

Sandipan Kumar Das

Office 107, Mechanical Engineering Department, IIT(ISM) Dhanbad. 914 704 5784 (C). sandipan@iitism.ac.in

Publications

➤ Journal:

- ❖ **Das, S.K.**, 'Two-equation population balance model for turbulence-induced coalescence and breakage physics in bubbly flows', ***Physics of Fluids***, volume 38, 2026. **Editor's Pick**
- ❖ Saha, A., Joshi, A., Mukherjee, P.P. and **Das, S.K.**, 'Two-phase flow modeling and understanding of transport limitations in the Porous Transport Layer of a Polymer Electrolyte Membrane Electrolyzer', ***Physics of Fluids***, volume 38, 2026.
- ❖ Lad, C.J., Prasad, B., Mondal, T.K., Sen Gupta, S., **Das, S.K.** and Samanta A., 'Hydrogen production from the scrap Aluminum beverage can chips and valorization of byproduct residue for CO₂ capture', ***Journal of Energy Resources Technology, Part B: Subsurface Energy and Carbon Capture***, volume 2, 2026.
- ❖ Saha, A. and **Das, S.K.**, 'Deciphering bubbles dynamics in confined quiescent fluid – A numerical approach', ***Physics of Fluids***, volume 37, 2025.
- ❖ Sankhla, K. and **Das, S.K.**, 'Solution of Three-Dimensional Steady State Stokes flow problems with exit boundary conditions by the Boundary Element Method', ***Computers and Mathematics with Applications***, volume 195, 2025.
- ❖ **Das, S.K.**, 'Solution of the Poisson Equation by the Boundary Integral Method', ***International Journal of Numerical Methods for Heat and Fluid Flow***, volume 34, 2024.
- ❖ Roy, A., Sen Gupta, S., Samanta, A., Likhith, P.V.S.S. and **Das, S.K.**, 'Prospects of energy-efficient power generation system with ammonia as Hydrogen carrier', ***International Journal of Hydrogen Energy***, volume 71, 2024.
- ❖ Sengupta, A., **Das, S.K.**, Nandi, B.K. and Sharma, P., 'Characterizing pulverized coal combustion for high-ash content Indian coal', ***Energy Sources, Part A: Recovery, Utilization and Environmental Effects***, volume 46, 2024.
- ❖ **Das, S.K.**, 'Extension of the Boundary Integral Method for different boundary conditions in steady-state Stokes Flows', ***International Journal of Numerical Methods for Heat and Fluid Flow***, volume 33, 2023.
- ❖ **Das, S.K.**, 'A Reynolds Stress model with a new elliptic relaxation procedure for stratified flows', ***International Journal of Heat and Fluid Flow***, volume 83, 2020.
- ❖ **Das, S.K.**, 'Analytical expression for concentration overpotential of anode-supported Solid Oxide Fuel Cell based on the Dusty Gas Model', ***Journal of Electrochemical Energy Conversion and Storage***, volume 17, 2020.
- ❖ **Das, S.K.**, 'General Dusty Gas Model for porous media with a specified pore size distribution', ***Chemical Engineering Science***, volume 203, 2019.
- ❖ **Das, S.K.**, 'Elliptic relaxation model for stably stratified turbulence', ***International Journal of Heat and Fluid Flow***, volume 74, 2018.
- ❖ **Das, S.K.**, 'Towards enhancement of carbon capture by Molten Carbonate Fuel Cell through controlled thermodiffusion', ***International Journal of Heat and Mass Transfer***, volume 127, part A, 2018.

- ❖ **Das, S.K.**, Direct solver for pentadiagonal matrix containing tridiagonal submatrices', *Numerical Heat Transfer, Part B: Fundamentals*, volume 72, issue 1, 2017.
- ❖ **Das, S.K.**, A new turbulence induced theoretical breakage kernel in the context of the population balance equation', *Chemical Engineering Science*, volume 152, 2016.
- ❖ **Das, S.K.**, Development of a coalescence model due to turbulence for the population balance equation', *Chemical Engineering Science*, volume 137, 2015.
- ❖ **Das, S.K.** and Durbin, P.A., Prediction of atmospheric dispersion of pollutants in an airport environment', *Atmospheric Environment*, volume 41, issue 6, 2007.
- ❖ **Das, S.K.** and Durbin, P.A., A Lagrangian stochastic model for dispersion in stratified turbulence', *Physics of Fluids*, volume 17, issue 2, 2005.

➤ **Book:**

- ❖ **Das, S.K.**, Pollutant dispersion prediction in airports: A Lagrangian stochastic modeling approach', *VDM publishers*, ISBN # 9783639124798, 2009. (My Ph.D. thesis has been published as a book by the publisher)
<https://www.amazon.com/Pollutant-Dispersion-Prediction-Airports-Lagrangian/dp/3639124790>

➤ **Conference/Talk/Media:**

- ❖ **Das, S.K.**, 'General Dusty Gas Model for Porous Media with a Specified Pore Size Distribution', featured in *Advances in Engineering*, (<https://advanceseng.com/general-dusty-gas-model-porous-media-specified-pore-size-distribution/>).
- ❖ **Das, S.K.** (Lead Author), Hanson, H. (Topic Editor), 'Modeling Atmospheric Dispersion of Pollutants', *Encyclopedia of Earth* (<http://www.eoearth.org>), Ed: Cutler J. Cleveland, 2007.
- ❖ **Das, S.K.**, Backward Lagrangian Stochastic Modeling for Pollutant Dispersion in Airports', *LAX Air Quality and Source Apportionment Study, Technical Work Group Meeting No. 4*, March 22, 2007.
- ❖ **Das, S.K.** and Durbin, P.A., Airport Pollutant Dispersion Modeling', *Thermal and Fluid Sciences Affiliates & Sponsors Conference*, Stanford University, 2004.
- ❖ **Das, S.K.**, Kalitzin, G. and Durbin, P.A., A Model for Prediction of Bypass Transition', *Thermal and Fluid Sciences Affiliates & Sponsors Conference*, Stanford University, 2003.

Patents granted

- 'A system for Ammonia combustion with two stage coupled combustor'. **Patent Number:** 590591 (India). **Grant Date:** May 27, 2026. **Date filed:** November 16, 2023. **Inventors:** Sandipan Kumar Das, Arunkumar Samanta, Soumyajit Sen Gupta.
- 'Dual fluidized bed chemical looping gasification system for Hydrogen production and process of Hydrogen production therein'. **Patent Number:** 583080 (India). **Grant Date:** March 12, 2026. **Date filed:** October 30, 2023. **Inventors:** Arunkumar Samanta, Sandipan Kumar Das, Soumyajit Sen Gupta.
- 'Flow field baffle for Molten Carbonate Fuel Cell Cathode'. **Patent Number:** 12734470. **Type:** Grant (USA). **Date of Patent:** July 29, 2025. **Date Filed:** November 26, 2019. **Inventors:** Timothy C. Geary,

Timothy A. Barckholtz, Jonathan Rosen, **Sandipan K. Das**, Carl A. Willman, Abdelkader Hilmi, Chao-Yi Yuh.

- 'An adsorbent/catalyst support material from the byproduct of hydrolysis of aluminium waste or scrap and a process for the preparation thereof', **Patent Number:** 569226 (India). **Grant Date:** July 29, 2025. **Date filed:** November 26, 2024. **Inventors:** Arunkumar Samanta, Babuni Prasad, **Sandipan Kumar Das**, Soumyajit Sen Gupta.
- 'A fabric-based structured bed gas-solid contractor system for capturing CO₂ and process for capturing CO₂ therein', **Patent Number:** 569189 (India). **Grant Date:** July 28, 2025. **Date filed:** April 23, 2024. **Inventors:** Arunkumar Samanta, Babuni Prasad, **Sandipan Kumar Das**, Soumyajit Sen Gupta.
- 'Cathode collector structures for Molten Carbonate Fuel Cell'. **Patent Number:** 12355085. **Type:** Grant (USA). **Date of Patent:** July 8, 2025. **Date Filed:** November 26, 2019. **Inventors:** Jonathan Rosen, Timothy A. Barckholtz, Heather A. Elsen, Gabor Kiss, Lu Han, Thomas M. Smith, **Sandipan K. Das**, Chao-Yi Yuh, Carl A. Willman, Timothy C. Geary, Keith E. Davis, Abdelkader Hilmi, Lawrence J. Novacco.
- 'An integrated fluidized bed reactor system for Ammonia combustion to obtain Hydrogen and power and method to do the same', **Patent Number:** 541857 (India). **Grant Date:** June 14, 2024. **Date filed:** March 15, 2023. **Inventors:** **Sandipan Kumar Das**, Arunkumar Samanta, Siddhartha Sengupta, Soumyajit Sen Gupta.
- 'Method and system for optimum usage of Ammonia by generating power using coupled heat exchanger-combustor', **Patent Number:** 513499 (India). **Grant Date:** February 21, 2024. **Date Filed:** December 1, 2022. **Inventors:** **Sandipan Kumar Das**, Aditi Sengupta, Laltu Chandra.
- 'Desalter Inlet distributor designs and methods'. **Patent Number:** 1173415 (USA). **Type:** Grant. **Date of Patent:** November 16, 2021. **Date Filed:** August 13, 2019. **Inventors:** **Sandipan K. Das**, Andrew P. Sullivan, Magaly C. Barroeta.
- 'Housing for multiple fuel cell stacks'. **Patent Number:** 10622660. **Type:** Grant (USA). **Date of Patent:** April 14, 2020. **Inventors:** Frank Hershkowitz, Timothy A. Barckholtz, Paul J. Berlowitz, **Sandipan K. Das**, Thomas A. Badgwell.
- 'Nozzle for wet gas scrubber'. **Patent Number:** 10478835. **Type:** Grant (USA). **Date of Patent:** November 19, 2019. **Inventors:** Glenn M. Beatty, Christopher J. Fowler, Venkatesh Subramania, **Sandipan K. Das**, John B. Barnes, Laura Johnsen.
- 'Sludge management system for crude oil storage tanks'. **Patent Number:** 10384242. **Type:** Grant (USA). **Date of Patent:** August 20, 2019. **Inventors:** **Sandipan Kumar Das**, Sally Ann Thomas.
- 'Injector nozzle quenching process for piping systems'. **Patent Number:** 9650691. **Type:** Grant (USA). **Date of Patent:** May 16, 2017. **Inventors:** **Sandipan Kumar Das**, Steven Allen Trese.
- 'Injector nozzle quenching for piping systems'. **Patent Number:** 9487842. **Type:** Grant (USA). **Date of Patent:** November 8, 2016. **Inventors:** **Sandipan Kumar Das**, Steven Allen Trese.

Patents published

- 'A process for the production of Hydrogen from Aluminum waste'. **Publication Number:** 202431005303. **Publication Date:** February 23, 2024. **Date filed:** January 25, 2024. **Inventors:** Arunkumar Samanta, Chitrang Jayantibhai, Babuni Prasad, Tapas Kumar Mandal, **Sandipan Kumar Das**, Soumyajit Sen Gupta. (Indian Patent)
- 'Integrated operation for Molten Carbonate Fuel Cells'. **Publication Number:** 20170271701. **Type:** Application (USA). **Publication Date:** September 21, 2017. **Date Filed:** March 3, 2017. **Inventors:** Paul J. Berlowitz, Timothy A. Barckholtz, **Sandipan K. Das**.