sub>3</sub> and TiO<sub>2</sub> Based Photoelectrochemical System Modified by Swift Heavy Ion Irradiation”, *Proceeding of National Systems Conference (NSC-2009)*.
30. Monika Gupta, Jaya Shrivastava, Vidhika Sharma, Anjana Solanki, **Aadesh P. Singh**, Vibha R. Satsangi, S. Dass and Rohit Shrivastav, “Enhanced Photoelectrochemical Activity of 120 MeV Ag<sup>9+</sup> Irradiated Nanostructured Thin Films of ZnO for Solar-Hydrogen Generation via Splitting of Water”, *Advanced Materials Research*, **67**, (2009), 95-102.
31. **Aadesh P. Singh**, Saroj Kumari, R. Shrivastav, Sahab Dass, Vibha R. Satsangi, “Iron doped Nanostructured TiO<sub>2</sub> for Photoelectrochemical Generation of Hydrogen”, *International Journal of Hydrogen Energy*, **33**, (2008), 5363–5368.
32. **Aadesh P. Singh**, Ambuj Tripathi, Rohit Shrivastav, Sahab Dass, Vibha R. Satsangi, “New Benchmark to Improve the Photoelectrochemical Properties of Hematite” *Proceeding of Solar Hydrogen and Nanotechnology III*, **7044**, 2008, 70440H (1-8).
33. Jaya Shrivastava, Chanakya Tripathi , Anjana Solanki, Monika Gupta, **Aadesh P. Singh**, Vibha R. Satsangi, Rohit Shrivastav, Sahab Dass “Development of New Photocatalyst for PEC System to Generate Renewable Hydrogen”, *Proceeding of National Systems Conference (NSC-2008)*.
34. Vibha R. Satsangi, Saroj Kumari, **Aadesh P. Singh**, Rohit Shrivastav, Sahab Dass, “Nanostructured Hematite for Photoelectrochemical Generation of Hydrogen”, *International Journal of Hydrogen Energy*, **33**, (2008), 312-318.
35. Vibha R. Satsangi, **Aadesh P. Singh**, Pooja Johri, Saroj Kumari, Sonal, R. Shrivastav, S. Dass, “Bilayered Photoelectrode for Solar Hydrogen Production System”, *Proceeding of National Systems Conference (NSC-2007)*.
36. Saroj Kumari, **Aadesh P. Singh**, Chanakya Tripathi, Diwakar Chauhan, Sahab Dass, Rohit Shrivastav, Vinay Gupta, K. Sreenivas, Vibha R. Satsangi “Enhanced Photoelectrochemical Response of Zn Dotted Hematite”, *International Journal of Photoenergy*, **2007**, 2007, 87467 (1-6).

37. Saroj Kumari, Chanakya Tripathi, **Aadesh P. Singh**, Diwakar Chauhan, Rohit Shrivastav, Sahab Dass, Vibha R. Satsangi, "Characterization of Zn Doped Hematite Thin Films for Photoelectrochemical Splitting of Water", *Current Science*, **91(8)**, (2006), 1062-1064.

#### **Book Chapter Published**

1. "Metal Organic Chemical Vapor Deposition of Metal Oxide Films and Nanostructures" **published by Wiley-VCH Verlag GmbH & Co. KGaA** in the book "Ceramics Science and Technology: Volume 3: Synthesis and Processing" Edited by Ralf Riedel and I-Wei Chen.
2. "Multi-component Metal Oxide Nano-architectures for Chemical Sensors", **published by Springer Science** in the book "Metal Oxide Nanomaterials for Chemical Sensors" Edited by Sanjay Mathur, Andrei Kolmakov and Michael A. Carpenter.

#### **Presentations in International/National Conferences, Workshops and Symposiums**

1. "A Study on Zn Doped Hematite Thin Films for Photoelectrochemical Splitting of Water" National Symposium on Energy, Environmental and Chemical Industries, Udaipur (14<sup>th</sup> -15<sup>th</sup> December 2005).
2. "Nanostructured Metal Oxide in Photoelectrochemical Splitting of Water for Hydrogen Production" Discussion Meeting on Materials for Future Energy Systems, BARC, Mumbai (18<sup>th</sup> -19<sup>th</sup> January 2006).
3. "Effects of 100 MeV Ni<sup>10+</sup> on Electrodeposited Cuprous Oxide Thin Films", Workshop on Nanotechnology with Ion Beams & Possible Applications, Inter University Accelerator centre, New Delhi (Oct.31-Nov.1, 2006).
4. "Nanostructured Hematite for Photoelectrochemical Generation of Hydrogen" International Workshop on Hydrogen Energy Production, Storage and Application, Centre for Non-Conventional Energy Resources, University of Rajasthan, Jaipur (5<sup>th</sup> - 9<sup>th</sup> Nov. 2006).
5. "Bandgap Tailoring in Nanocrystalline TiO<sub>2</sub> by Ammonia Treatment" National Seminar on Multifunctional Nanomaterials Nanostructures and Applications, University of Delhi (22<sup>nd</sup> - 23<sup>rd</sup> Dec. 2006).
6. "Growth and characterization of nanostructured thin films of CuO for photoelectrochemical energy conversion" 9<sup>th</sup> CRSI, National Symposium in Chemistry, University of Delhi (1<sup>st</sup> - 4<sup>th</sup> Feb. 2007).
7. "Modification induced by 100 MeV Ni<sup>10+</sup> ions on electrodeposited copper oxide thin film for PEC application" PHOTORADCHEM-2007 (An international conference on frontiers and photochemistry), Mahatma Gandhi University, Kottayam, Kerala (8<sup>th</sup> -11<sup>th</sup> Feb. 2007).
8. "Bilayered Semiconductor (WO<sub>3</sub>/TiO<sub>2</sub>) for Photoelectrochemical Splitting of Water" National Symposium on Recent Advances in Analytical Sciences and Applications, Himachal Pradesh University, Summer Hills, Shimla, (9<sup>th</sup> -11<sup>th</sup> April 2007).
9. "Effect of 100 MeV Ni<sup>10+</sup> swift heavy ion (SHI) irradiation on electrodeposited Cu<sub>2</sub>O films for hydrogen generation by photoelectrochemical splitting of water" SPIE Optics + Photonics 2007-Solar Hydrogen and Nanotechnology II, San Diego Convention Center, San Diego California, USA (27<sup>th</sup> - 30<sup>th</sup> August 2007).
10. "Effect of 120 MeV Ag<sup>9+</sup> Ions Irradiation on Photoelectrochemical Behaviour of Nanostructured TiO<sub>2</sub>", Workshop on Swift Heavy Ions Based Material Science", Inter University Accelerator centre, New Delhi (17<sup>th</sup> -18<sup>th</sup> September 2007).
11. "100 MeV Ni<sup>10+</sup> Induced Modification on Electrodeposited Cuprous Oxide Thin Films", Workshop on Swift Heavy Ions Based Material Science", Inter University Accelerator centre, New Delhi (17<sup>th</sup> -18<sup>th</sup> September 2007).
12. "Bilayered Photoelectrode for Solar Hydrogen Production System", National Systems Conference (NSC-2007), Manipal Institute of Technology, Manipal, (14-15<sup>th</sup> December 2007).

13. "Photoelectrochemical Behaviour of Nanostructured TiO<sub>2</sub> modified by 120 MeV Ag<sup>9+</sup> Ions Irradiation", International Conference cum Workshop on Nanoscience and Nanotechnology, Ansal Institute of Technology, Gurgaon (17<sup>th</sup> - 21<sup>st</sup> December 2007).
14. "Modifications Induced by 100 MeV Ni<sup>10+</sup> Ions on Electrodeposited Cu<sub>2</sub>O thin films for Splitting of Water", National Workshop on Catalysis- Futuristic Material as Catalysts and Adsorbents, Institute of Minerals and Material Technology, Bhubaneswar (18<sup>th</sup> – 20<sup>th</sup> February, 2008).
15. "New Benchmark to Improve the Photoelectrochemical Properties of Hematite" SPIE Optics + Photonics 2008-Solar Hydrogen and Nanotechnology III, San Diego Convention Center, San Diego California, USA (10<sup>th</sup> – 14<sup>th</sup> August 2008).
16. "Copper Oxide Nanoparticles via Flame Spray Pyrolysis for Photoelectrochemical Hydrogen Generation", AAAR Annual Meeting, Orlando FL, (October 21, 2008).
17. "Structural and Photoelectrochemical Properties of Iron Oxide Modified by Swift Heavy Ion Irradiation" 2<sup>nd</sup> DAE-BRNS International Symposium on Materials Chemistry, BARC Mumbai (2<sup>nd</sup>- 6<sup>th</sup> December, 2008).
18. "Development of New Photocatalyst for PEC System to Generate Renewable Hydrogen" XXXII National Systems Conference on Energy Systems - Optimization and Conservation (NSC-2008), Indian Institute Of Technology, Roorkee (17<sup>th</sup>-19<sup>th</sup> December, 2008).
19. "Enhanced Photoelectrochemical Response of Titanium Dioxide Thin Films Modified by Swift Heavy Ion Irradiation" International Conference Hydrogen & Hydrogen Storage Methods & Materials, Indian Institute of Science, Bangalore (3<sup>rd</sup>- 6<sup>th</sup> January, 2009).
20. "Surface Modified Undoped and Iron Doped Titanium Dioxide Thin Films with Improved Photoelectrochemical Response" MRS Symposium S: Materials in Photocatalysis and Photoelectrochemistry for Environmental Applications and H<sub>2</sub> Generation, San Francisco, California, (13<sup>th</sup>-17<sup>th</sup> April, 2009).
21. "Photoelectrochemical Study on Nanostructured  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub> Modified by Swift Heavy Ion Irradiation" Workshop on Oxide Materials, Aligarh Muslim University, Aligarh, (12<sup>th</sup>-13<sup>th</sup> May 2009).
22. "Nanostructured Fe-TiO<sub>2</sub>/Zn-Fe<sub>2</sub>O Double Layered Film for PEC Generation of Hydrogen", International Conference cum Workshop on Nanoscience and Nanotechnology, Ansal Institute of Technology, Gurgaon (12<sup>th</sup> - 16<sup>st</sup> October 2009).
23. "Nanostructured TiO<sub>2</sub>/ $\alpha$ -Fe<sub>2</sub>O<sub>3</sub> Coupled Thin Films for PEC generation of Hydrogen" 3<sup>rd</sup> International Symposium on Hydrogen in Matter" ISOHIM-09, IIT, Madras (13-16 Dec, 2009)
24. "Structural, Morphological and Photoelectrochemical Behavior of Hematite Modified by 120 MeV Ag<sup>9+</sup> Ions", 2009 MRS Fall Meeting, Symposium Y: Catalytic Material for Energy, Green Processes and Nanotechnology, Boston, Massachusetts, USA (30<sup>th</sup> November - 4<sup>th</sup> December, 2009).
25. "Solar Energy Induced Hydrogen Production Using Multilayered Thin films" Recent Advances in Environmental Protection, RAEP-09, St. Johns College, Agra (17-19 December. 2009).
26. "Morphological, Optical and Photoelectrochemical Study of Electrodeposited Nanostructured Hematite Thin Films" International Conference on Nanotechnology in Chemistry, Health & Environment, NATCHEE 2010, DEL, Agra (7-9, January 2010). (**Best Poster Presentation Award**)
27. "PEC System for Hydrogen Generation Using Zn Doped Fe<sub>2</sub>O<sub>3</sub>/TiO<sub>2</sub> Bicomponent" International Conference on Nanotechnology in Chemistry, Health & Environment, NATCHEE 2010, Jan. 7-9, 2010, DEL, Agra (7-9, Jan. 2010).
28. "Enhanced Photoelectrochemical Response of Metal Oxide Thin Films Modified By Swift Heavy Ion Beam" Conference on Nanostructuring by Ion Beams, University of Allahabad, Allahabad (October 17-19, 2011).

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29. "Plasma-Enhanced CVD of Hematite: Photoelectrochemical Water Splitting for Hydrogen Production" 36<sup>th</sup> International Conference and Exposition on Advanced Ceramics and Composites, Daytona Beach, Florida, USA, (January 22-27, 2012).
  30. "MO-CVD of Niobium (V) Oxide Nanorods: Structural, Morphological and Photoelectrochemical Properties" 36<sup>th</sup> International Conference and Exposition on Advanced Ceramics and Composites, Daytona Beach, Florida, USA, (January 22-27, 2012).
  31. "Plasma-Enhanced CVD of Metal Oxide Nanostructures: Growth and Device Applications" 36<sup>th</sup> International Conference and Exposition on Advanced Ceramics and Composites, Daytona Beach, Florida, USA, (January 22-27, 2012). (**Best Poster Presentation Award**).
  32. Dr. Aadesh P. Singh attended 6<sup>th</sup> International Conference on Nano Science and Technology- ICONSAT 2014 - held at Panjab University during March 3-5, 2014.
  33. "Structural, Optical and Photoelectrochemical Properties of Nanostructured TiO<sub>2</sub> Thin Films Prepared by Rf Sputtering" Nisha, Aadesh P. Singh, Bodh Raj Mehta presented a poster entitled 6<sup>th</sup> International Conference on Nano Science and Technology- ICONSAT 2014 - held at Panjab University during March 3-5, 2014.
  34. "RF-Sputter Deposition of Surface Disordered Metal Oxide Nanostructures: Growth and Photoelectrochemical Applications" Aadesh P. Singh, Nisha and B.R. Mehta", E-MRS 2014 Fall Meeting at the Warsaw University of Technology during 15<sup>th</sup> to 19<sup>th</sup> September 2014.
  35. "Vacuum Hydrogen Treated TiO<sub>2</sub> Nanocatalysts for Photoelectrochemical Water Splitting" Aadesh P. Singh, Nisha Kodan, Manan Mehta, Suddhasatwa Basu Satheesh Krishnamurthy", E-MRS 2015 Spring Meeting at Lille (France) during 11<sup>th</sup> to 15<sup>th</sup> May 2015.
  36. "Surface Disordered Bismuth Vanadate Thin Films for Photoelectrochemical Water Splitting" Aadesh P. Singh, Nisha Kodan and B.R. Mehta, National Conference on Semiconductor Materials and Devices, Indian Institute of Technology Jodhpur during 4-6<sup>th</sup> March 2016.
  37. "Efficient Phototelectrochemical Water using FeOOH decorated Hematite Thin Films photoanodes" Nishant Saini, Aadesh P. Singh and B.R. Mehta, National Conference on Semiconductor Materials and Devices, Indian Institute of Technology Jodhpur during 4-6<sup>th</sup> March 2016.
  38. "Vacuum Hydrogen Annealed Titanium Dioxide Nanocrystal for Enhanced Photoelectrochemical and Photocatalytic Performance" Manan Mehta, Satheesh Krishnamurthy, Aadesh P. Singh<sup>2</sup>, Suddhasatwa Basu, National Conference on Semiconductor Materials and Devices, Indian Institute of Technology Jodhpur during 4-6<sup>th</sup> March 2016.
  39. "Metal oxides based heterostructure for its application in photoelectrochemical water splitting under visible light illumination" Aadesh P. Singh, Nishant Saini, and B.R. Mehta, EMRS Spring Meeting at Lille (France) during 2<sup>nd</sup>-6<sup>th</sup> May 2016.