

Dr. Mahendra Naktuji Nandanwar

Assistant Professor
Department of Chemical Engineering
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Education

Ph.D. Chemical Engineering Indian Institute of Science, Bangalore	<i>August, 2015</i>
M.E Chemical Engineering Indian Institute of Science, Bangalore	<i>June, 2007</i>
B.E Chemical Engineering Anuradha Engineering college, Amravati University	<i>April, 2003</i>

Experience

Assistant Professor Department of Chemical Engineering IIT(ISM) Dhanbad	<i>Since March 2022</i>
Assistant Professor Department of Chemical Engineering & Materials Science, Amrita Vishwa Vidyapeetham, Coimbatore.	<i>June, 2016 – Feb 2022</i>
Senior Simulation Engineer Andritz, Bangalore	<i>September, 2015 – June , 2016</i>
Process Engineer JFWTC (GE), Bangalore	<i>August, 2007 – June, 2010</i>
Scientist 'B' DRDO, Pune	<i>April, 2004 – July, 2005</i>

Areas of Research Interest

- Electrochemical storage of energy (batteries and super-capacitors)
- Desalination of water
- Capacitive deionization
- Solar thermal energy
- Population balance modeling and simulation
- CFD Modeling and simulation

Teaching Experience

- Heat Transfer
- Mass Transfer
- Mechanical Operations
- Advanced separation methods
- Numerical Methods
- Transforms and Partial Differential Equations
- Engineering Drawing
- Chemical Process Technology
- Energy Technology
- Electrochemical Energy Science and Technology (Proposed)

Research

PhD Thesis

Modeling and Experimental Investigations into Soluble Lead Redox Flow Battery: New Mechanisms

ME Thesis

On the Solution of Multidimensional Population Balance Equations Using Fixed Pivot Technique

Sponsored Projects (Ongoing / Completed)

As PI

Sl. No.	Years	Funding Agency	Title of Project	Amount of Grant (Rs.)	Investigators	Status
1	2021-2024	SERB (Core research grant)	Development of scaled-up, pump-less, free-convection-driven, soluble lead redox flow battery	34,48,764/-	Dr. Mahendra Nandanwar (PI), Dr. Sudip Batabyal (Co-PI)	Ongoing

2	Dec 2022	DSIR	International conference on 'Net-zero Emission Technologies for Sustainable Development: Challenges and Opportunities (NOET-2022)'	5,50,000/-	Dr. Mahendra Nandanwar (Convener)	Completed
3	2017-2020	SERB (Early Career Research award)	Natural Convection Driven Flow-Through Soluble Lead Redox Flow Battery With Inbuilt Sonication mechanism for Achieving Longer Cycle Life	14,34,100/-	Dr. Mahendra Nandanwar (PI)	Completed

As Co-PI

Years	Funding Agency	Title of Project	Amount of Grant (Rs.)	Investigators	Status
2021-2024	DST	Development of chemically modified carbon based interfacial solar evaporator	33,20,000/-	Dr. Sudip Batabyal (PI), Dr. Mahendra Nandanwar (Co-PI) ,	Ongoing
2019-2022	SERB	Development of a Pulsed Flow Packed Bed Electrochemical Reactor for Heavy Metals Removal from Groundwater and Wastewater	37,24,571/-	Dr. Murali Rangarajan (PI), Dr. Mahendra Nandanwar (Co-PI) , Dr. Thirughnabhan (Co-PI).	Completed
2019-21	BRNS	Impact of surface micro-structure modification using plasma and its wetting behavior on the corrosion	17,86,350/-	Dr. Kannan (PI), Dr. Mahendra Nandanwar (Co-PI) .	Completed

Publications (Average Impact Factor 6.1)

Peer Reviewed International Journals

1. **MN Nandanwar (single author)**, Effect of Porous Nature of Anode on the Performance of the Soluble Lead Redox Flow Battery: A Modelling and Simulation Study, *Journal of Power Sources*, 571, 233029, **2023, IF: 9.7**
2. Prakhar Verma, Sreeraj Puravankara, **MN Nandanwar**, and Jayanta Chakraborty, Insights into the Morphological Evolution of Mossy Dendrites in Lithium Metal Symmetric and Full Cell: A modelling study, *Journal of Electrochemical Society*, 170, 030529, **2023, IF: 4.39**
3. KG Baiju, **MN Nandanwar (corresponding author)**, K Jayanarayanan, D Kumaresan, Numerical modelling and simulation of heat sink assisted thermal sintering of titania film on polymer substrate for fabrication of high performance flexible dye sensitized solar cell, *Chemical Engineering Research and Design*, 181, 209-219, 2022, **IF: 4.1**

4. **Mahendra N. Nandanwar (first and corresponding author)**, Kottu Santosh Kumar, S.S. Srinivas, D.M. Dinesh, Pump-less, free-convection-driven redox flow batteries: Modelling, simulation, and experimental demonstration for the soluble lead redox flow battery, *Journal of Power Sources*, Volume 454, 2020, 227918, **IF: 9.7**
5. **Mahendra Nandanwar (first and corresponding author)**, Sanjeev Kumar, A modelling and simulation study of soluble lead redox flow battery: Effect of presence of free convection on the battery characteristics, *Journal of Power Sources*, Volume 412, 2019, Pages 536-544, **IF: 9.7**
6. **Mahendra Nandanwar (first author)**, Sanjeev Kumar, Charge coup de fouet phenomenon in soluble lead redox flow battery, *Chemical Engineering Science*, Volume 154, 2016, Pages 61-71, **IF: 4.31**
7. **Nandanwar, Mahendra (first author)**, Kumar Sanjeev, Modelling of Effect of Non-Uniform Current Density on the Performance of Soluble Lead Redox Flow Batteries, *Journal of The Electrochemical Society*, 2014, A1602-A1610, 10, 161, **IF: 4.39**
8. **Mahendra N. Nandanwar (first author)**, Sanjeev Kumar, A new discretization of space for the solution of multi-dimensional population balance equations: Simultaneous breakup and aggregation of particles, *Chemical Engineering Science*, Volume 63, Issue 15, 2008, Pages 3988-3997. **IF: 4.311**
9. **Mahendra N. Nandanwar (first author)**, Sanjeev Kumar, A new discretization of space for the solution of multi-dimensional population balance equations, *Chemical Engineering Science*, Volume 63, Issue 8, 2008, Pages 2198-2210. **IF: 4.311**

Patents

1. **MN Nandanwar**, A process for the selective removal/recovery of ionic species from aqueous/non-aqueous solution using capacitive de-ionization, Application no.: E-137/1896/2022/KOL (Provisional)

Events

1. Convener, International conference on 'Net-zero Emission Technologies for Sustainable Development: Challenges and Opportunities (N0ET-2022)' at IIT(ISM) Dhanbad

Reviewer – Journals and Conferences

- Electrochimica Acta
- Journal of Thermal Science and Engineering Applications
- Journal of The Electrochemical Society

Honors

- **Amrita Innovation and Research Awards**, Amrita Vishwa Vidyapeetham, Coimbatore 2021
- **Research Excellence Award**, Amrita Vishwa Vidyapeetham, Coimbatore, January, 2018

- **GATE 2004 All India Rank: 04 (99.96 percentile)**



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