Dr. Amit Paul

Associate Professor, Department of Chemistry
Indian Institute of Science Education and Research (IISER) Bhopal
Bhopal by Pass Road, Bhauri, Bhopal, MP, 462066, India
Ph No: 91-755-2691343 (office)/ 91-8085175266 (mobile)
email: apaul@iiserb.ac.in

Education

- **University of Pittsburgh, PA, USA** (9/2003-10/2008)
  Ph.D. (Chemistry, Specialization: Physical Chemistry, Electrochemistry)
  Advisor: Prof. David H. Waldeck
- **I.I.T. (Indian Institute of Technology) Bombay, India** (7/2001-5/2003)
  M.Sc. (Chemistry, Specialization: Physical Chemistry)
  Advisor: Prof. Maheshwar Sharon
- **Jadavpur University, Calcutta, India** (9/1998-6/2001)
  B.Sc. (Honors) (Chemistry)

Professional Experience

- **Associate Professor** (08/2018-Present)
  Department of Chemistry, IISER Bhopal, India
- **Assistant Professor** (10/2011-07/2018)
  Department of Chemistry, IISER Bhopal, India
- **UVa-Energy Frontier Research Center (EFRC) Postdoctoral Research Associate** (11/2009-10/2011)
  Department of Chemistry, University of North Carolina at Chapel Hill, NC, USA
  Advisor: Prof. Thomas J. Meyer
- **Research Associate** (11/2008-9/2009)
  Department of Mechanical Engg. and Materials Science, University of Pittsburgh, USA
  Advisor: Prof. Prashant N. Kumta

Honors and Awards

- Qualified Graduate Aptitude Test (GATE) Examination, 2002
- Qualified University Grants Commission (UGC)-National Eligibility Test (NET) Examination, 2003.
- Visiting Student, Weizmann Institute of Science, Rehovot, Israel, Summer 2005.
- Travel Grant from University of Pittsburgh for American Chemical Society, Atlanta 2006.
- Travel Grant from University of Pittsburgh for American Chemical Society, Boston 2007.
- Poster Prize Winner at Polymer Innovation Northeast Ohio (PINO), Cleveland, 2008.
- Department of Atomic Energy, Govt. of India, Young Scientist Award (2013).
- Highlighted by Royal Society of Chemistry (RSC) in "**New Frontiers in Indian Research**", 2017.
- **2018 Emerging Investigator** by *Chemical Communications*, Royal Society of Chemistry (RSC).

Research Articles:
From IISER Bhopal

1. Barua, A.; Paul, A. Unraveling the role of temperature in a redox supercapacitor composed of multifarious nanoporous carbon@hydroquinone. *RSC Adv.* **2020**, *10*, 1799-1810.
2. Kumar, A.; Sujesh, S.; Varshney, A.; Paul, A.; Sankar, J. Aminophenyl substituted cobalt(III) corrole: A bifunctional electrocatalyst for the hydrogen and oxygen evolution reactions. *Dalton Trans.* **2019**, *48*, 11345-11351.
3. Jash, P.; Aravind, V.; **Paul, A.*** Tuning water oxidation reactivity by employing surfactant directed synthesis of porous Co_3O_4 nanomaterials. *New. J. Chem.* **2019**, *43*, Accepted.
4. Jash, P.; **Paul, A.*** Selective synthesis of single layer translucent cobalt hydroxide for the efficient oxygen evolution reaction. *Chem. Commun.* **2019**, *55*, 2230-2233.
5. Singh, C.; **Paul, A.*** Immense microporous carbon@hydroquinone metamorphosed from nonporous carbon as a supercapacitor with remarkable energy density and cyclability. *ACS Sustainable Chem. Eng.* **2018**, *6*, 11367-11379.
6. Bandhopadhyay, S.; Singh, C.; Jash, P.; Hussain, W.; **Paul, A.***; Patra, A*. Redox-active pyrene-based pristine porous organic polymers for efficient energy storage with exceptional cyclic stability. *Chem. Commun.* **2018**, *54*, 6796-6799. (Invited article for **2018 Emerging Investigators**)
7. M. A.; **Paul, A.*** Importance of Electrode Preparation Methodologies in Supercapacitor Application. *ACS Omega*, **2017**, *2*, 8039-8050. (Highlighted in **ACS Insights** as high quality publication from India, Among **top read articles since inception of the journal, ~8000 download**)
8. Saha, J.; Roy Chowdhury, D.; Jash, P.; **Paul, A.*** Cobalt phosphonates as precatalysts for water oxidation: Role of pore size in catalysis. *Chem. Eur. J.* **2017**, *23*, 12519-12526.
9. Maqbool, Q.; Singh, C.; Jash. P.; **Paul, A.***; Srivastava, A.* Nano "Koosh balls" of mesoporous MnO_2: Improved supercapacitor performance through superior ion transport. *Chem. Eur. J.* **2017**, *23*, 4216-4226.
10. Chandra, S.; Roy Chowdhury, D.; Addicoat, M.; Heine, T.; **Paul, A.***; Banerjee, R.* Molecular level control of the capacitance of two-dimensional covalent organic frameworks: Role of H-bonding in Energy Storage Materials. *Chem. Mater.* **2017**, *29*, 2074-2080. (Article was selected for **cover page**, **most read articles** for the year 2017)
11. Pattanayak, S.; Roy Chowdhury, D.; Garai, B.; Singh, K. K.; **Paul, A.*,** Dhar, B. B.*; Sen Gupta, S.* Electrochemical formation of $Fe^{V}(O)$ and mechanism of its reaction with water during O-O bond formation. *Chem. Eur. J.* **2017**, *23*, 3414-3424
12. Singh, C.; S. N.; Jana, A.; Mishra, A. K.*; **Paul, A.*** Proton conduction through oxygen functionalized few-layer graphene. *Chem. Commun.* **2016**, *52*, 12661-12664. (Part of themed collection **New Frontiers in Indian Research**)
13. Roy Chowdhury, D.; Spiccia, L.; Amritphale, S. S.; **Paul, A.***; Singh, A*. A robust iron oxyhydroxide water oxidation catalyst operating under near neutral and alkaline conditions. *J. Mater. Chem. A* **2016**, *4*, 3655-3660.

14. Singh, C.; Mishra, A. K.*; **Paul, A.*** Highly Conducting Reduced Graphene Synthesis via Low Temperature Chemically Assisted Exfoliation and Energy Storage Application. *J. Mater. Chem. A* **2015**, *3*, 18557-18563.
15. Singh, C.; **Paul, A.*** Physisorbed Hydroquinone on Activated Charcoal as a Supercapacitor: An Application of Proton-Coupled Electron Transfer. *J. Phys. Chem. C* **2015**, *119*, 11382-11390.
16. Maqbool, Q.; Singh, C.; **Paul, A.***; Srivastava, A.* Uniform spheroidal nanoassemblies of magnetite using Tween surfactants: Influence of surfactant structure on morphology and electrochemical performance. *J. Mater. Chem. C* **2015**, *3*, 1610-1618.
17. Jana, A.; Roy Chowdhury, D.; Singh, A.*; **Paul, A.*** Simultaneous Introduction of the Henderson-Hasselbalch Equation and Proton-Coupled Electron Transfer: An Undergraduate Laboratory Experiment. *The Chemical Educator* **2014**, *19*, 333-337. *(Teaching Article)*
18. Singh, A.; Roy Chowdhury, D.; **Paul, A.*** A kinetic study of ferrocenium cation decomposition utilizing an integrated methodology composed of cyclic voltammetry and amperometry. *Analyst* **2014**, *139*, 5747-5454.
19. Roy Chowdhury, D.; Singh, C.; **Paul, A.*** Role of graphite precursor and sodium nitrite in graphite oxide synthesis. *RSC Adv.* **2014**, *4*, 15138-15145.

From PhD and Postdoc

20. Weinberg, D. R.; Gagliardi, C. J.; Hull, J. F.; Murphy, C. F.; Kent, C. A.; Westlake, B.; **Paul, A.**; Ess, D. H.; McCafferty, D. G; Meyer, T. J. Proton Coupled Electron Transfer. *Chem. Rev.* **2012,** *112*, 4016-4093**.**
21. Ramidi, P.; Munshi, P.; Gartia, Y.; Pulla, S.; Biris, A. S.; **Paul, A.**; Ghosh, A. Synergistic Effect of Alkali Halide and Lewis Base on the Catalytic Synthesis of Cyclic Carbonate from CO_2 and Epoxide. *Chem. Phys. Lett.* **2011**, *512*, 273-277.
22. **Paul, A.**; Hull, J. F.; Norris, M. R.; Chen, Z.; Ess, D. H.; Concepcion, J. J.; Meyer, T. J. Multiple Pathways for Benzyl Alcohol Oxidation by $Ru^{V}=O^{3+}$ and $Ru^{IV}=O^{2+}$. *Inorg. Chem.* **2011**, *50*, 1167-1169.
23. Venkatramani, R.; Davis, K. L.; Wierzbinski, E.; Bezer, S.; Balaeff, A.; Keinan, S.; **Paul, A.**; Kocsis, L.; Beratan, D. N.; Achim, C.; Waldeck, D. H. Evidence for a Near-Resonant Charge Transfer Mechanism for Double-Stranded Peptide Nucleic Acid. *J. Am. Chem. Soc.* **2011**, *133*, 62-72.
24. Chen. Z.; Concepcion, J. J.; Luo, H.; Hull, J. F.; **Paul, A.**; Meyer, T. J. Nonaqueous Catalytic Water Oxidation. *J. Am. Chem. Soc.* **2010**, *132*, 17670-17673. (Manuscript highlighted in *Nature Chemistry*, **2011**, *3*, 92)
25. **Paul, A.**; Watson, R. M.; Wierzbinski, E.; Davis, K. L.; Sha, A.; Achim, C.; Waldeck, D. H. Distance Dependence of the Charge Transfer Rate for Peptide Nucleic Acid Monolayers. *J. Phys. Chem. B* **2010**, *114*, 14140-14148.
26. **Paul, A.**; Bezer, S.; Venkatramani, R.; Kocsis, L.; Wierzbinski, E.; Balaeff, A.; Keinan, S.; Beratan, D. N.; Achim, C.; Waldeck, D. H. Role of Nucleobase Energetics and Nucleobase Interactions in Single Stranded Peptide Nucleic Acid Charge Transfer. *J. Am. Chem. Soc.* **2009**, *131*, 6498-6507.
27. **Paul, A.**; Watson, R. M.; Lund, P.; Xing, Y.; Burke, K.; He, Y.; Borguet, E.; Achim, C.; Waldeck, D. H. Charge Transfer through Single-Stranded Peptide Nucleic Acid Composed of Thymine Nucleotides. *J. Phys. Chem. C* **2008**, *112*, 7233-7240.

28. Wei, J. J.; Schafmeister, C.; Bird, G.; **Paul, A.**; Naaman, R.; Waldeck, D. H. Molecular Chirality and Charge Transfer through Self-Assembled Scaffold Monolayers. *J. Phys. Chem. B* **2006**, *110*, 1301-1308. (Manuscript highlighted in *Science*, **2009**, *323*, 1435-1436)

Patent

1. Kumta, P. N.; **Paul, A**.; Hanumantha, P. J. Ternary Metal Transition Metal Non-oxide Nanoparticles, Methods and Applications Thereof. *U.S. Pat. Appl.* **2010**, US 2010/0019207 A1.

Professional Presentations

1. Electrochemical Methodology Development and Materials for Supercapacitor Application. National Chemical Laboratory (NCL), Pune, 2015.
2. Electrochemical Methodology Development and Materials for Supercapacitor Application. RSC Symposium, IISER Bhopal, 2015.
3. Understanding the Graphite Oxide Synthesis and Hydroquinone Adsorbed on Charcoal for Supercapacitor Application. JNC Research Conference, Trivandrum, 2014.
4. Journey with Electrochemistry: From IIT-B to IISER-B. IIT Bombay Alumni Meeting, IIT Bombay, 2014.
5. Many Faces of Electrochemistry. Jadavpur University, 2014.
6. Many Faces of Electrochemistry. Presidency University, 2014.
7. Electron Transfer through Peptide Nucleic Acid Chains. American Chemical Society (ACS), Atlanta, 2006. (Poster Presentation)
8. Charge Transfer through Peptide Nucleic Acid Films. American Chemical Society (ACS), Boston, 2007. (Poster Presentation)
9. Charge Transfer through Single Stranded and Double Stranded Peptide Nucleic Acid Films. Pittsburgh Conference (PITTCON), New Orleans, 2008.
10. Charge Transfer through Peptide Nucleic Acid (PNA) Films. Polymer Innovation Northeast Ohio (PINO), Cleveland, 2008. (Poster Presentation)
11. Charge Transfer Study through Single-stranded and Double Stranded Peptide Nucleic Acid (PNA) Films. American Chemical Society (ACS), Philadelphia, 2008.
12. Remarkable Reactivity of Ruthenium Catalyst for C-H Activation: A Case Study of Alcohol Oxidation. American Chemical Society (ACS), Boston, 2010.
13. Multiple Pathways for Benzyl Alcohol Oxidation by $Ru^{IV}=O^{2+}$ and $Ru^{V}=O^{3+}$. UNC Solar Energy Research Center (SERC) Conference, Chapel Hill, 2011. (Poster Presentation)
14. Hydrocarbon Oxidation in Aqueous and Nonaqueous Media by Ruthenium Oxo Catalyst. DOE Energy Frontier Research Center (EFRC) Summit, Washington DC., May 2011. (Poster Presentation)

Teaching Experiences

At IISER Bhopal

1. CHM 321: Physical Chemistry of Solutions (3^{rd} Year B.S-M.S.)
2. CHM 223/224: Physical Chemistry Laboratory (2^{nd} Year B.S.-M.S.)
3. CHM 424/628: Electrochemistry: Fundamentals and Applications (4^{th} Year B.S.-M.S. and PhD)

4. CHM 423: Physical Chemistry Laboratory II (4th Year B. S.-M.S.)
5. CHM 637: Physics and Chemistry of Materials (4th Year B. S.-M.S. and PhD)
6. CHM 222: Classical Thermodynamics (2nd Year B.S-M.S)
7. CHM 422/622: Molecular Spectroscopy (4th Year B.S.-M.S and PhD)

At University of Pittsburgh

1. Chem 110: Undergraduate 1st year Laboratory Class.
2. Chem 970: Undergraduate 2nd year Engineering Laboratory Class.
3. Chem 1440: Undergraduate 4th year Physical Chemistry Laboratory Class.
4. Chem 1430: Undergraduate 3rd year Physical Chemistry Laboratory Class.

Course Developer:

1. Developed computational experiments for 4th and 1st year undergraduate students for molecular modeling using CAChe chemistry software.

Professional Societies

- American Chemical Society.
- Chemical Research Society of India

References

Prof. David H. Waldeck
PhD Supervisor
University of Pittsburgh
219 Parkmann Avenue
G10 Chevron Science center
Pittsburgh, PA, 15260
Ph No: 412-624-8430
Email: dave@pitt.edu

Prof. Thomas J. Meyer
Postdoctoral Advisor
University of North Carolina Chapel Hill
Campus Box 3290
Chapel Hill, NC 27599
Ph No: 919-843-8313
Email: tjmeyer@unc.edu

Prof. Catalina Achim
Research Collaborator
Carnegie Mellon University
4400 5th Avenue
Pittsburgh, PA, 15213
Ph No: 412-268-9588
Email: achim@cmu.edu

Prof. David N. Beratan
Research Collaborator
Duke University
5311 French Family Science Center
Box 90346
Durham, NC, 27708-0346
Ph No: 919-660-1526
Email: david.beratan@duke.edu