



K K Wagh Education Society's

K K Wagh Institute of Engineering Education and Research, Nashik.

Chemical Engineering Department

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TECHNICAL NEWS LETTER

January 2025 - June 2025

The Department of Chemical Engineering was established in 1999 with the objective of creating a center of excellence in Chemical Engineering, with an annual intake of 60 students. The department has been accredited twice by the National Board of Accreditation (NBA), AICTE, New Delhi and got the NBA extension for 3 years from June 2025 to June 2028. The department boasts experienced faculty members with several years of academic expertise and veteran supporting staff with strong research interests in both conventional and emerging areas of Chemical Engineering. Emphasizing continuous knowledge enhancement, the department has been sponsoring faculty members for postgraduate and research programs in recent years. It is equipped with state-of-the-art infrastructure and laboratories designed to meet the requirements of the industries. Additionally, the department has an adequate number of computers with the latest configurations and internet facilities. To support teaching and learning, the department provides advanced computational tools, including professional software such as UniSim Design, Ansys Fluent, BricsCAD, and MATLAB. It also maintains an in-house library with reference books for all subjects and a comprehensive Chemical Engineering encyclopedia.

The department has an excellent track record of academic results. Students have secured top ranks in university examinations and achieved success in competitive exams such as GATE, GRE, and others. They have also been recruited by leading national and international Chemical industries. In addition to focusing on basic sciences and engineering subjects, the department encourages students to participate in various national events such as project exhibitions, paper presentations, model-making competitions, and sports activities. Association of Chemical Engineering Students (ACES), a student's association, functions in the department and provides strong platform for overall development of the students. The students get a chance to interact in Seminars, Workshops, Cultural Programs, Expert Lectures on various topics like Personality Development, Preparation for competitive examination, study abroad etc. through ACES.

The department is proactive for good industry institute interaction. Department has signed MoUs with various industries for mutual benefit. Industry experts are regularly invited, and industrial visits are organized each year to bridge the gap between theory and practice. The department organizes internships for third-year students every year in various renowned industries in the region.

■ Details of Faculty of Chemical Engineering

S.N.	Name of Faculty	Qualification	Area of Specialization	Designation
1.	Dr. Suyog N. Jain	Ph. D	Chemical Engg.	Associate Professor & Head of Department
2.	Prof. Vijay N. Mawal	Ph.D Pursuing	Chemical Engg.	Assistant Professor
3.	Dr. Gaurav B. Daware	Ph. D	Chemical Engg.	Assistant Professor
4.	Prof. Sandeep N. Derle	Ph.D Pursuing	Chemical Engg.	Assistant Professor
5.	Prof. Piyush P. Joshi	M. Tech	Chemical Engg.	Assistant Professor
6.	Prof. Zameer K. Deshmukh	M. Tech	Chemical Engg.	Assistant Professor
7.	Prof. Tejmal B. Mahale	M. Tech	Chemical Engg.	Assistant Professor
8.	Dr. Yennam Rajesh	Ph. D	Chemical Engg.	Assistant Professor
9.	Dr. Neha B. Gautam	Ph.D	Chemical Engg.	Assistant Professor
10.	Dr. Prashant Kumar	Ph. D	Chemical Engg.	Assistant Professor
11.	Dr. Rajsekhar Ravula	Ph. D	Chemical Engg.	Assistant Professor
12.	Prof. Ritul M. Chaudhari	M. Tech	Chemical Engg.	Assistant Professor

■ MoU's with Industries

MoU's Sign with different Industries as follows:

- United Heat Transfer, Nashik on 1st January 2025.
- SVAAR Process Solutions Pvt Ltd., Nashik on 29th January 2025

■ Technical Symposium: ChemFest-2K25



Organizing Team of ChemFest 2K25

ChemFest 2K25, the esteemed annual technical fest of the Chemical Engineering Department at K. K. Wagh Institute of Engineering Education and Research, Nashik was organized on 3rd and 4th March 2025. The ChemFest-2K25 kicked off with an inspiring Inaugural Ceremony featuring Mr. Sonu Zunj, Director, SVAAR Process Industries, Nashik who brought a wealth of expertise from both academia and industry. He shared valuable insights into emerging trends in chemical engineering, highlighting the significance of interdisciplinary collaboration. Various technical events such as paper presentations, project expo, technical quizzes, CAD Mania and non-technical events such as treasure hunt, free fire, neon

cricket, etc. were held. The event was graced by esteemed judges: Dr. Sharda K. Patil, Assistant Professor, KKWagh Senior College, Saraswati Nagar and Dr. Dipak K. Chandre, HOD, Chemical Engineering, SVIT Chincholi,

■ Value added Course on ANSYS Fluent



The Chemical Engineering Department organized a Certificate Course titled "Computational Fluid Dynamics (CFD) for Chemical Engineers using ANSYS Fluent" from 16th to 20th March 2025. A total of 40 Third Year B. Tech students participated in the course. The course was conducted under the guidance of Prof. S. N. Derle and Prof. P. P. Joshi. Mr. Rohit Sangwan from ARK Solutions Delhi, was invited as the resource person. The course enabled students to understand the fundamentals of CFD and performed fluid flow simulations using ANSYS Fluent.

■ Expert Lectures and Career Guidance Sessions Organized:

- Alumni Interaction on "Pressure Swing Adsorption for Green Hydrogen Applications" was conducted by Ms. Madhura N. Chincholi, Assistant Manager, Deepak R&D Center, Vadodara, on 29th March 2025.
- Expert Talk on "Chemical Engineer's Role in Production Industries" was delivered by Ms. Sharmishtha Joshi, Production Engineer, VIP Industries Nashik, on 25th March 2025.
- Expert Talk on "Nanostructured Materials and Composites Applications in Chemical Engineering" was delivered by Dr. Manish K. Yadav, Assistant Professor, ICT Mumbai, on 15th February 2025.
- Expert Talk on "Guidance on Abroad Education" was conducted by Mrs. Kiran Kulthe, Prime Study Abroad, covering general topics, on 12th February 2025.
- Expert Session on "ANSYS/CAD Applications in Chemical Engineering" was conducted by Susheel Pote, Director Academics, Invensys CAD Solutions Pvt. Ltd., on 8th February 2025.
- Counselling Session was conducted by Dr. Pratibha Chandak, Counsellor of KKWIEER, emphasizing on the mental health of the students, on 7th February 2025.
- Expert Session on "Overview of Software/ Simulations Applications in Chemical Engineering" was conducted by Susheel Pote, Director Academics, Invensys CAD Solutions Pvt. Ltd. covering PMS and

CACHe, on 5th February 2025.

- Expert Talk on "Waste Vegetable Oils Utilization and Management as a Big Source of Green Alternative Fuel" was delivered under the Institute by Prof. (Dr.) A.K. Goswami, Director, UICT Jalgaon, on 1st February 2025.
- Expert Talk on "Development of Cenosphere Ceramic Membranes and Its Applications" was delivered by Dr. Ajit P. Rathod, Assistant Professor, VNIT Nagpur, on 18th January 2025.
- Alumni Interaction on Various Aspects such as Career Guidance, Placement Preparation, and Research Innovations was conducted by Ms. Hetansha Boricha, M.Tech, IIT Madras, specializing in Technical Writing, on 9th January 2025

■ Training and Placements:

S.No.	Name of Student	Name of Industry
1.	Ms. Pansare Shraddha Sanjay	Burns & McDonnell Engineering (I) Pvt. Ltd., Mumbai
2.	Ms. Panchal Saloni Sanjay	Emerson Measurement Systems and Solutions Pvt. Ltd., Pune
3.	Mr. Gaikwad Rushikesh Bhimraj	Reliance Industries Ltd., Mumbai
4.	Ms. Bangera Shravya Yoganand	Reliance Industries Ltd., Mumbai
5.	Mr. Date Krushna Sampat	Reliance Industries Ltd., Mumbai
6.	Ms. Deore Vaidehi Somnath	Worley India Ltd., New Mumbai
7.	Mr. Mahajan Mandar Prashant	Konark Global, Nashik
8.	Ms. Dhivar Rutika Deepak	Laxmi Organic Industries Ltd., Mahad
9.	Ms. Bodake Chanchal Hanumant	Laxmi Organic Industries Ltd., Mahad
10.	Ms. Jaiswal Sunita Jagannath	Laxmi Organic Industries Ltd., Mahad
11.	Mr. Pathade Vaibhav Vilas	Catapharma Chemicals Pvt. Ltd., Sinnar
12.	Mr. Shinde Shubham Vishram	Catapharma Chemicals Pvt. Ltd., Sinnar
13.	Mr. Mokate Ganesh Pundalik	Catapharma Chemicals Pvt. Ltd., Sinnar
14.	Mr. Jadhav Poonam Sunil	Ekhade Agrochemicals Pvt. Ltd., Nashik
15.	Ms. Pawar Neha Santosh	Ekhade Agrochemicals Pvt. Ltd., Nashik
16.	Mr. Girase Jayesh Anandsingh	Val Organics Pvt. Ltd., Valsad
17.	Mr. Patil Vishal Bharat	Val Organics Pvt. Ltd., Valsad
18.	Mr. Ghorpade Shubham Sopan	Fabex Engineering Pvt. Ltd., Nashik
19.	Ms. Jadhav Poonam Sunil	Fabex Engineering Pvt. Ltd., Nashik
20.	Ms. Pawar Neha Santosh	Fabex Engineering Pvt. Ltd., Nashik
21.	Mr. Mokate Ganesh Pundalik	Toyo Engineering (I) Pvt. Ltd., Mumbai
22.	Mr. Barhate Rushikesh Pradeep	Aarti Pharmalabs Ltd., Tarapur
23.	Mr. Kale Umesh Dnyaneshwar	Aarti Pharmalabs Ltd., Tarapur
24.	Mr. Kale Pankaj Sharad	Aarti Pharmalabs Ltd., Tarapur
25.	Ms. More Karuna Ramendra	Lord India Pvt. Ltd., Nashik
26.	Ms. Shaikh Shifa Samad	Lord India Pvt. Ltd., Nashik
27.	Ms. Alok Diksha Yogesh	Lord India Pvt. Ltd., Nashik
28.	Mr. Tejas Sunil Ubale	Canter Engineers, Netzscho, Goa
29.	Mr. Pratik Ramkrushna Shinde	Nibe Limited, Pune
30.	Mr. Pratik Raosaheb Mahale	Nibe Limited, Pune
31.	Mr. Durgesh Taty Khaimar	Catapharma Chemicals Pvt. Ltd., Sinnar

■ Industrial Visits

S.No.	Class	Name of Industry	Date
1.	SY	Abeline Polymer, Ambad, Nashik	28/03/2025
2.		Kadwa Sahakari Sakhar Karkhana Materewadi, Dindori.	15/04/2025
3.	TY	AgriSearch India Pvt. Ltd., Pimpalner, Nashik.	10/03/2025
4.	BE	Meridian Technics, Musligaoan, Sinnar	12/02/2025

■ FDP/ Workshop/STTP attended by Faculty:

- Prof. P. P. Joshi successfully attended Face to Face 5-day FDP on Universal Human Values-II by NCCIP, AICTE, New Delhi Organised by K. K. Wagh Polytechnic, Nashik from 26th May to 31st May 2025.
- Prof. V. N. Mawal and Dr. Prashant Kumar successfully attended a seven days Teacher

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■ 6. Preparation and Characterization of Hybrid Nanoparticles in Phase-Change Material

Conference : PRAKALP 2025, National Chemical Engineering Conference, MIT Alandi

Author : Rutika Dhivar, Dr. Prashant Kumar

Date : 21st March 2025

Abstract : In this research, we perform the synthesis and characterization of a phase change material (PCM) formulated from paraffin wax blended with graphene oxide (GO) and copper oxide (CuO) hybrid nanoparticles. The nanohybrid is fabricated utilizing a hydrothermal methodology, employing ethanol as the solvent and GO and CuO as solutes at two distinct concentrations. The method consists of sonicating the GO and CuO composite in ethanol for 30 minutes, subsequently undergoing hydrothermal treatment at 180–200 °C for 4 hours to facilitate the reaction. The resultant nanohybrid is subsequently washed with acetone and then integrated into molten paraffin wax. The structural, thermal, and chemical attributes of the nanohybrid are assessed. Scanning Electron Microscopy (SEM) to determine morphology; Energy Dispersive Spectroscopy (EDS) to ascertain elemental composition; X-Ray Diffraction (XRD) to determine crystallographic structure and phase constitution; and Fourier Transform Infrared Spectroscopy (FTIR) to determine functional groups. The nanohybrid-paraffin wax composite is subsequently analyzed using UV-Vis Spectroscopy to evaluate optical absorptivity, Thermogravimetric Analysis (TGA) to determine thermal stability and degradation traits, and Thermal Cycling Analysis (TCA) to evaluate stability in the face of recurring thermal fluctuations. This research aims to augment the thermal properties of paraffin wax-based PCMs through the incorporation of GO-CuO hybrid nanoparticles, thereby enhancing their efficacy in thermal energy storage applications.

Keywords : Hybrid nanoparticles, PCM, Paraffin Wax, Hydrothermal Synthesis, Energy Storage

■ 7. Development of Sustainable Cementitious Composite Using Agricultural Waste and Sea Shells

Conference : International Conference on Engineering Innovation for Sustainable Futures, KKWIEER, Nashik

Author : Himani Chaudhari, Shraddha Pansare, Dr. Yennam Rajesh

Date : 6th January 2025

Abstract : This project explores the utilization of agricultural waste and sea shells in the development of cementitious materials, emphasizing their potential contributions to the construction sector. Agricultural by-products such as coconut shells, bamboo leaves, groundnut shells, and rice husks, along with sea shells, are readily available yet largely underutilized resources. Incorporating these materials into cement production offers a sustainable, efficient, and economically favorable alternative while helping to address environmental and waste disposal challenges.

These agro-industrial residues exhibit pozzolanic activity, enhancing the strength, durability, and sustainability of the resulting cementitious products and contributing to reduced production costs. Moreover, cement produced using these materials demonstrates improved mechanical strength and significantly lower carbon dioxide emissions, promoting a more environmentally friendly approach to construction materials.

Keywords : Coconut shell, Bamboo leaves, Groundnut shell, Rice husk, Sea shell, Pozzolanic Activity, Sustainable construction

■ Achievements

- Shravya Bangera and Saloni Panchal, final-year students, Dr Rajesh Yennam secured 1st prize in the National Conference on CHEMBLAZE 2.0 Agni College of Technology, Chennai, for Paper PPT - Development of Composite Activated Carbon for removal of Microplastic, on 5th April 2025.
- Dr S. N Jain received the Best Library User Award in Maffick 2k25 from K K Wagh Institute of Engineering Education and Research, Nashik.

Dr. S. N. Jain
I/C Head,
Chemical Engg. Dept.

Prof. Dr. K. N. Nandurkar
Director



■ 3. Metal Recovery from Black Mass of Spent Li-ion Batteries

Conference : PRAKALP 2025, National Chemical Engineering Conference, MIT Alandi

Author : Chetan Kolhe, Krishna Date, Dr. S. N. Jain

Date : 21st March 2025

Abstract : Lithium-ion battery recycling is crucial for resource recovery and environmental sustainability. The findings demonstrated that a black mass with a complex composition (Li, Ni, Mn, Co, and Al) could be comprehensively recycled using synergetic carbothermic reduction and hydrochlorination. The present study will explore efficient methods to extract valuable metals like cobalt, nickel, etc. from spent battery black mass. Hydrometallurgical technique will be investigated for their effectiveness in recovering high-purity metals. The study will aim at optimizing factors affecting recovery such as cobalt and nickel for the extraction and analyses the recovered metals using X-ray Diffraction (XRD), X-ray Fluorescence Spectroscopy (XRF) techniques, etc. Economic feasibility and scalability will also be assessed considering circular economy principles. The findings in the present work will highlight the potential of efficient metal recovery from black mass for sustainable battery recycling. The recovered metal alloy can be used to enhance the ultra-high strength and as a master alloy application. Besides the significant extraction rates of metals, the proposed technique will minimize recycling process steps and chemical usage, which is industrially utmost important.

Keywords : Lithium-ion battery recycling, Black mass, Hydrometallurgy, Metal recovery and Circular economy

■ 4. Development and Synthesis of Nanomaterial from Biomass for Enhanced Derived Products

Conference : PRAKALP 2025, National Chemical Engineering Conference, MIT Alandi

Author : Rohit Dholi, Ganesh Mokate, Prof. V. N. Mawal

Date : 21st March 2025

Abstract : The intensification in the field of nanotechnology demands sustainable and eco-friendly methods for nano material synthesis. Biomass derived nano-materials is an emerging area that will be successful alternative to traditional chemical approaches, offering a greener and more cost effective solution. This study explores that development & synthesis of nanoparticle using *Crescentia cujete* biomass, a readily available and renewable source. A systematic optimization of operating variable, including temperature, pH, reaction time and biomass concentration performed to produce nano particle with tailored characteristics. A comprehensive characteristic of the synthesized nano

particle will be conducted using an advanced technique such as transmission electron microscopy (TEM). The results are expected to have the nano particle with controlled size, shape, crystallinity and functional groups. The potential application of these nano particle are extensively explored in various industrial sector including enhanced catalytic activity and selectivity in chemical reaction, Improved removal of pollutant and targeted drug delivery. The research will contribute to the utilization of the biomass and growing field of biomass based nanotechnology, highlighting the potential of renewable resources in the development of high value industrial products.

Keywords : - Nano materials, Biomass, *Crescentia cujete*, renewable sources, Optimization, Operating variables.

■ 5. Modelling and Simulation of Continuous Adsorption of Pyridine Using Low-Cost Adsorbent

Conference : PRAKALP 2025, National Chemical Engineering Conference, MIT Alandi

Author : Rushikesh Gaikwad, Pralay Meshram, Dr. Gaurav Daware

Date : 21st March 2025

Abstract : The present study focuses on the modeling and simulation of continuous adsorption of pyridine derivatives from synthetic wastewater using a low-cost biochar adsorbent. The adsorption process is evaluated under varying inlet flow rates, initial concentrations, and bed heights to determine its efficiency in removing pyridine contaminants. The adsorbent is characterized using Fourier-Transform Infrared Spectroscopy (FTIR) to identify functional groups and Scanning Electron Microscopy (SEM) to analyze surface morphology. Additionally, UV-Visible spectroscopy is employed to monitor pyridine concentrations before and after adsorption. The breakthrough curves obtained from experimental data are fitted to Thomas and Temkin isotherm models to establish adsorption kinetics and capacity under different conditions. The primary objective is to optimize adsorption parameters and elucidate the underlying mechanisms governing the removal process. The findings offer critical insights into the feasibility of employing biomass-derived adsorbents for wastewater treatment. This research demonstrates the potential of sustainable, cost-effective adsorbents for removing pyridine derivatives, paving the way for scalable and efficient adsorption-based treatment systems

Keywords: Pyridine adsorption, continuous adsorption, wastewater treatment, low-cost adsorbent, biochar, adsorption kinetics, breakthrough curves, isotherm models, effluent treatment.

Training Programme under Malaviya Mission Teacher Training Programme on "NEP 2020 Orientation and Sensitization" from 21st to 30th April 2025.

- Prof. Z. K. Deshmukh attended a one-week Faculty Development Programme (FDP) on "Process Intensification: Sustainability in Chemical Engineering" at Datta Meghe College of Engineering, Mumbai, from 07th to 11th April 2025.
- Prof. P. P. Joshi participated in a one-week Faculty Development Programme (FDP) on "Application of AIML and DS in Chemical Engineering" at VIT Pune, from 07th to 11th April 2025.
- Dr. Yennam Rajesh attended a webinar on "Building a Sustainable Journal Ecosystem" organized by Research Academy on Campus on 27th March 2025.
- Dr. Prashant Kumar participated in a workshop on "Quantum Computations and Its Application in Molecular Structure" at IIT Kharagpur on 05th March 2025.
- Dr. Prashant Kumar successfully completed a one-week Faculty Development Programme (FDP) on "Process Intensification through Heat Transfer Augmentation" at Gharda Institute of Technology, Ratnagiri, from 18th to 22nd February 2025.
- Dr. Ravula Rajasekhara attended a training and learning program on "Impact of Urban Green Spaces in Alleviating Microclimate Change Using Geospatial Techniques" at Shri Ramakrishna Engineering College, from 10th to 22nd February 2025.
- Dr. Ravula Rajasekhara participated in a one-week Faculty Development Programme (FDP) on "Integrating Synergism Among Chemical Process and Technologies for Sustainable Development" at SVNIT, Surat, from 10th to 15th February 2025.
- Dr. Prashant Kumar successfully completed a 12-weeks NPTEL course on "Machine Learning for Engineering and Science Applications" from January 2024 to April 2024.

■ Papers Presented in Conference by Staff and students:

1. Removal of Microplastics Using a Dual-Bed Zeolite System via Sorption Method

Conference : International Conference on Innochem -25, Woxsen University, Hyderabad

Author : Shravya Bangera, Saloni Panchal, Dr. Yennam Rajesh

Date : 8th April 2025

Abstract : As plastics have become ubiquitous, the presence of microplastics in water bodies and drinking water is increasing, posing serious threats to human health, the environment, and ecosystems. This study addresses the urgent issue of microplastic contamination by employing Amino-Functionalized Zeolite (AFZ) and potassium hydroxide (KOH) activated biochar in a dual-bed column system using sorption technology. The first bed contains KOH activated biochar prepared from tea waste (TAC), combined with Zeolite Clinoptilolite for high

adsorption capabilities. The second bed uses ZeoliteBeta, known for its excellent ion-exchange properties and surface area. Water samples from a nearby polymer industry were treated to evaluate the system's effectiveness, simulating real-world conditions. The study focused on the removal efficiency of AFZ, revealing significant changes in microplastic surface morphology post-treatment. The dual mechanisms of chemisorption and physisorption were crucial in achieving comprehensive microplastic removal. The results demonstrated that combining TAC and clinoptilolite zeolite, the dual-bed column setup significantly reduces microplastic concentrations. This research highlights a viable solution to microplastic pollution, contributing to sustainable water treatment technologies and environmental protection.

Keywords : Microplastics, AFZ, KOH, Biochar, Sorption Technology, Clinoptilolite Zeolite

■ **2. Development of Composite Activated Carbon for Removal of Microplastics**

Conference : National Conference on CHEMBLAZE 2.0, Agni College of Technology, Chennai

Author : Shravya Bangera, Saloni Panchal, Dr. Yennam Rajesh

Date : 5th April 2025

Abstract : As plastics have become ubiquitous, the presence of microplastics in water bodies and drinking water has increased, posing serious threats to human health, the environment, and ecosystems. This study addresses the urgent issue of microplastic contamination by employing Amino-Functionalized Zeolite (AFZ) and potassium hydroxide (KOH)-activated biochar in a dual-bed column system using sorption technology. The first bed contains KOH-activated biochar prepared from tea waste (TAC), combined with clinoptilolite zeolite for its high adsorption capabilities. The second bed uses Zeolite Beta, known for its excellent ion-exchange properties and high surface area. Water samples from a nearby polymer industry were treated to evaluate the system's effectiveness under simulated real-world conditions. The study focused on the removal efficiency of AFZ, revealing significant changes in microplastic surface morphology post-treatment. The dual mechanisms of chemisorption and physisorption played a crucial role in achieving comprehensive microplastic removal. The results demonstrated that the combination of TAC and clinoptilolite zeolite in the dual-bed column setup significantly reduced microplastic concentrations. This research highlights a viable solution to microplastic pollution, contributing to sustainable water treatment technologies and environmental protection.

Keywords: Microplastics, Amino-Functionalized Zeolite (AFZ), KOH-Activated Biochar, Sorption Technology, Clinoptilolite Zeolite, Environmental Protection.