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EDUCATION **Ph.D., Energy, Environmental, and Chemical Engineering**

Washington University in St. Louis – MO, USA 2006–2011
Doctoral Dissertation Award-First Place, for original work that makes an unusually significant contribution, Air & Waste Management Association, 2012
Advisor: Prof. Pratim Biswas

M.S, Energy, Environmental, and Chemical Engineering

Washington University in St. Louis – MO, USA 2006–2010
Advisor: Prof. Pratim Biswas

Masters of Technology, Environmental Science and Engineering

IIT Bombay, India 1999-2001
Advisor: Prof. H. Veeramani

Bachelors of Engineering, Civil Engineering

Indira Gandhi Institute of Technology, Utkal University, India 1995–1999

WORK

EXPERIENCE

Assistant Professor January 2019–Present

Principal Investigator, Aerosol and Nanotechnology (ANT) Laboratory
Environmental Science & Engineering Department (ESED)
Indian Institute of Technology (IIT) Bombay, India

Affiliate Faculty, Center for Machine Intelligence and Data Science

IIT Bombay, India 2020–Present

Affiliate Faculty, Interdisciplinary Program in Climate Studies

IIT Bombay, India 2020–Present

Senior Scientist

SABIC, Mount Vernon, Indiana, USA 2018–2019

R & D Engineer

Solar Materials R & D,
GCL Solar Materials, Pasadena, Houston, USA 2017–2018

R & D Scientist/Engineer

Solar Materials R & D,
MEMC Pasadena Inc/SunEdison, TX, Houston, USA 2013–2018

Post-Doctoral Research Fellow

University of Illinois at Urbana-Champaign, IL, USA 2011-2013

Scientific Officer (C&D),

Bhabha Atomic Research Center, Mumbai, India 2001-2006

AWARDS & HONORS

1. **Young Faculty Award**, IIT Bombay 2021–2025
2. **Start-up Research Grant Award** from Science and Engineering Research Board, DST 2019
3. **Dissertation Award-First Place**, for original work that makes an unusually significant contribution, Air & Waste Management Association 2012
4. **Highly cited paper award** to my paper in Chemical Engineering Science journal 2011& 2012
5. **Best poster award**, The Society of Toxicity Annual Meeting, Washington DC, USA 2011
6. **Recipient of McDonnell International Scholars Academy Fellowship**, Washington University in St. Louis 2006-2011
7. **Energy and Environmental Research Group Corporate Fellow**, Washington University in St. Louis 2006-2011
8. **Recipient of Ed. Edgerley Scholarship**, Washington University in St. Louis, USA 2006

RESEARCH EXPERIENCE

SUMMARY OF PHD RESEARCH, Washington University in St. Louis

- Designed and built single-step gas phase reactor for synthesis of **pristine, doped and composite metal oxide catalysts** (metal oxides, doped metal oxides, noble metal supported-metal oxides, and composite material)
- **Scaled-up** the aerosol reactor and identified important parameters for scale up, and **optimized the process** to increase the materials yield by 3 times.
- Identified the impact of processing conditions on nanomaterial **catalyst properties** and demonstrated through **advanced characterization that dopants altered catalysts physicochemical and optical properties**, and enhanced the performance
- Proposed growth mechanisms, and key process parameters to independently control the **physicochemical properties (size, morphology, crystal structure, composition)** of metal oxide and doped metal oxide and composite catalyst materials
- Investigated and tested **catalysts performance**, the reaction mechanisms, **kinetics and structure-property relationship**, and identified **catalysts properties** essential for optimizing performance in applications
- Experienced in **synthesis and process optimization to synthesize nanostructured thin film catalysts and mesoporous catalysts by gas phase process**

- Developed and implemented structured experiments to quantify the role of dopants and other physicochemical properties on processes on nanomaterial interface under various environmental conditions such as pH and ionic strength
- Hands-on experience in handling advanced **catalyst characterization** equipment and particle size measurement instruments
- **Led a multidisciplinary international team of 25 people**, trained them with equipments, conducted field sampling and proposed an index concept among exposure metrics to characterize the fine particles exposure

POST-DOCTORAL RESEARCH, University of Illinois at Urbana-Champaign

- Managed and developed technologies for federally funded project “Bench-Scale Development of a Hot Carbonate Absorption Process with Crystallization-Enabled High-Pressure Stripping for Post-Combustion CO₂ Capture” (US DOE DE-FE0004360) from the **flue gas of fossil fuel power plants**
- **Designed, set-up and operated bench-scale reactors** for absorption experiment, investigated **mass transfer and reaction kinetics** of absorption system and evaluated the performance of catalysts
- Performed **screening experiments and identified catalysts and their reaction mechanisms** that enhanced the absorption rate of carbonate system and facilitated effective crystallization of bicarbonate slurry
- Determined the **rate of reaction and kinetics of carbonate solution with CO₂ and also the enhanced kinetics** with the addition of organic catalysts
- Investigated **solid-liquid separation by filtration, crystallization process** for bicarbonate separation without and with the presence of catalysts and investigated the changes in size and morphology of bicarbonate crystal
- Investigated **particle size distribution of crystal solids under linear and non-linear cooling rates** and studied the effects of residence time and crystallization temperature on crystal growth and nucleation rates
- Advised **technicians and graduate students in setting up laboratory equipments and operation of experiments**, and prepared quarterly progress report to Department of Energy (DOE) and Illinois Clean Coal Institute (ICCI)

R & D ENGINEER/SCIENTIST (GCL Solar Materials, MEMC Electronic Materials/SunEdison, USA)

- **Collaborated** with business team, analytical chemists/engineers, manufacturing team to **discover, co-develop and scale-up manufacturing processes** to meet business within specified project timeline
- Managed resource **allocation, project prioritization & led establishment of a pilot plant and ensured EHS compliance** during execution of planned activities and performance appraisal for technicians.
- Led **pilot plant team** for day to day operation and **technology demonstration, design data generation**, and prototype product generation with **novel Fluidized Bed Reactor (FBR) technology** for poly-silicon material production
- Assisted plant **start-up and commissioning, supervised technicians**, developed procedures (start-up and shut down of reactor, operations) for plant operations, equipment and processes, and training of operations personnel, conducted **root cause analysis (RCA)** and implemented changes to improve the process safety
- **Designed and conducted experiments, led pilot campaigns, analyzed the experimental results**, prepared weekly and monthly reports, and presented to stakeholders
- Investigated and identified the **scale-up process parameters and optimized process** for increasing polysilicon yield and low dust production.
- Determined the **kinetics of silane reaction with solid particles** (heterogeneous reaction and homogenous reaction) under different temperature and pressure conditions
- Developed **empirical models** for segregation and attrition in FBR based on pilot plant data
- Supported **start-up and commissioning of the commercial SMP plant and process support** through data analysis and provided solution for **process optimization**
- Conducted **statistical analysis and model development** of the pilot plant results using **MINITAB** modeling to identify the effect of process parameters and proposed future experiments for process optimization
- **Black Belt and Green Belt** certified and improved lead time by **25% for the pilot experiments** and decreased the restacking time of reactor by 59% and reduced the reactor downtime by 25% and post pilot trial maintenance by 20%.

- Provide site performance improvement, inventory management, troubleshooting and leadership in technical issues, investigate process safety incident, look after process safety management and work on permitting ensuring regulatory compliance

SENIOR SCIENTIST, SABIC

- Collaborated with business groups, process chemists, product developer and engineers to **co-develop and scale-up** manufacturing processes to meet business objectives
- Leading **product scale-up and optimization from laboratory scale to pilot scale to manufacturing** for new high heat copolymers to expand the product portfolio and scaled of high heat resins in ahead of project timeline.
- **Process technology development efforts involving purification & separation processes** and **process improvement** idea to improve the yields and robustness of the process
- Identification of the **bottleneck in the process for the new process and process technologies** to improve **rate/quality/stability** by identifying and mitigating risk and **scoping of scale-up** plans
- Developed **process scale up and risk mitigation** involving **isolation, precipitation, and drying of polymer** for scale-up for high volume manufacturing
- **Technical service and troubleshooting of manufacturing plant performance** for improving production of polymers and developed process changes to improve the production and presented to global manufacturing team
- **Designed, setup, and operated column dryer experimental** set-up for studying the **drying of polymer** for scaling up in high volume manufacturing plant and benchmarking with various copolymers.
- **Through** statistical tools on pilot and laboratory data developed strategies **for continuous process improvements, process standardization, monitoring product quality** and related troubleshooting

SCIENTIFIC OFFICER (C/D), Bhabha Atomic Research Center

- Designed process equipment, coordinated with vendor, third-party contractors, and regulatory agencies
- Collaborated with 2 research teams and developed interface program for transport model and analyzed large datasets with statistical tools for developing an emergency preparedness system for accidental scenarios

- Established a monitoring station for routine measurements of atmospheric aerosol particles and analyzed their physical and chemical properties and conducted modeling analysis to identify the sources.
- Led ambient field sampling campaign at two traffic junctions in Mumbai, characterized for physical and chemical properties, and identified the sources by modeling using statistical software packages
- Developed a user-friendly software based on dispersion modeling to evaluate the exposure impact in accidental scenarios at hazardous storage facilities, and used for decision making of the establishment of toxic storage facilities
- Coordinated regulatory inspection and periodic quality checks, in-house documentation and developed safety guidelines and prepared reports for plant operations, and planned and organized safety training for 35 people

JOURNAL ARTICLES

UNDER REVIEW

1. Prajapati, B, V. Malyan, V. Kumar, V. Dharaiya, **M. Sahu** et al, *Physics-based Method for Calibration of a Low-cost Particulate Matter Sensor and Comparison with Statistical Calibration Models*, Journal of Aerosol Science 2023 (Under review)
2. Ghosh, S and **M. Sahu**, *Adsorptive Removal of Dimethyl Phthalate Using Peanut Shell Derived Biochar from Aqueous Solutions: A Step Towards Circular Economy*, Chemical Engineering Science, 2023, (Under review)
3. Kumar, V, V. Malyan, **M. Sahu**, B. Biswal, M. Pawar, and I. Dev, *Ensemble Machine Learning Approach for PM_{2.5} Reconstruction using MERRA-2 and Long-term Analysis for India (1980-2021)*, Journal of Environmental Management, 2023 (Under review)
4. Nishad V, C. Mandal, and **M. Sahu**, *Study of Bioaerosol Disinfection Kinetics and Application of Non-linear Regression Analysis for Optimization of TiO₂ based Photocatalytic Disinfection Process*, Nanotechnology, 2023 (under review)
5. Dharaiya, **M. Sahu** et al, *Application of Regression Methods for the Calibration of Low-cost Optical Particle Sensor for PM Measurements at Regional Sites in India*, 2023 (review)

PEER-REVIEWED PUBLICATIONS

6. Kumar, V, V. Malyan, **M. Sahu**, and B. Biswal, *Machine Learning Classification Model to Label Sources Derived from Factor Analysis Receptor Models for Source Apportionment of Particulate Matter*, Aerosol and Air Quality Research, 2023 (accepted)
7. Agrawal, A and **M. Sahu**, *Forecasting PM_{2.5} Concentrations using Statistical Modeling for Bengaluru and Delhi Regions*, Environmental Monitoring and Assessment, 2023 (Accepted)

8. Kumar, A, V. Malyan, and **M. Sahu**, *Air Pollution Control Technologies for Indoor Particulate Matter Pollution: A Review*, Aerosol Science and Engineering, 2023, (Accepted)
9. Dharaiya, V, V. Malyan, V. Kumar, **M. Sahu**, C. Venkatraman, P. Biswas, K. Yadav, D. Haswani, R. S. Raman, R. Bhat, T. H. Najar, A. Jehangir, R. Patil, G. Pandithurai, S. S. Duhan, J. S. Laura , 2023, *Evaluating the Performance of Low-cost PM Sensors over Multiple COALESCE Network Sites*, Aerosol and Air Quality Research, 2023 (Accepted)
10. Mandal, C, V. Nishad, and **M. Sahu**, *Impact of Spatial Distribution of Light Intensity on Disinfection Kinetics of Mycobacterium Smegmatis and E. coli using TiO₂ based photocatalyst*, Nanotechnology for Environmental Engineering, 2023, DOI: 10.1007/s41204-023-00311-2.
11. Chen, S, Q. Cao, T. H. Kuehn, C. Lo, **M. Sahu**, Y. S. Mayya, and D. Y. H. Pui, *Design of a Medium Scale Ambient PM_{2.5} Cleaning System*, Aerosol and Air Quality Research, 2023, 23 (2), 220437.
12. Kumar, V, V. Malyan, and **M. Sahu**, *Significance of Sources and Size Distribution on Calibration of Low-cost Particle Sensors: Evidence from a Field Sampling Campaign*, Journal of Aerosol Science, 2023, 168, 106114.
13. Kumar, V, V. Malyan, and **M. Sahu**, *Significance of Meteorological Feature Selection and Seasonal Variation on Performance and Calibration of Low-cost Particle Sensor*, Atmosphere 2022, 13(4), 587.
14. Ghosh, S and **M. Sahu**, *Phthalate Pollution and Remediation Strategies: A Review*, Journal of Hazardous Materials Advances, 2022, 6, 100065.
15. Kumar, V, P. Biswas, and **M. Sahu**, *Source Apportionment of Particulate Matter by Application of Machine Learning Clustering Algorithms*, Aerosol and Air Quality Research, 2022, 22(3) 210240.
16. Kumar, V, and **M. Sahu**, *Evaluation of Nine Machine Learning Regression Algorithms for Calibration of Low-cost PM_{2.5} Sensor*, Journal of Aerosol Science, 2021, 157, 105809.
17. **Sahu, M** and P. Biswas, *Single-step Processing of Copper-doped Titania Nanomaterials in a Flame Aerosol Reactor*, Nanoscale Research Letters, 2011: p 6:441.
18. **Sahu, M**, B. Wu, L. Zhu, C. Jacobson, W. N. Wang, Y. Goyal, K. Jones, Y. J. Tang, and P. Biswas, *Role of Dopant Concentration, Crystal Phase, and Particle Size on Microbial Inactivation of Cu-doped TiO₂ Nanoparticles*, Nanotechnology, 2011, 22 (415704): p 1-9.
19. **Sahu, M**, K. Suttiaponarnit, S. Suvachittanont, T. Charinpanitku, and P. Biswas, *Characterization of Doped TiO₂ Nanoparticle Dispersions*, Chemical Engineering Science, 2011, 66 (15): p 3482-3490.
20. Wu, B, W. Zhuang, **M. Sahu**, P. Biswas, and Y. J. Tang, *Cu-doped TiO₂ Nanoparticles Enhance Survival of Shewanella Oneidensis MR-1 under*

Ultraviolet Light (UV) Exposure, Science of the Total Environment, 2011,409: p 4635–4639.

21. Suttiponparnit, K, J. Jiang, **M. Sahu**, S. Suvachittanont, T. Charinpanitku, and P. Biswas, *Role of Surface Area, Primary Particle Size, and Crystal Phase on Titanium Dioxide Nanoparticle Dispersion Properties*, Nanoscale Research Letters, 2011, 6 (27): p 1-8.
22. **Sahu, M**, J. Peipert, V. Singhal, G. Yadama, and P. Biswas, *Evaluation of Mass and Surface Area Concentration of Particle Emissions And Development of Emissions Indices for Cookstoves in Rural India*, Environmental Science and Technology, 2011, 45 (6):p 2428-2434.
23. **Sahu, M**, S. Hu, P. Ryan, G. LeMasters, S. Grinshpun, J. Chow, and P. Biswas, *Chemical Compositions and Source Identification of PM_{2.5} Aerosols for Estimation of a Diesel Source Surrogate*, Science of the Total Environment, 2011, 409 (13): p 2642-2651.
24. Kreyling, W. G, P. Biswas, M. E. Messing, N. Gibson, M. Geiser, A. Wenk, **M. Sahu**, K. Deppert, I. Cydzik, C. Wigge, O. Schmid, and M. Semmler-Behnke, *Generation and Characterization of Stable Highly Concentrated Titanium Dioxide Nanoparticle Aerosols for Rodent Inhalation Studies*, Journal of Nanoparticle Research, 2011, 13 (2):p 511-524.
25. **Sahu, M** and P. Biswas, *Size Distributions of Aerosols in an Indoor Environment with Engineered Nanoparticle Synthesis Reactors Operating under Different Scenarios*. Journal of Nanoparticle Research, 2010, 12 (3): p 1055-1064
26. Wu, B, R. Huang, **M. Sahu**, X. Feng, P. Biswas, and Y. J. Tang, *Bacterial Responses to Cu-doped TiO₂ Nanoparticles*, Science of the Total Environment, 2010, 408 (7): p 1755-1758.
27. Zeng, H, A. Singh, S. Basak, K. U. Ulrich, **M. Sahu**, P. Biswas, J. C. Catalano, and D. E. Giammar, *Nanoscale Size Effects on Uranium (VI) Adsorption to Hematite*. Environmental Science and Technology, 2009, 43 (5): p 1373-1378.
28. **Sahu, M**, J. Park, and P. Biswas, *In-Situ Charge Characterization of TiO₂ and Cu- TiO₂ Nanoparticles in a Flame Aerosol Reactor*, Journal of Nanoparticle Research, 2012,14 (678): p 1-11.
29. Han, X, N. Corson, P. Wade-Mercer, R. Gelein, J. Jiang, **M. Sahu**, P. Biswas, J. N. Finkelstein, A. Elder, and G. Oberdörster, *Assessing the Relevance of In vitro Studies in Nanotoxicology by Examining Correlations Between in-vitro and in-vivo Data*, Toxicology, 2012, 297: p:1-9.
30. Yadama, G, J. Peipert, **M. Sahu**, P. Biswas, and V. Dyda, *Social, Economic, and Resource Predictors of Variability in Household Air Pollution from Cookstove Emissions*, PLOS One, 2012, 7 (10): p 1-8.

31. Seders, L. A, **M. Sahu**, P. Biswas, and J. B. Fein, *Experimental Study of TiO₂ Nanoparticle Adhesion to Silica and Fe(III) Oxide-coated Silica Surfaces*. Chemical Geology, 2012, 332-333: p148-156.
32. Suttiaponarnit, K, V. Tiwari, **M. Sahu**, P. Biswas, S. Suvachittanont, and T. Charinpanitku, *Effect of Pt or Pd Doping on Stability of TiO₂ Nanoparticle Suspension in Water*, Journal of Industrial and Engineering Chemistry, 2013,19(1): p 150-156.
33. Leavey, A, J. Fang, **M. Sahu**, and P. Biswas.: "*Comparison of Measured Particle Lung-deposited Surface Area Concentrations by an Aerotrak 9000 Using Size Distribution Measurements for a Range of Combustion Aerosols*", Aerosol Science and Technology, 2013, 47: p 966-978

**CONFERENCE/WORKS
HOP
PRESENTATION**

1. Kumar, V, V. Malyan, **M. Sahu**, and B. Biswal, *PM_{2.5} Reconstruction using MERRA-2 using Ensemble Machine Learning Approach and Long-term Analysis for India (1980-2021)*, EGU General Assembly 2023 (accepted for presentation)
2. Malyan, V, V. Kumar, and **M. Sahu**, *Significance of Sources and Size Distribution on Calibration of Low-cost Particle Sensors: Evidence from a Field Sampling Campaign*, EGU General Assembly 2023 (accepted for presentation)
3. Moni, M and **M. Sahu**, *Development of high-resolution particle concentration prediction model - an application of remote sensing and machine learning*, EGU General Assembly 2023 (accepted for presentation)
4. Kumar, A and **M. Sahu**, *Design, Development and Application of a Particulate Matter Control Technology with Special Consideration for Indoor Air Quality Management*, EGU General Assembly 2023 (accepted for presentation)
5. Moni, M and **M. Sahu**, *Development of High-accuracy Particle Concentration Prediction Model. An application of remote sensing and machine learning*, 18th Healthy Buildings Europe Conference, Aachen, Germany, June 11-14, (accepted)
6. Kumar, A, M. Moni and **M. Sahu**, *Design, Development and Evaluation of Performance of an Electrostatic Precipitator for Indoor Environment*, 18th Healthy Buildings Europe Conference, Aachen, Germany, June 11-14, 2023 (accepted)
7. Ghosh, S, C. Mandal, A. Kumar, M. Sahu, Manoranjan, *Photocatalytic Inactivation of Bioaerosols in a Continuous Flow Reactor*, 18th Healthy Buildings Europe Conference, Aachen, Germany, June 11-14, 2023 (accepted)
8. Malyan, V, V. Kumar, and **M. Sahu**, *IoT-based Solution for Hyperlocal Air Quality Monitoring in IITB Campus*, TechFest'22, IIT Bombay, December 16 -18, 2022.
9. Kumar, V, V. Malyan, **M. Sahu**, and B. Biswal, *Ensemble Machine Learning*

Approach for PM_{2.5} Reconstruction using MERRA-2 and Long-term Analysis (1980-2021) for India, Sustainability Conclave, IIT Bombay, November 30, 2022

10. Malyan, V, V. Kumar, M. Moni, and **M. Sahu**, *Machine Learning assisted IoT-based Solutions for Real-time Exposure Assessment in Indoor Environments: A Concept for Smart Buildings*, Indoor Air Quality Workshop, TIH-IoT, IIT Bombay, November 19, 2022.
11. Nawale, P, R. Kumar, R. Parikh, S. Ghosh, A. Kumar, C. Mandal, L. Pagarware, and **M. Sahu**, *Design and Development of Indoor Air Purifiers for PM Control*, TechFest22, IIT Bombay, December 16 -18, 2022.
12. Kumar, A, S. Ghosh, C. Mandal, P. Nawale, R. Parikh, M. Moni, and **M. Sahu**, *Development of an Indoor PM Control with Special Focus to Bioaerosols*, Indoor Air Quality Workshop, TIH-IoT, IIT Bombay, November 19, 2022.
13. Ghosh, S, and **M. Sahu**, *Removal of Dimethyl Phthalate from Aqueous Systems Using Low Cost Adsorbents*, 2nd International Conference on Water Technologies (ICWT), IIT Bombay, Mumbai, December 01-02, 2022.
14. Malyan, V, V. Kumar, and **M. Sahu**, *Fundamental Issues with Low-cost Particle Sensors: Evidence from a Field Sampling Campaign*, 2nd Air Sensors International Conference (ASIC'22), Bangalore, India, August 23-26, 2022.
15. Kumar, V, V. Malyan, and **M. Sahu**, *Selection of Meteorological Parameters and Effect of Seasonal Variation on Performance of Low-cost Particle Sensor*, Asian Aerosol Conference (AAC), Taiwan, June 12-16, 2022.
16. Chen, S, Q. Cao, T. H. Kuehn, C. Lo, Y. S. Mayya, **M. Sahu** and D. Y. H. Pui, *Design of a Medium Scale Ambient PM Cleaning System*, Asian Aerosol Conference (AAC), Taiwan, June 12-16, 2022.
17. Kumar, A, and **M. Sahu**, *Development of a Standard Fine Particle Matter Index for Performance Comparison of Biomass Cookstoves*, Asian Aerosol Conference (AAC), Taiwan, June 12-16, 2022.
18. Mandal, C, V. Nishad and **M. Sahu**, *Mathematical Model for Bioaerosol Disinfection in Photocatalytic Oxidation*, Asian Aerosol Conference (AAC), Taiwan, June 12-16, 2022.
19. Kumar, A, V. Malyan, and **M. Sahu**, *Performance Comparison of Different Particle Matter Control Technologies in Indoor Environment*, 17th International Conference Society of Indoor Air Quality and Climate, Finland, June 11, 2022
20. Kumar, V and **M. Sahu**, *Application of Machine Learning Algorithm for Calibration of Low-cost Sensor*, Air Sensors International Conference, California, May 11-13, 2022.

21. Ghosh, S, and **M. Sahu**, *Phthalate Esters Removal from Aqueous Systems using Semiconductor Photocatalysis*, International Conference on Environmental Science and Engineering (ICESE-2022), Bombay, January 20-22, 2022.
22. Mandal, C, V. Nishad, and **M. Sahu**, *Photocatalytic Disinfection, Kinetics and Optimization of Bacteria of Inactivation using Metal and Doped Metal Oxide Nanoparticles*, International Conference on Environmental Science and Engineering (ICESE-2022), Bombay, January 20-22, 2022.
23. Mandal, C, V. Nishad, and **M. Sahu**, *Photocatalytic Disinfection Kinetics and Optimization of Light Source on Inactivation of Mycobacterium smegmatis using Nanoparticles*, National Taiwan University - ESED Symposium, January 6, 2021.
24. Kumar, V, **M. Sahu**, and P. Biswas *Machine Learning (ML) Clustering Algorithms as a Receptor Modelling Technique for Source Apportionment of Particulate Matter*, International Aerosol Modeling Algorithms Conference, California, December 6-8, 2021.
25. Kumar, A, V. Malyan, and **M. Sahu**, *Comparative Analysis of Different Indoor Particle Control Technologies*, 6th Indian International Conference on Air Quality Management (IICAQM2021), December, 2021
26. Lu, Y, **M. Sahu**, X. Ye, Q. Ye, J. Hirschi, and A. Jones, *A Hot Carbonate Absorption Process with High Pressure Stripping to Reduce Energy Use for Post-Combustion CO₂ Capture*, SME Annual Meeting, USA 2013.
27. Lu, Y, **M. Sahu**, X. Q. Ye, X. Ye, K. O'Brien, S. Chen, J. Hirschi, and A. Jones, *Development of a Carbonate-Based Absorption Process for High Pressure CO₂ Recovery from Post-Combustion Flue Gases: Studies of CO₂ Absorption and Bicarbonate Crystallization*, Eleventh Annual Conference on Carbon Capture, Utilization & Sequestration, Pittsburgh, USA, 2012.
28. **Sahu, M**, Q Ye, and Y. Lu, *Development of a Novel Hot-Carbonate Process for Post-Combustion CO₂ Capture: Role of Organic Promoters in Enhanced Absorption and Bicarbonate Crystallization*, AIChE, Pittsburgh USA, 2012.
29. Ye, Q, **M. Sahu**, Y. Lu and X. Wang, *Development of a Novel Carbonate Absorption Process with Crystallization-Enabled High Pressure Stripping for Post-Combustion CO₂ Capture: Kinetic Study of Bicarbonate Salt Crystallization*, AIChE, Pittsburgh, USA, 2012.
30. **Sahu, M**, Q. Ye, Y. Lu, and M. Abadi, *Organic Catalysts in Promoting CO₂ Absorption in a Hot-Carbonate Process Enabled with Crystallization for Post-combustion CO₂ Capture*, Post-Doctoral Symposium, University of Illinois at Urbana-Champaign, Champaign, 2011.
31. Corson, N, P. Mercer, R. Gelein, **M. Sahu**, P. Biswas, G. Oberdörster and A. Elder, *Effects of Copper Doped Titanium Dioxide Nanoparticles in Vivo: Role of Soluble Metal*, The Society of Toxicity Annual Meeting, Washington DC, USA, 2011.

32. **Sahu, M** and P. Biswas, *Single-step Processing of Copper-doped Titania Nanomaterials in a Flame Aerosol Reactor*, International Aerosol Conference, Finland, 2010.
33. **Sahu, M**, B. Wu, L. Zhu, W. N. Wang, Y. J. Tang, and P. Biswas, *Role of Nanoparticle Chemical Composition and Particle Size on Toxicity of Cu-doped TiO₂ Nanomaterials in Environmental Microorganism*, AAAR 29th Annual Conference, Portland, USA, 2010.
34. **Sahu, M**, K. Suttiponparnit, S. Suvachittanont, T. Charinpanitkul, and P. Biswas, *Characterization of Doped TiO₂ Nanoparticle Dispersion: The Effect of Dopants*, AAAR 29th Annual Conference, Portland, USA, 2010.
35. Park, J, **M. Sahu**, and P. Biswas, *Characterization of In-Situ Charge Distribution of TiO₂ and Cu-Doped-TiO₂ Nanoparticles in a Flame Aerosol Reactor*, AAAR 29th Annual Conference, Portland, USA, 2010.
36. Suttiponparnit, K., J. Jiang, **M. Sahu**, S. Suvachirranont, Charinpanitkul, T, and P. Biswas, *Effect of Crystalline Phase, Primary Particle Size and Particle Mass Concentration on Titania Nanoparticle Dispersions*, RGJ Seminar Series LXIII: Chemical Engineering: Theory and Applications, Kasetsart University, Thailand, 2010.
37. Wang, W.N L. Zhu, S. Torkamani, W.J. An, **M. Sahu**, J. Park, V. Shah, X. Wang, and P. Biswas, *Nanoparticle Technology Research in Aerosol and Air Quality Research Laboratory*, *Missouri NanoFrontiers Symposium 2010: Gateway to Economic Development*, Washington University in St. Louis, Missouri, USA, 2010
38. Wu, B, **M. Sahu**, C. Jacobson, P. Biswas, and Y. J. Tang, *Light-Dependent Antibacterial Properties of Cu-Doped TiO₂ Nanoparticles (NPs)*, AIChE, USA, 2010.
39. Seders, L. A, **M. Sahu**, P. Biswas, and J. B. Fein, *Experimental Study of TiO₂ Nanoparticle Adhesion to Silica and Fe(III) Oxide-coated Silica Surfaces*, Goldschmidt Conference, USA, 2010.
40. **Sahu, M**, B. Wu, Y. J. Tang, and P. Biswas, *Single-step Flame Aerosol Synthesis of Cu-doped TiO₂ Nanomaterials and Their Potential Toxicity*, AAAR 28th Annual Conference, Minnesota, USA, 2009.
41. Suttiponparnit, K, J. Jiang, **M. Sahu**, S. Suvachittanont, T. Charinpanitku, and P. Biswas, *Effect of Crystalline Phase, Primary Particle Size, and Particle Mass Concentration on Titania Nanoparticle Dispersions*, 6th Asian Aerosol Conference, Bangkok, Thailand, 2009.
42. Wu, B, R. Huang, **M. Sahu**, X. Feng, P. Biswas, and Y. J. Tang, *Assessment of Toxicity of Metal Oxide Nanoparticles to Microbial Species*, AIChE, USA, 2009.
43. Huang, R, B. Wu, **M. Sahu**, X. Feng, P. Wurm, H. Wynder, P. Biswas, and Y. J. Tang, *Enhanced Toxicity of Cu-doped TiO₂ Nanoparticles to Pathogenic and Environmental Microorganisms*, 1st Symposium on

Nanotechnology for Public Health, Environment, and Energy, Washington University in St. Louis, 2009.

44. Zeng, H, A. Singh, S. Basak, **M. Sahu**, P. Biswas, J. C. Catalano, and D. E. Giammar, *Nanoscale Size Effects on Uranium(VI) Adsorption and Surface Mediated Reduction on Hematite Nanoparticles*, The 236th ACS National Meeting, Philadelphia, USA, 2008.
45. **Sahu, M.** *Energy Poverty in Rural Areas; A Challenge for New Development*, Global Leadership Vision of McDonnell International Scholars Academy, Washington University in Saint Louis, USA, 2008.
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50. **Sahu, M.**, A. V. Kumar, R. M. Tripathi, S. Saundararajan, V. D. Puranik, and D. N. Sharma, *Software Package for Hazardous Risk Assessment of Toxic and Inflammable Storage Facilities*. In proceedings of XIII National Symposium on Environment, Shilong, India 377-382, 2004.

**KEY INVITED
PRESENTATIONS**

1. Key Note Talk on “*Air Quality Management in India: Current and Future Challenges*”, Customer Connect, HORIBA Process and Environment, HORIBA India Pvt. Ltd, July 1, 2022
2. *Key Invited Presentation on “Development, Deployment, and Calibration of Low-cost Sensor Network for Air Quality Management”*, Orissa State Pollution Control Board (OSPCB), December 23, 2022
3. *Key Invited Presentation on “Air Quality Management in India: Current Status and the Way Ahead”*, Orissa State Pollution Control Board (OSPCB), July 27, 2022
4. *Key Note Talk on Machine Learning (ML) Application in Air Quality Monitoring and Modelling*, International Conference on Environmental Science and Engineering, IIT Bombay, January 20-22, 2021, India
5. *Development of One-step Process for Catalyst Synthesis, Characterization and Their Applications*, Process Technology Group, Johnson Matthey, March 14, 2017
6. *Aerosol Process Enabled Nanotechnology for Environmental Applications*, School of Infrastructure, IIT Bhubaneswar, India, December 9, 2016.
7. *Aerosol Process Enabled Nanotechnology for Environmental Applications*, Center for Environmental Science and Engineering, IIT Bombay, India, December 21, 2016.
8. *Study Abroad: Getting into MS and PhD Programs in USA, A Step by Step Process*, Indira Gandhi Institute of Technology (IGIT), Biju Pattanaik University of Technology, Odisha, India, December 6, 2016.
9. *Process Development for Post-Combustion CO₂ Capture*, Process Research and Development Dept., Hexion Inc, Texas, USA, September 27, 2016.
10. *Particle Synthesis, Characterization, and Their Applications*, Process Research and Development Dept., E-Ink Corporation, CA, USA, April 18, 2016.
11. *Development of One-step Process for Catalyst Synthesis, Characterization and Their Applications*, Process Research and Development Department, Honeywell, Buffalo, NY, USA, April 5, 2016.
12. *Development of a Hot Carbonate Absorption Process with Crystallization-Enabled Stripping for Post-Combustion CO₂ Capture*, Process Research and Development Department, Boehringer Ingelheim, CT, USA Jan 11, 2016.
13. *Development of a Novel Hot-Carbonate Process for Post-Combustion CO₂ Capture*, Process Research and Development Department, AbbVie, Chicago, USA, June 1, 2015.
14. *Synthesis, Characterization, and Applications of Doped Nanostructured Materials*, Research and Development Dept, Saint-Gobain, MA, USA, Dec 17, 2014.

15. *Particle Synthesis, Characterization, and Their Applications*, 1366 Technology Inc, Research and Development Dept, MA, USA, Jun 16, 2014.
16. *Aerosol Route Synthesis, Characterization, and Applications of Doped Nanostructured Materials*, Process Technology R & D, SABIC Innovative Plastics, Indiana, USA Nov 18, 2012.
17. *Synthesis, Characterization, and Applications of Doped Nanostructured Materials*, Poly Silicon R & D, MEMC Electronic Materials, Texas, USA, October 12, 2012.
18. *Synthesis of Nanostructured Catalysts and Their Environmental Applications*, Catalysts R & D Group, BASF, NJ, USA, August 15, 2012
19. *Aerosol Route Synthesis, Characterization, and Applications of Doped Nanostructured Materials*, CABOT, MA, USA, August 13, 2012.
20. *Flame Aerosol Synthesis and Applications of Doped Nanostructured Materials*, Material Processing R & D, Global Advanced Metals, MA, USA, February 10, 2012

BOOK CHAPTER

1. **Sahu, M.**, V. Malyan, Y. S. Mayya, *Technologies for Controlling Particulate Matter Emissions from Industries*, Springer Nature, Singapore, 2021
2. Mandal, C and **M. Sahu**, *Application of Metal and Metal Oxide Nanoparticles as Potential Antibacterial Agents*, Springer Nature, Singapore, 2021
3. Ghosh, S and **M. Sahu**, *Mechanistic Understanding of Stability and Photocatalytic Efficiency of Titanium Dioxide Nanomaterials in Aquatic Media: A Sol-Gel Approach*, IntechOpen, 2023 (under revision)

CERTIFICA- TIONS

- Black Belt: Operational Excellence: SunEdison, 2015
- Lean Green Belt: SunEdison, 2014
- Certificate-Business Administration: University of Illinois at Urbana-Champaign-IL, 2012
- Certificate-Entrepreneurship and Management: University of Illinois at Urbana-Champaign-IL, 2012

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