



# ABHAS ANAND

*Prime Minister's Research Fellow, IIT Delhi*

A self-motivated electrochemical researcher with a primary interest in the design and development of sustainable battery materials for next-generation energy storage platforms.

## Contact Information

Email: [abhas.anand@chemical.iitd.ac.in](mailto:abhas.anand@chemical.iitd.ac.in)/[abhaschemical@gmail.com](mailto:abhaschemical@gmail.com)  
Phone: +91-9097443588  
Permanent Address: F/No. 604, Riya Plaza Apartment, Kokar, Ranchi, Jharkhand, India – 834001  
Website: [abhaschemical.wixsite.com/abhasanand](http://abhaschemical.wixsite.com/abhasanand)

## Research Interests

- Electrochemical storage and renewable energy source: Batteries – Zinc-ion, Zinc-air, Sodium-ion, Lithium-ion, Sulfur cathode, Hydrogen generation, Super-capacitors, Water splitting, Oxygen reduction reactions.
- Waste and biomass valorization: Electrocatalytic hydrogenation, Biomass (co-products) to value-added chemical.
- Coal and coke making: Blend properties (petrography, rheological- FSI, TD, fluidity, granulometry), Cake stability (stamping, bulk density, shear and compressive strength, vertical-lateral expansion, push force, CT) Coke properties (CSR, CRI, M10, M40, AMS).

## Education Background

Year	Degree	Institute/Degree	Percentage/CGPA
2025	Ph.D. (Synopsis Submitted)	Indian Institute of Technology Delhi Chemical Engineering	9.727/10
2020	M.Tech.	Indian Institute of Technology Kharagpur Chemical Engineering	9.34/10
2017	B.E.	Birla Institute of Technology Mesra, Ranchi Chemical Engineering	76.3%
2013	AISSCE (CBSE)	Delhi Public School Ranchi	93%
2011	AISSE (CBSE)	B.N.S. DAV Public School, Giridih	9.80/10

## Research Projects

- Ph.D. Thesis (PMRF)**

Sept' 2025-Present

  - Thesis title: Energy Storage Materials for Rechargeable Zinc Aqueous Batteries
  - Thesis supervisors: Prof. Suddhasatwa Basu (IIT Delhi), Prof. Anil Verma (IIT Delhi), Prof. Vijay K Ramani (Washington University in St. Louis, USA)
- M.Tech. Thesis**

June 2019-May 2020

  - Thesis title: Effect of Coal Blend on Coal Cake Stability Under Stamp Charging Condition
  - Thesis supervisors: Prof. Bhim Charan Meikap (IIT Kharagpur), Dr. Amitabh Shankar (TATA Steel, Jamshedpur)
- B.E. Thesis**

June 2016-May 2017

  - Thesis title: Application of Phase Change Materials for Thermal Energy Storage
  - Thesis supervisor: Prof. Debasree Ghosh (BIT Mesra)

# Research Internships/Training

<b>Envision M.Tech. Internship, TATA Steel</b>	<b>June 2019-May 2020</b>
<ul style="list-style-type: none"><li>Project title: Effect of Coal Blend on Coal Cake Stability Under Stamp Charging Condition</li><li>Supervisor: Dr. Amitabh Shankar</li></ul>	
<b>Internship, Dr. Reddy's Laboratory</b>	<b>July 2020-Sept' 2020</b>
<ul style="list-style-type: none"><li>Project title: Topical Drug Formulations Scale-up</li></ul>	
<b>Vocational Training, QC Division, JSPL</b>	<b>Dec' 2015-Jan' 2016</b>
<ul style="list-style-type: none"><li>Project title: Comprehensive Evaluation of Furnace Oil through Chemical Testing and Quality Assessment of Steel Grades via Mechanical and Metallurgical Testing</li></ul>	

# List of Publications and Patents

- Abhas Anand**, Ram Ji Dixit, Anil Verma, and Suddhasatwa Basu. "Zeolitic Imidazolate Framework-67-derived  $\text{Co}_3\text{O}_4/\alpha\text{-MnO}_2$  Composite as Efficient Cathode for Aqueous Zinc-ion Batteries." *ACS Energy & Fuels* (2024).
- Abhas Anand**, Ram Ji Dixit, Anil Verma, and Suddhasatwa Basu. "Corn Husk-Derived Activated Carbon as High-Performance Anode Constituent for Rechargeable Aqueous Zn/ $\alpha\text{-MnO}_2$  Batteries." *Energy Technology* (2023).
- Abhas Anand**, Anil Verma, and Suddhasatwa Basu. "Electrodeposited Zeolitic Imidazolate Framework-8 Modified Zinc Anode Supported Over Porous Copper Structure for Rechargeable Aqueous Zinc-Ion Batteries." *Small* (Revision Received).
- Abhas Anand**, Amitabh Shankar. "Study of Coal Cake Bulk Density and Its Shear Strength for Stamp Charging Coke Making Technique at Tata Steel." *Coke and Chemistry* (2021).
- Abhas Anand**, Anil Verma, and Suddhasatwa Basu. "NiMn<sub>2</sub>O<sub>4</sub> as an Efficient Cathode Host for Rechargeable Aqueous Zinc-Ion Batteries." *Advanced Materials Technologies* (Under Review).
- Ram Ji Dixit, Pralay Gayen, Sulay Saha, Biswajit Samir De, **Abhas Anand**, Suddhasatwa Basu, and Vijay K. Ramani. "Tuning Product Selectivity during Electrocatalytic Hydrogenation of Biomass-Derived Furfural through Oxygen Vacancy Control in Metal Oxides." *Industrial & Engineering Chemistry Research* (2024).
- Biswajit Samir De, Ram Ji Dixit, **Abhas Anand**, Vicky Rahul Dhongde, and Suddhasatwa Basu. "Experimental, equilibrium modelling, and column design for the reactive separation of biomass-derived 2-furoic acid." *The Canadian Journal of Chemical Engineering* (2023).
- Ram Ji Dixit, **Abhas Anand**, Biswajit Samir De, Aditya Singh, and Suddhasatwa Basu. "Electrochemical Reactor for the Production of Hydrofuroin from Furfural." *IN Patent No. 518854*.

# List of Conference's Presentations (Oral/Poster)

- Abhas Anand**, Anil Verma, and Suddhasatwa Basu. "Corn Husk-derived Activated Carbon for High Performance Rechargeable Aqueous Zn/ $\alpha\text{-MnO}_2$  Batteries." *IUMRS-ICA 2022, IIT Jodhpur (Poster)*.
- Abhas Anand**, Anil Verma, and Suddhasatwa Basu. "ZIF-67-derived  $\text{Co}_3\text{O}_4/\alpha\text{-MnO}_2$  Nanorod Composite as Cathode for Long Cycle Life Zinc-ion Batteries." *I-CONNECT 2023, IIT Delhi (Poster)*.
- Abhas Anand**, Anil Verma, and Suddhasatwa Basu. "Corn husk-derived activated carbon for high performance rechargeable aqueous Zn/ $\alpha\text{-MnO}_2$  batteries." *NRF Scholar Award 2023, IIT Delhi (Poster)*.
- Abhas Anand**, Ram Ji Dixit, Anil Verma, and Suddhasatwa Basu. "Understanding the Electrochemical Stability of Potential Current Collectors in Zinc Sulfate Electrolyte for Rechargeable Aqueous Zinc Ion Battery Application." 243<sup>rd</sup> ECS Meeting 2023, Boston MA (Oral).
- Abhas Anand**, Anil Verma, and Suddhasatwa Basu. "Zeolitic Imidazolate Framework-67-derived  $\text{Co}_3\text{O}_4/\alpha\text{-MnO}_2$  Composite as Efficient Cathode for Aqueous Zinc-ion Batteries." *NSEST 2023, ARCI Hyderabad (Oral)*.
- Abhas Anand**, Anil Verma, and Suddhasatwa Basu. "Zeolitic Imidazolate Framework-67-derived  $\text{Co}_3\text{O}_4/\alpha\text{-MnO}_2$  Composite as Efficient Cathode for Aqueous Zinc-ion Batteries." *IMESD 2023, IIT Roorkee (Poster)*.

- **Abhas Anand**, Anil Verma, and Suddhasatwa Basu. "NiCo<sub>2</sub>O<sub>4</sub>/MnO<sub>2</sub> Microsphere as Efficient Bi-functional Electrocatalyst for Zinc-air Battery." *ECS Meeting 2024, San Francisco (Oral)*.
- **Abhas Anand**, Anil Verma, and Suddhasatwa Basu. "Electrodeposited ZIF-8 Modified Zinc Anode Supported Over Porous Copper Framework for Aqueous Zinc-ion Battery Application." *E<sub>2</sub>M 2024, IIT Indore (Oral)*.
- **Abhas Anand**, Anil Verma, and Suddhasatwa Basu. "Revisiting the Zinc Dendrite Growth in Zinc Aqueous Batteries: Strategies for Extending the Life of Zinc Anode." *ISIEA 2024, IIT Delhi (Oral)*.
- **Abhas Anand**, Anil Verma, and Suddhasatwa Basu. "NiMn<sub>2</sub>O<sub>4</sub> as an Efficient Cathode Host for Rechargeable Aqueous Zinc-Ion Batteries." *SEGT 2024, Bangkok (Oral)*.
- **Abhas Anand**, Anil Verma, and Suddhasatwa Basu. "Dendritic Growth Minimization in Zinc-ion Batteries." *INAE Annual Convention 2024, IIT Delhi (Poster)*.
- **Abhas Anand**, Anil Verma, and Suddhasatwa Basu. "Dendritic Growth Minimization in Zinc-ion Batteries." *ISAMSEA 2025, IIT Delhi (Poster)*.
- **Abhas Anand**, Anil Verma, and Suddhasatwa Basu. "Electrodeposited ZIF-8 Modified Zinc Anode Supported Over Porous Copper Framework for Aqueous Zinc-ion Battery Application." *IECS 2025, IIT Madras (Oral)*.
- **Abhas Anand**, Anil Verma, and Suddhasatwa Basu. "Dendritic Growth Minimization in Zinc-ion Batteries." *PMRF Annual Symposium 2025, IIT Hyderabad (Poster)*.

## National Level Examinations

- GATE 2025 (CH), *All India Rank 519*
- GATE 2018 (CH), *All India Rank 381*
- GATE 2017 (CH), *All India Rank 450*
- JEE (Advanced) 2013, *All India Rank 14,229*
- JEE (Main) 2013, *All India Rank 23,734*

## Scholastic Achievements

- Best presentation award in PMRF-Chemical Engineering domain, PMRF annual symposium, 2025.
- Awarded research excellence travel award (RETA), IIT Delhi, 2024.
- Recipient of commendation grade (top 5 percentile PMRF) in PMRF annual review, 2024.
- Awarded Prime Minister's Research Fellowship (PMRF), 2021.
- Departmental topper in Ph.D. coursework – IIT Delhi (CGPA: 9.73/10.00).
- Among top 3 rank holders (batch of 52 candidates) during M. Tech. course – IIT Kharagpur (CGPA: 9.34/10.00).
- Awarded G.P. Birla Scholarship for meritorious performance in U.G. curriculum – BIT Mesra, 2015 & 2016.
- Subject topper (99%) in Physical Education, AISSCE 2013.

## Position of Responsibilities

- Head Teaching Assistant (High Performance Liquid Chromatography), NRF, IIT Delhi, May 2022 – Present.
- Teaching Assistant (Scanning Electron Microscopy), FC Lab, IIT Delhi, October 2021 – Present.
- PMRF Teaching Assistant, Guru Nanak Dev DSEU Rohini Campus, July 2023 – April 2024.
- PMRF Teaching Assistant, PM Shri Kendriya Vidyalaya NMR JNU, July 2024 – September 2024.
- Teaching Assistant (Mass Transfer), IIT Delhi, January 2023 – June 2023.
- Department Representative: Career Development Centre, IIT Kharagpur, August 2018 – March 2019.
- Organising Member, IICHE, BIT Mesra, 2014 – 2015.
- Lead Counsellor: Physiochography Society, Ranchi, June 2014 and June 2015.

## References

- Prof. Suddhasatwa Basu  
Professor, Department of Chemical Engineering  
Energy Storage & Environmental Lab  
IIT Delhi, Hauz Khas – 110016  
E-mail: sbasu@iitd.ac.in
- Prof. B.C. Meikap  
Professor, Department of Chemical Engineering  
Pollution Control Laboratory  
IIT Kharagpur – 721302  
E-mail: bcmeikap@che.iitkgp.ac.in
- Prof. Anil Verma  
Professor, Department of Chemical Engineering  
Sustainable Energy Research Lab  
IIT Delhi, Hauz Khas – 110016  
E-mail: aniverma@iitd.ac.in
- Dr. Amitabh Shankar  
Head, Coal & Coke Technology  
Process Technology Group  
TATA Steel, Jamshedpur – 831001  
E-mail: amitabh.shankar@tatasteel.com

## Declaration

I hereby declare that the details stated above are true and correct to the best of my knowledge.

***Abhas Anand***  
***(Delhi, India)***

