Curriculum Vitae

Arunkumar Samanta
MTech, PhD
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Education

- PhD from the **Indian Institute of Technology (IIT) Kharagpur**, 2009 Dissertation Title: Absorption of Carbon Dioxide into Piperazine Activated Alkanolamines.
- Master of Technology (M. Tech) in Chemical Engineering with a CGPA of 8.50 (First Class) from the **Indian Institute of Technology (IIT) Kharagpur**, 1998.
- Bachelor of Technology (B. Tech) in Chemical Engineering with 78.70% marks (First Class), from the **University of Calcutta**, 1st Class, 1996.
- Bachelor of Science (B.Sc., Honors in Chemistry) with **64.25%** (First Class) from the **University of Calcutta**, 1993.

Research Interest

- Carbon Capture, Utilization and Sequestration, Gas Separation and Purification, Chemical Looping Combustion and Gasification, Clean Coal Technology

  One of our research groups in our CCUS Lab is working on developing high-performance functionalized solid sorbents for postcombustion CO_2 capture & techno-economic assessment. They mainly synthesize and characterize various solid mesoporous supports that are functionalized with amines/amino-silanes using conventional wet impregnation and covalent grafting procedures. Another group investigates the chemical absorption of CO_2 in single and mixed amines, the vapor-liquid equilibria of the CO_2 -amine system, and estimates physicochemical properties such as diffusivity and physical solubility. The CO_2 utilization group explores areas of CO_2 utilization through mineral carbonation using steel slag and CO_2 to value-added products using the catalytic method.
  Our clean coal technology group are involved in the development of oxygen carriers from locally available low-cost natural ores and mineral processing waste and structure-engineered mixed metal oxides oxygen carriers with high oxygen transfer capacity and improved reactivity suitable for a fluidized bed Chemical Looping Combustion and Gasification processes.

Research/Consultancy Projects

Title: Conversion of Anthracene Oil into High-Speed Grease (Phase-I)
Funding Agency: SAIL/Bokaro
Total Outlay of the Project: 18.26 Lakh
Role: PI
Status: Ongoing

Title: High-Temperature CO_2 Capture using Novel Fly-ash infused CaO-MgO Sorbents in Pre & Post Combustion Processes: Kinetics, Thermodynamics and Breakthrough Studies
Funding Agency: DST (SERB)
Total Outlay of the Project: 35.145 Lakh
Role: Co-PI
Status: Ongoing

Title: DST-FIST
Funding Agency: DST
Total Outlay of the Project: 180 Lakhs
Role: Co-PI
Current Status: Ongoing

Title: High Ash Coal Gasification and Associated Upstream and Downstream Processes (Coal to Chemicals, CTC)
Funding Agency: Coal India Ltd
Total Outlay of the Project: 21.60 Crores
Role: Co-PI since inception, PI since 2022
Status: Completed

Title: Post-combustion CO_2 Capture using Novel Amine-Based Solvent
Funding Agency: IIT(ISM) Dhanbad
Total Outlay of the Project: 7.3 Lakhs
Role: PI
Status: Completed

Details of Consultancy Projects:
Title: Testing of HFO sample of NTPC
Funding Agency: NTPC
Total Outlay of the Project: 4.13 Lakhs
Role: Co-PI
Status: Completed

Conference/ Workshops/Short-term Course & Training Organized

Title: A six-day short-term programme on “High-Efficiency, Low-Emissions Clean Coal and Carbon Capture, Utilization and Storage Technologies”
Funding Agency: MALAVIYAMISSION TEACHER TRAINING PROGRAMME (MMTTP)
Role: Coordinator
Time: 23 - 28 September 2024

Title: Advances in Solid Fuel Processing & Conversion Technologies
Funding Agency: TEQIP-III
Role: Coordinator
Time: 29-30 January 2018

Title: Energy Resources: Future Prospects of Fuel and Chemicals
Funding Agency: TEQIP-II
Role: Co-Coordinator
Time: 7-8 November 2016

Title: Net-Zero Emission Technologies for Sustainable Development: Challenges and Opportunities (N0ET - 2022) [International Conference]
Funding Agency: DSIR and Others
Role: Chairman
Time: 12-13 December 2022

Title: Net-Zero Emission Technologies for Sustainable Development: Challenges and Opportunities (N0ET - 2023) [International Conference]
Role: Chairman
Time: 16-17 December 2023

Title: Carbon Dioxide Capture and Sequestration – Challenges for Engineers [National Conference]
Funding Agency: Gujarat Council on Science and Technology (GUJCOST), Govt. of Gujarat
Role: Organizing Secretary
Date: 6-7 March 2009

Title: CHEMQUEST 2001 -A State-Level Symposium for Chemical Engineering Students
Funding Agency: ONGC, MOL, Gujarat & Self-sponsored
Role: Convenor
Date: 12-13 April 2001

Title: Stakeholders' Meet on "Hydrogen Valley Innovation Cluster" [Workshop]
Organized by: CHCCUST, IIT(ISM) Dhanbad
Funding: IIT(ISM)
Role: Co-convener
Date: 28 April 2023

Title: Design, Selection & Operation of Heat Exchangers [Workshop]

Funding Agency: L&T and L&T Chiyoda Limited Baroda
Role: Convenor
Date: 12 October 2002

Title: Soft computing for Engineers using MATLAB [Two-day crash course]
Funding Agency: Self-sponsored
Role: Convenor
Date: 2-3 February 2008.

Professional Experience

- More than **27** years of Experience in Teaching and Research.
- **3+** years of experience as a Postdoctoral Research Fellow (from the University of Alberta) in the field of Separation Processes: design and development of high-performance mesoporous solid sorbents for removal of acid gases.
- No. of PhD Students Supervised: 03; Ongoing: 03
- No. of MTech Students Supervised: 09; Ongoing: 03
- Published about **80+** journal and conference papers.
- Experience in project coordination and execution and team leading and training.
- Functional experience includes software such as ASPEN PLUS, ASPEN-HYSYS, MATLAB.

Work Experience

- July 2024 – : Professor, Department of Chemical Engineering at IIT(ISM) Dhanbad.
- May 2013 – July 2024: Associate Professor, Department of Chemical Engineering IIT(ISM) Dhanbad.
- April 2010 – May 2013: Postdoctoral research fellow in Chemical Engineering at the Canadian Centre for Clean Coal/Carbon & Mineral Processing Technologies (C^5MPT), Department of Chemical and Materials Engineering at the University of Alberta, Edmonton, Canada.
- July 2003-April 2010: Assistant Professor, September 1998-June 2003: Lecturer, Department of Chemical Engineering, GCET (SPU), Gujarat.
- July 2004-2008: Research Scholar, Indian Institute of Technology Kharagpur.

Research Activity at University of Alberta & IIT Kharagpur

1. **Development of High-Performance Amine Impregnated Solid Sorbents for Post Combustion CO_2 Capture & Techno-Economic Assessment.**
   - **Status:** Completed
   - **Funding Agency:** Carbon Management Canada Inc. and C^5MPT centre
   - **Responsibility:** Key team member in preparing the project proposal and a key research team member in executing the project. We focused on developing a low-cost, novel sorbent and associated process to remove CO2 from coal-fueled power plant flue gas cost-effectively.

2. **Chemical Looping Combustion**
   - **Status:** Completed
   - **Funding Agency:** C^5MPT Research Centre
     Responsibility: Key team member in executing the project. The objective of the project is to develop a cost-effective oxygen carrier to support the application of CLC as a technology to produce steam for Steam Assisted Gravity Drainage (SAGD) in bitumen production with reduced GHG emissions. The carrier development will focus on raw materials available in North America, particularly mineral processing wastes, which will overcome existing shortcomings of attrition resistance, cost and sour fuel tolerance.

3. **Hot gas Cleanup (Developing Sorbents for H_2S Capture)**
   - **Status:** Completed
   - **Funding Agency:** Alberta Innovates Technology Futures & C^5MPT Research Centre
   - **Responsibility:** Preparation of project proposal and as a key team member in executing the project. This program collaborated with the Alberta Innovates-Technology Futures (AITF), Edmonton, focused on developing novel hot-gas desulfurization sorbents for a relatively high-temperature application that shows stable and high reactivity at 400-650°C.

4. **Study of the Behavior of Lump Coal at High Temperature**
   - **Status:** Completed
   - **Funding Agency:** The Baoshan Iron and Steel Co. Ltd., China
   - **Responsibility:** A key team member in executing the project. The objective of the industrially sponsored collaborative research project was to study the behavior of coal at high temperatures that may have a direct or indirect impact on the plant's performance.

5. **Production and Characterization of Ash-free Coal from Low-Rank Canadian Coal by Solvent Extraction**
   - **Status:** Completed
   - **Funding Agency:** Sherritt International Corp., AB, Canada
   - **Responsibility:** A key team member in executing the project. The major objective of the industrially sponsored collaborative research project was to prepare ash-free coal from low-ranking coal using industrial solvents.

6. **Natural Gas Processing: CO_2 Capture-Rate Model and VLE of CO_2 in Activated Amine Solvents**
   - **Status:** Completed

- **Funding Agency:** MHRD
- **Responsibility:** Assisted in developing the experimental set-up and mathematical model for absorption of carbon dioxide into piperazine-activated alkanolamine solvent.

Member of Professional Bodies

- **Member:** Indian Institute of Chemical Engineers (LM No.: 53982)
  : American Institute of Chemical Engineers (Membership No.: 009900153330)
  : Chemical Institute of Canada (Membership No.: 604242)
- **Life Member:** Indian Society of Technical Education (LM No.: 53064)

Awards & Honors

- Received 2nd Runner Award in the "Hackathon on Coal Gasification" organized by the Ministry of Coal, Govt. of India, under the category "Emission Reduction in Coal Gasification" held during May 13 - 17 May 2024.
- Received National Scholarship award consecutively in 1988 and 1990 from MHRD, GOI.
- Received Gold medal from Ramakrishna Mission Vidya Mandir, Belur Math, WB, 1993.

Publications

Patent Filed/Published/Granted

(i) **Title:** An integrated fluidized bed reactor system for Ammonia combustion to obtain hydrogen and power and method for the same
Name of Inventors: S. K. Das, A. Samanta, S. Sengupta, S Sen Gupta
Patent No. and Publication Date: 202331017619
Status: **Granted** Date: 15 June 2024

(ii) **Title:** Dual fluidized bed chemical looping gasification system for Hydrogen production and process of Hydrogen production therein
Name of Inventors: A. Samanta, S.K. Das, S. Sen Gupta
Patent No. and Publication Date: 202331073657, 24 November 2023
Status: Published

(iii) **Title:** A system for ammonia combustion with two-stage coupled combustor
Name of Inventors: A. Samanta, S.K. Das, S. Sen Gupta,
Patent No. and Publication Date: 202331078073, 01 Dec 2023
Status: Published

(iv) **Title:** A process for the production of Hydrogen from Aluminum waste
Name of Inventors: A. Samanta, C. J. Lad, B. Prasad, T.K. Mandal, S.K. Das, S. Sen Gupta
Patent No. and Publication Date:202431005303, 23 February 2024
Status: Published

(v) **Title:** Synthesis method and apparatus for carbon dioxide capture using functionalized fabric cloth
Name of Inventors: A. Samanta, B. Prasad, S.K. Das, S. Sen Gupta
Patent No. and Publication Date: 202431032179, 23 April 2024
Status: Filed

Peer-reviewed Journals

1. B. Prasad, R. Dey, A Samanta, Facile Synthesis, Characterization, and Performance Study of a Low-Cost Structured Adsorbent for CO_2 Capture. Industrial & Engineering Chemistry Research, 64 (2), 1274−1285, 2025
2. A. Roy, S. Sengupta, A. Samanta, P.V.S. Sai Likhith, S. K Das, Prospects of Energy-efficient Power Generation System with Ammonia as Hydrogen Carrier, International Journal of Hydrogen Energy, 71, 131-142, 2024
3. A.K.Dubey, A.Samanta, P.Sarkar, V. K. Saxena, Investigations on the chemical looping with oxygen uncoupling process using Indian coal and copper oxide oxygen carrier, Fuel, 311, 122546, 2022.
4. R. Dey, A.Samanta, Microwave-synthesized high-performance mesoporous SBA-15 silica materials for CO_2 capture, Korean J. Chem. Eng., 37(11), 1951-1962, 2020.
5. A. Agarwal, A. Samanta, B. K.Nandi, A. Mandal, Synthesis, characterization and performance studies of kaolin-fly ash-based membranes for microfiltration of oily waste water, Journal of Petroleum Science and Engineering 194, 107475, 2020.
6. A.K.Dubey, A.Samanta, P.Sarkar, R. Dey, V. K. Saxena, Performance and kinetic evaluation of synthesized CuO/SBA-15 oxygen carrier for chemical looping with oxygen uncoupling, Energy Technology, 7:1900407, 2019.
7. Runa Dey, Rajender Gupta, Arunkumar Samanta, Carbon dioxide capture under postcombustion conditions using amine-functionalized SBA-15: Kinetics and multicyclic performance. Separation Science and Technology, 53, 2683-2694, 2018.
8. A.K.Dubey, A.Samanta, P.Sarkar, M.K.Karmakar, A.Mukherjee, C.Loha, M.Kumar, S.G.Sahu, V.K.Saxena, P.K.Chatterjee, Hydrodynamic characteristics in a pilot-scale cold flow model for chemical looping combustion. Advanced Powder Technology, 29, 1499-1506, 2018.
9. A Shabani, M Rahman, D Pudasainee, A Samanta, P Sarkar and R Gupta, Evaluation of Ash-Free Coal for Chemical Looping Combustion - Part II: Thermogravimetric Multi-cycle Performance. The Canadian Chemical Engineering, 95, 832-633, 2017.
10. A Shabani, M Rahman, D Pudasainee, A Samanta, P Sarkar and R Gupta. Evaluation of Ash-Free Coal for Chemical Looping Combustion -Part I: Thermogravimetric Single

Cycle Study and the Reaction Mechanism. The Canadian Chemical Engineering, 95, 623-633, 2017.

11. Mittal, Nikhil; Samanta, Arunkumar; Partha Sarkar; Rajender Gupta, Post-combustion CO_2 capture using N-(3-trimethoxysilylpropyl)diethylenetriamine grafted solid adsorbent, Energy Science & Engineering, 3, 207-220, 2015.

12. M. Rahman; A. Samanta; R. Gupta, Production and Characterisation of Ash-free Coal from Low-Rank Canadian Coal by Solvent Extraction. Fuel Processing Technology, 115, 88-98, 2013.

13. A. Zhao, A. Samanta, P. Sarkar, R. Gupta, Carbon Dioxide Adsorption on Amine Impregnated Mesoporous SBA-15 Sorbents: Experimental and Kinetics Study. Industrial & Engineering Chemistry Research, 52(19), 6480-6491, 2013.

14. Samanta, A.; A. Zhao; G. K. H. Shimizu; P. Sarkar; R. Gupta, Post-Combustion CO_2 Capture Using Solid Sorbents: A Review. Industrial & Engineering Chemistry Research, 51(4), 1438-1463, 2012.

15. S. K. Dash; A. Samanta; A. N. Samanta; S. S. Bandyopadhyay, Absorption of Carbon Dioxide in Piperazine Activated Concentrated Aqueous 2-Amino-2-Methyl-1-propanol Solvent. Chemical Engineering Science, 66, 3223 -3233, 2011.

16. A. Samanta and S.S. Bandyopadhyay Absorption of Carbon Dioxide into Piperazine Activated Aqueous N-Methyldiethanolamine. Chemical Engineering Journal, 171, 734-741, 2011.

17. S. K. Dash; A. Samanta; A. N. Samanta; S. S. Bandyopadhyay, Vapour Liquid Equilibria of Carbon Dioxide in Dilute and Concentrated Aqueous Solutions of Piperazine at Low to High Pressure. Fluid Phase Equilibria, 300, 145-154, 2011.

18. A. Samanta and Bandyopadhyay, S. S. Absorption of Carbon Dioxide into Aqueous Solutions of Piperazine Activated 2-Amino-2-Methyl-1-Propanol. Chemical Engineering Science, 64, 1185 - 1194, 2009.

19. A. Samanta and Bandyopadhyay, S. S. Kinetics and Modeling of Carbon Dioxide Absorption into Aqueous Solutions of Piperazine. Chemical Engineering Science, 62, 7312-7319, 2007.

20. A. Samanta and Bandyopadhyay, S. S. Physical Solubility and Diffusivity of N_2O and CO_2 in Aqueous Solutions of Piperazine and (N-Methyldiethanolamine + Piperazine). Journal of Chemical and Engineering Data, 52, 1381- 1385, 2007.

21. Samanta, A. and Bandyopadhyay, S. S. Density and Viscosity of Aqueous Solutions of Piperazine and (2-Amino-2-Methyl-1-Propanol + Piperazine) from 298 to 333 K. Journal of Chemical and Engineering Data, 51, 467-470, 2006.

22. Samanta, A., Basu. J. K. and Kundu, G. Removal of Hexavalent Chromium from Aqueous Solution by Using Low-cost Adsorbent. Indian Journal of Environmental Protection, 20 (10), 754-760, 2000.

23. Samanta, A., Banerjee, T. K. and Das, S. K. Pressure Losses in Orifices for the Flow of Gas-Non-Newtonian Liquids. The Canadian Journal of Chemical Engineering, Vol. 77, June, 579-583, 1999.

Conference Presentations/ Publications

1. B. Prasad, S.K. Sharma, T.K. Mondal, A. Samanta, CO_2 utilization through mineral carbonation using steel slag, International Conference on Refractories in Iron & Steel Industries, Organized by the Steel Authority of India Limited, Bokaro Steel Plant, 12-13 April 2024.

2. B. Prasad, A. Samanta, Post-combustion CO_2 capture using functionalized supported sorbents, National Seminar on Transforming waste into valuable resources for mitigating Greenhouse Gas Emissions, Organized by the Steel Authority of India Limited, Bokaro Steel Plant, 5-6 January 2024, Bokaro.

3. B. Prasad, A. Samanta, Carbon dioxide capture using functionalized structured adsorbents, CHEMCON 2023 (Platinum Jubilee Celebration), 27-30 December 2023 Kolkata.

4. B. Prasad, A. Samanta, Facile synthesis, characterization, and performance study of low-cost structure adsorbent for CO_2 capture, National Seminar on Sustainable & Green Technologies for Industries, Organized by The Institution of Engineers (India) Bokaro Steel City Local Centre, 26-27 August 2023, Bokaro.

5. C. Lad, B. Prasad, T. K. Mondal, A. Samanta, Hydrogen production using scrap aluminium from municipal waste, National Seminar on Sustainable & Green Technologies for Industries, Organized by The Institution of Engineers (India) Bokaro Steel City Local Centre on 26-27 August 2023, Bokaro.

6. B. Prasad, A. Samanta, Postcombustion carbon dioxide capture using functionalized structured adsorbents, Two-day International Conference on Net-Zero Emission Technologies for Sustainable Development: Challenge and Opportunities (N0ET-2022) 12-13 December 2022, Dhanabd.

7. A. Agarwal, A. Samanta, A. Mandal, B.K. Nandi, Fabrication of low-cost ceramic membranes and its application in the treatment of oily wastewater, CHEMCON 2018, Jalandhar.

8. Ashwani Kumar Dubey,Arunkumar Samanta, Pinaki Sarkar, Vinod Kumar Saxena, Kinetics of silica supported CuO as an oxygen carrier for chemical looping oxygen uncoupling (CLOU), CHEMCON 2018, Jalandhar.

9. Runa Dey, Ravisha Goswami and Arunkumar Samanta, Modeling of CO_2 adsorption properties on KCC-1, CHEMCON 2018, Jalandhar.

10. O. Kotpalliwar, A. Singhal, T. Dutta and A. Samanta, Efficiency Analysis of Organic Rankine Cycle, CHEMCON 2018, Jalandhar.

11. R. Goswami, and A. Samanta, A novel mesoporous sorbent KCC-1 for CO_2 capture under postcombustion conditions, CHEMCON 2017, Haldia.

12. R. Kumar, and A. Samanta, Photocatalytic conversion of CO_2 to methanol using TiO_2 as photocatalyst, CHEMCON 2017, Haldia

13. R. Dey and A. Samanta, Modelling CO_2 Adsorption on PEI-Functionalized SBA-15: Kinetics and Semi-empirical Equilibrium Model, 67th Canadian Chemical Engineering Conference 2017, Edmonton, Alberta, Canada, 2017.

14. A. K. Dubey, P. Sarkar, A. Samanta and V. K. Saxena, Development of ilmenite as oxygen carrier with coal in chemical looping combustion, National conference on Sustainable Technologies to Connect People with Nature-2017, CGCRI, Kolkatta.

15. Katta. Srikanth, R. Dey, A. Samanta, PEI impregnated mesocellular siliceous foam (MCF) for post-combustion CO_2 capture, CHEMCON 2016, Chennai.

16. A.K. Dubey, A. Samanta, V.K. Saxena and P. Sarkar, Investigation of Chemical Looping Combustion with coal, CHEMCON 2016, Chennai.

17. A.K. Dubey, A. Samanta, P. Sarkar and V.K. Saxena, Cold Flow Model Investigation on a Chemical Looping System, CHEMCON 2016, Chennai.

18. R. Dey and A. Samanta, Investigation on Performance of PEI Impregnated mesoporous SBA-15 sorbent for CO_2 capture, CHEMCON 2016, Chennai.

19. A. Agarwal, A. Mandal, B.K.Nandi and A. Samanta, Separation of oil from oil-in-water emulsions using kaolin-based ceramic membranes, Conference on Challenges and prospects of petroleum production and processing industries, IIT(ISM) Dhanbad, 2016.

20. A Samanta, P Sarkar, R Gupta,A Multi-Cyclic Study on Post-Combustion CO_2 Capture Using Polyethyleneimine-Impregnated Mesoporous SBA-15 Silica Sorbents, 65th Canadian Chemical Engineering Conference, 2015, Calgary, Alberta, Canada, 2015.

21. R. Dey and A. Samanta, Mesoporous SBA-15 Support for CO_2 Capture: Microwave-Assisted Synthesis and Morphology Study, CHEMCON 2015, Guwahati.

22. A Samanta, N Mittal, J Segura, P Sarkar, R Gupta, 'Carbon Dioxide Capture Using Structured Bed Loaded with Functionalized Sorbent', CHEMCON 2014, December 27-30, 2014, Chandigarh, India.

23. A K Dubey, P Sarkar, V K Saxena, A Samanta, 'Chemical Looping Combustion of Indian Coal with Copper oxide as Oxygen Carrier' CHEMCON 2014, December 27- 30, 2014, Chandigarh, India.

24. Runa Dey and A. Samanta, 'Amine-functionalized mesoporous solid sorbents for CO2 capture from flue gas: A Review', 10th Annual Session of SCHEMCON 2014, September, 19 – 20, 2014. Haldia, India.

25. Azar Shabani, Moshfiqur Rahman, Deepak Pudasainee, Arunkumar Samanta, and Rajender Gupta, and Partha Sarkar, 'Chemical Looping Combustion of Ash Free Coal with CuO as an Oxygen Carrier', The 39th International Technical Conference on Clean Coal & Fuel Systems, June 1 - 5, 2014, Clearwater, Florida, U.S.A.

26. N. Mittal, A. Samanta, J. Segura, S. Amiri, P. Sarkar and R. Gupta, Post-Combustion CO_2 Capture Using Structured Bed Loaded With Functionalized SBA-15 Sorbent. AIChE Annual General Meeting, San Francisco, CA , USA, Nov. 3- 8, 2013.

27. Z. Liu, A. Samanta, Q. Liu and R. Gupta, Amine Functionalized Mesostructured Cellular Foams (MCF) for Post-combustion CO_2 Capture. Carbon Management Canada 3rd Annual Conference 2013, Calgary, Alberta, Canada, June 3-5, 2013.

28. N. Mittal, A. Samanta, P. Sarkar and R. Gupta, Performance of Structured Bed Configuration for Post-combustion CO_2 Capture. Carbon Management Canada 3rd Annual Conference 2013, Calgary, Alberta, Canada, June 3-5, 2013.

29. N. K. Sandhu, A. Samanta, P. Sarkar and R. Gupta, Measurement of Heats of Adsorption of Amine Functionalized SBA-15 Sorbents. Carbon Management Canada 3rd Annual Conference 2013, Calgary, Alberta, Canada, June 3-5, 2013.

30. N. Mittal, A. Samanta, P. Sarkar and R. Gupta, Study of CO_2 Capture Using Amine Grafted SBA-15 Sorbent. 245th American Chemical Society Conference, New Orleans, LA, USA, April 7-11, 2013.

31. A. Samanta, A. Zhao, P. Sarkar and R. Gupta, Kinetics and Modeling of CO_2 Adsorption on Amine Functionalized Mesoporous SBA-15 Sorbents. AIChE Annual General Meeting, Pittsburgh, PA, USA, Oct. 28- Nov 02, 2012.

32. P. Sarkar, Luis Yamarte, A. Samanta and R. Gupta, Synthesis and Characterization of Lithium Zirconate based Adsorbents for CO_2 capture. The Energy and Materials Research Conference (EMR2012), Torremolinos (Malaga), Spain, June 20 – 22, 2012.

33. A. Samanta, A. Zhao, P. Sarkar and R. Gupta, Adsorption of CO_2 on Amine Functionalized SBA-15. Carbon Management Canada 2nd Annual Conference 2012, Gatineau, QC, Canada, May 23-25, 2012.

34. N. Mittal, A. Samanta, P. Sarkar and R. Gupta, Numerical Simulation and Analysis of Postcombustion CO_2 Capture using Structured Sorbent Bed Configuration. Carbon Management Canada 2nd Annual Conference 2012, Gatineau, QC, Canada, May 23-25, 2012.

35. A. Samanta, P. Sarkar, Luis Yamarte, R. Gupta, CO_2 Capture Using Lithium Zirconate Based Adsorbents. 61st Canadian Chemical Engineering Conference, London, Ontario, Canada, October 23-26, 2011.

36. A. Zhao, A. Samanta and R. Gupta, CO_2 Capture Using Amine Functionalized Mesoporous Sorbents. Clean Coal Technology and Carbon Capture & Storage (C^5MPT) Workshop, Edmonton, Alberta, Canada, August 25-26, 2011.

37. S. Lunawat, A. Samanta and R. Gupta, Hot Gas Desulfurization with Metal Oxide Supported and Non-Supported Sorbents and Thermodynamic Analysis for H_2S Sorption. Clean Coal Technology and Carbon Capture & Storage Workshop, Edmonton, Alberta, Canada, August 25-26, 2011.

38. S. Tian, Ambrose Itika, A. Samanta, Zhenghe X., R. Gupta, Q. Zhang, Fragmentation of Large Coal Particles in a Drop Tube Furnace. Clean Coal Technology and Carbon Capture & Storage Workshop, Alberta, Canada, August 25-26, 2011.

39. A. Zhao, A. Samanta, R. Gupta, Postcombustion CO_2 Capture Using Some Nanocomposite Amine Functionalized Sorbents. 28th International Pittsburgh Coal Conference, Pittsburgh, PA, USA, September 12-15, 2011.

40. M. Rahman, A. Samanta, Arno de Klerk and R. Gupta, Ash free coal (afc) from low-grade Canadian coal by solvent extraction. Prep. Pap.-Am. Chem. Soc., Div. Fuel Chem, 56, 308-309, 2011.

41. Tian, S., Ambrose Itika, A. Samanta, Zhenghe X., R. Gupta; Q. Zhang, Fragmentation Behavior of Lumpy Coal at High Temperatures. The 7th International Symposium of Coal Combustion (ISCC) Harbin, China, July 17-20, 2011.

42. S. K. Dash; A. Samanta; A. N. Samanta; S. S. Bandyopadhyay, Absorption of Carbon Dioxide in Piperazine Activated Concentrated Aqueous 2-Amino-2-Methyl-1-propanol Solvent. 10th International Conference on Gas-Liquid and Gas-Liquid-Solid Reactor Engineering (GLS10), Braga, Portugal, June 26-29, 2011.

43. A. Samanta, W.Chen, S.Kuznicki, Z. Hashisho, P. Sarkar, and R. Gupta, Development of High-Performance Amine Impregnated Solid Sorbents for Postcombustion CO_2 Capture & Techno-Economic Assessment. . Carbon Management Canada 1st Annual Conference 2011, Calgary, Canada, May 17-20, 2011.

44. M. Rahman, A. Samanta, Ebrahim Azimi and R. Gupta, Beneficiation of Low-Rank Coals and Petcoke. Carbon Management Canada 1st Annual Conference 2011, Calgary, Canada, May 17-20, 2011.

45. A. Samanta and S.S. Bandyopadhyay Absorption of Carbon Dioxide into Piperazine Activated Aqueous N-Methyldiethanolamine. Proceedings of Post-Combustion Carbon Dioxide Capture Workshop, Tufts European Center, Talloires, France, July 11-13, 2010.

46. A. Samanta and Bandyopadhyay, S. S. Absorption of Carbon Dioxide into Piperazine Activated Aqueous N-Methyldiethanolamine. Proceedings of Distillation Absorption 2010 (DA 2010) Eindhoven, The Netherlands, September 12-15, 2010.

47. S. Shah , S. Ray, Y. Prajapati, A. Singh, A. Metre and A. Samanta, Biodiesel Production from Waste Vegetable Oil Using Alkali Catalyst. Indian Chemical Engineering Congress (CHEMCON 2009), December, Visakhapatnam, AP, India.

48. A. Samanta. Relative Performance of Aqueous (MDEA + PZ) and Aqueous (AMP + PZ) Solvents for CO_2 removal. National Conference on Carbon dioxide Capture and Sequestration-Challenges for Engineers (NCCS09), March, 2009, V.V. Nagar, Gujarat, India.

49. Jayaprakash, B., Samanta, A., Dash S. K., and Bandyopadhyay, S. S., Vapour-Liquid Equilibrium of CO_2 in Piperazine Activated Aqueous AMP, Indian Chemical Engineering Congress (CHEMCON 2008), December, Chandigarh, India.

50. Samanta, A. and Bandyopadhyay, S. S. Absorption of Carbon Dioxide into Piperazine Activated 2-Amino-2-Methyl-1- Propanol Solvent. Indian Chemical Engineering Congress (CHEMCON 2007), December, Calcutta, India.

51. Samanta, A., Roy, S. and Bandyopadhyay, S. S. Vapour-Liquid Equilibrium of Carbon Dioxide in Aqueous Piperazine. Indian Chemical Engineering Congress (CHEMCON 2007), December, Calcutta, India.

52. A. Samanta and Bandyopadhyay, S. S. Kinetics and Modeling of Carbon Dioxide Absorption into Aqueous Solutions of Piperazine. International Conference on 8th Gas-Liquid and Gas-Liquid-Solid Reactor Engineering (GLS 8), December, 2007, New Delhi.

53. Samanta, A. and Bandyopadhyay, S. S. Natural Gas Processing: Absorption of Carbon Dioxide into Piperazine Activated Amine Solvents. 2nd International Conference on Advances in Petrochemicals and Polymers (ICAPP 2007), June, Bangkok, Thailand.

54. Samanta, A. and Bandyopadhyay, S. S. Natural Gas Processing: Density and Viscosity of Binary Mixtures of Water and Piperazine over the Temperature Range (303-333) K, 1st Student Chemical Engineering Congress (SCHEMCON 2005), December, IIT Guwahati, India.
55. Samanta, A. and Bandyopadhyay, S. S. Absorption of Carbon Dioxide into Aqueous Solutions of Piperazine Activated Alkanolamine. Indian Chemical Engineering Congress (CHEMCON 2006), December, Bharuch, Gujarat, India.

56. Samanta, A. and Bandyopadhyay, S. S. Physical Solubility of Carbon Dioxide and Nitrous Oxide in Aqueous Solutions of Piperazine Activated 2-Amino-2-methyl-1-propanol. Indian Chemical Engineering Congress (CHEMCON 2006), December, Bharuch, Gujarat, India.

57. Jani, J. and Samanta, A. Estimation of Binary Parameters using Non-linear Least Square Regression Technique. Indian Chemical Engineering Congress (CHEMCON 2002), December, Hyderabad, India.

58. Trivedi, S. and Samanta, A. Development of User-Friendly Software for Fluidized Bed. Indian Chemical Engineering Congress (CHEMCON 2002), December, Hyderabad, India.

59. Patel, J. B. and Samanta, A. Development of User-friendly Thermodynamic and Physical Property Data bank for Pure Components. Indian Chemical Engineering Congress (CHEMCON 2001), December, CLRI Chennai, India.

Invited Talk

Title: Post-combustion CO_2 Capture – Research Progress & Challenges
Event: A six-day short-term programme under the aegis of MALAVIYAMISSION TEACHER TRAINING PROGRAMME (MMTTP) on "High-Efficiency, Low-Emissions Clean Coal and Carbon Capture, Utilization and Storage Technologies", 23 - 28 September 2024.

Title: Progress in Chemical Looping Combustion
Event: A training program for the officials of the Ministry of Mines, Govt. of Afghanistan on Clean Coal Technology, 21 September – 7 October 2013, IIT(SIM) Dhanbad

Title: Post-Combustion CO_2 Capture Using Functionalized Solid Sorbents
Event: Keynote Speaker at 68th Annual Session of the Indian Institute of Chemical Engineers (CHEMCON 2015) 27-30 December 2015, IIT Guwahati

Title: Postcombustion Carbon Dioxide Capture
Event: Five-Day Short Course on Coal to Chemical, 24-28 January 2018, Dept. of Chemical Engineering, IIT(ISM) Dhanbad

Title: Post-combustion CO_2 capture using solid sorbents - recent trends and challenges
Event: Workshop on Advances in Carbon Dioxide Capture & Utilization for Sustainable Climate (ACCUSC-2022), Karyashala Scheme- A SERB Initiative, 4 - 10 July 2022, Dept of Chemical Engineering, National Institute of Technology, Rourkela

Title: CHNS(O) Analysis.
Event: Uses of Sophisticated Instruments in Earth Sciences, DST-STUTI Project 25-31 March 2022, Dept of Applied Geology, IIT(ISM) Dhanbad

Title: Introduction to Elemental Analysis
Event: Contemporary Techniques in Chemical Engineering Characterizations, DST-STUTI Project 24-30 July 2023, Dept. of Chemical Engineering, IIT(ISM) Dhanbad

Analytical Instrument Handled

- Non-Dispersive Infra-Red Analyzer (NDIR), HORIBA
- GC-MS(GC: CP 3800, MS 2000), Varian
- OmniStar Quadrupole (QMS 220) Mass Spectroscopy, USA
- UV –Spectrophotometer, Shimadzu
- Fourier transform infrared (FTIR) spectrometer, Agilent and ABB
- Autosorb 1, Autosorb-iQ-MP-XR, Quantachrome
- Thermogravimetric Analyzer, TA Instruments

Other Activities

- **Former Head of Department:** Dept of Chemical Engineering, IIT(ISM), Tenure: 01 January 2021 to 31 December 2023
- Chairman DFSC: From 01 January 2021 to 31 December 2023: A strong push was made for the recruitment of faculty, and seven faculty members were recruited during this period.
- Senate Member: 01 January 2021 to 31 December 2023
- Chairman for Junior Technician Scrutiny Committee (Chemical Engineering): Inducted four JTs during this period.
- Faculty-in-Charge (Training & Placement): From 2014 – 2019
- Convener: Department Under-Graduate Committee (DUGC), From 2018-2020, Modification of UG course structure from NON-CBCS to CBCS
- Member Senate Under Graduate Committee (SUGC)

- BOCS Member: 2014 – 2016, Involved in designing UG & PG courses
- Core Committee Member Central Research Facility (CRF) and Faculty-in-Charge for Gas Sorption Analyzer, CRF, From 2015 – till date
- Member International Relations & Alumni Affairs, Year: 2016
- Member Central Library Committee, Year: 2015-2017
- Member of DFSC, DPAC, DAC, Budget Advisory Committee, Space Committee, UG Lab coordination committee
- Established the process simulation lab and prepared a manual for computational tools for the chemical engineers' lab.
- Established UG process control lab and prepared a lab manual: Upgradation of Process Control Lab and procured control lab equipment, such as computer-controlled absorption and distillation Column, DCS Workstation, Temperature Calibration unit, etc., Worth ~Rs. 70.5 lakhs
- Developed various experiments for undergraduate mass transfer lab: Special initiative was taken for the development of in-house experimental set-ups for this lab.
- **Equipment/Instrument Purchased:** TGA, FTIR, HORIBA Gas analyzer, Muffle furnace, Refrigerated circulator, Millipore MILLI Q INTEGRAL 5 water purification Unit, MFCs, Fume (Worth ~Rs 82 lakhs) from Institute fund, Automatic Gas Sorption Analyzer Equipped for Ultra-low Pressure Micropore/Mesopore Analysis for CRF(Worth ~Rs 70.0 lakhs), HPTGA, Split-furnace, Vacuum Ovens for CTC project sponsored by CIL (Worth ~Rs 2.05 Crores), Adsorption/Desorption System for CO_2 Capture and Bench-Scale Stirred Reactor with metal Shredder and Data Acquisition System for CHCCUST (Worth ~Rs 1.0 Crore)
- **New Courses Developed:** Chemical process calculations, Engineering Thermodynamics, Chemical Engineering Thermodynamics, Process Dynamics and Control, Advanced Process Control
- **New Elective Course Developed:** Carbon Capture and Clean Energy

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