

CHEMICAL ENGINEERING



NEWSLETTER
Aug – Sept 2019

Newsletter Highlights

Research Projects
Invited Expert Talk
Workshop/Seminar
International visit
UG/PG/PhD
Achievements
Other Activities

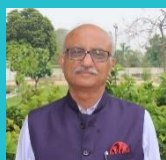


EDITORIAL TEAM

Dr. Lubhani Mishra (Coordinator)
Dr. Abhishek Yadav (Co-coordinator)
Dr. Suverna Trivedi (Member)



From the Director's desk



Prof. Sunil Khanna
Director, SOT, PDPU

Dear Colleagues and Students:

The advent of circular economy in Chemical systems is leading to the development of an economic system aimed at minimizing waste and making the most of resources. It replaces the end-of-life concept with restoration, shifts towards the use of renewable energy, eliminates the use of toxic chemicals, which impair reuse and return to the biosphere, and aims for the elimination of waste through the superior design of materials, products, systems and business models. The drivers of the circular economy would be the advances in computational modelling, data analytics, optimization tools, and next-generation and bio-based catalysts to produce fuels and chemicals at scale with lower emissions.

As we @ PDPU embark on this journey of circular economy in Chemical Engineering, I am Happy to Introduce the next issue of the Newsletter which not only share with all its readers the latest news and developments in the Department of Chemical Engineering but would also be sensitizing all of us on the latest trends and developments in the adoption of the circular economy.

The limitless power of technology to do good and the conviction of my faculty colleagues and students that the golden age is ahead of us - and not behind us – brings about the best in all of us which is reflected in their achievements.

Compliments to the editorial team for their passion for perfection and unbound creativity which makes me always look forward to the next edition of the Newsletter.

From the mentor's desk



Dr. Anurag A. Gupta
Chairman, IPR Apex Council
& Senior Mentor, PDPU

As we prepare for the new academic session, there are so many things to be proud of. For example, this time we could attract record number of PG & PhD students. Our incoming UG classes also have the best intake so far ever – both in terms of quality & numbers.

Congratulations to our faculties and PhD students for publishing quality research papers and also for being invited to deliver technical talks. Kudos to our graduate students who continue to set the world on fire by their innovative research using ORSP grant and supported by able mentorship by our faculty members. So, in short, as the rains fall in Gandhinagar, our faculties and students continue to rise!!!

Looking forward to the upcoming academic year to see what else our CE family has in store.

Hearty Congratulations & best wishes to all.

From the HOD's desk



Dr. Swapnil Dharaskar
HOD, Chemical Engineering

It gives me immense pleasure to share newsletter of the Chemical Engineering Dept., June-July 2019. The Department of Chemical Engineering at PDPU, Gandhinagar is one of the premier departments that provides a unique educational and research environment. We have a major emphasis on interdisciplinary and industrial collaborations. Our primary missions are to educate undergraduate and graduate students, and to discover and disseminate knowledge through research. The Department is committed to achieving excellence in these activities, and evaluates the success and leadership of its programs using the highest standards of quality, innovation, & visibility, while at the same time providing a friendly and supportive atmosphere.

FACULTY ZONE: PUBLICATIONS/PROJECTS

Dr. Pravin Kodgire and co-workers published a journal publication titled “**Biodiesel production from waste cotton-seed cooking oil using microwave-assisted transesterification: Optimization and kinetic modelling.**”

- ▶ Uniqueness of this study is that it provide comprehensive analysis of the microwave-assisted KOH and CaO catalyzed transesterification conditions including the details of process optimization with kinetic modeling, scalability and comparison with mechanical stirring. This work has been published in **Renewable Sustainable Energy Reviews. (Elsevier Publication: Impact factor 10.6)**

Dr. Sukhanta Dash and co-workers published a journal publication titled “**Change in Distillation Column Control Philosophy Using Dynamic Simulation.**”

- ▶ In this work, initially steady state model and finally a dynamic model was developed in Aspen HYSYS for the distillation column control. The model is used to study the process behavior for existing control philosophy and proposed philosophy. A new control philosophy was developed based on the response of variables after disturbances in feed rate and composition. The revised control philosophy has been implemented, providing stabilized operation of the column with consistent bottom product quality.. This work has been published in **Chemical Product and Process Modeling.**

Dr. Suverna Trivedi and co-workers published a journal publication titled “**Large Accumulation, Recombination And Their Associated Time Scale In Efficient $(GUA)_x(MA)_{1-x}PbI_3$ based Perovskite Solar Cell.**”

- ▶ In the present work, the influence of the GUA ions is observed to enhance interfacial and bulk electronic properties due to more efficient charge transfer between the bulk and interfaces and the reduced electronic defect energy levels. This work has been published in **ACS Omega. (Impact factor 2.54/Q1)**

Ms. Sweta Balchandani, Swapnil Dharaskar and Co-workers published a journal publication titled “**Thermally Induced Characterization and Modeling of Physicochemical, Acoustic, Rheological and Thermodynamic Properties of novel blends of (HEF+AEP) and (HEF+AMP) for CO₂/H₂S absorption. Environmental Science and Pollution Research, 1-15, 2019, (Q1 Journal, Springer, I.F. 2.9).**”

Dr. Swapnil Dharaskar and Co-workers published a journal publication titled “**“Feasibility study of phosphonium based Ionic liquids as efficient solvent for sulfur extraction from liquid fuels” American Institute of Physics Proceedings, 2019 (Scopus Indexed)**”

(FACULTY ZONE)

Conferences/Workshop/Seminar/Research Visits

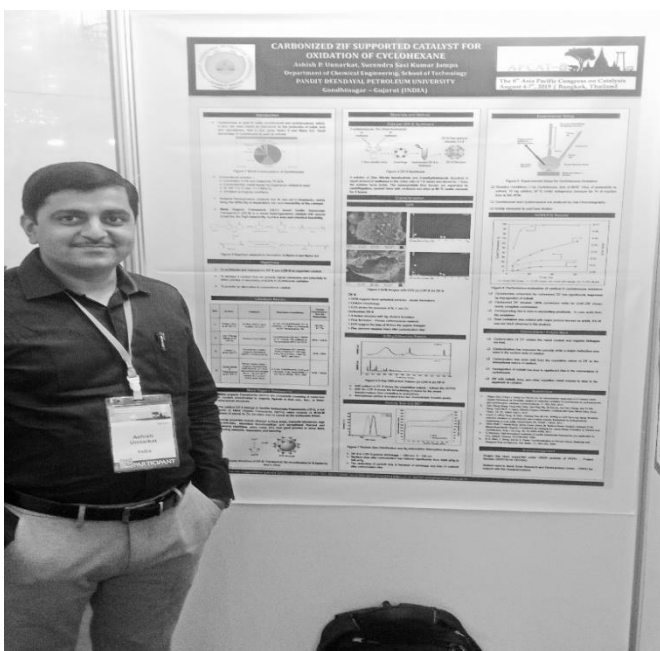
- **Dr. Abhishek Kumar Gupta** delivered a Contributed talk on “*Effect of Co-solvent (Ethanol) and PAA concentration on the structure and dynamics of sodium polyacrylate (Na⁺-PAA) in solutions investigated by MD Simulations*” at Physical Aspects of Polymer Science-19, organized by Institute of Physics (IOP) Polymer Physics group. during 11th-13th September, 2019 at University of Lincoln, UK
- **Dr. Dharaskar** working as Visiting Scientist at Department of Green Chemistry, LUT, Finland under Indo-Finnish Bilateral project Grant (September-November 2019).
- **Dr. Swapnil Dharaskar** visited the Chemical Engineering department and interacted/conducted PhD seminar on 9th September 2019 invited by **Dr. Piyush Vanzara, Head, Chemical Engineering, VVP Rajkot.**
- **Dr. Swapnil Dharaskar, Dr. P. Kodgire and Dr. S. K. Dash** invited to attend the “**Covenant of Mayors of Gujarat event**” on 30/08/2019 at New Sachivalaya Gandhinagar invited by **Mukesh Shah Joint Secretary, Climate Change Department (Govt. of Gujarat)**

Research PROJECTS

- **Dr. S. Dharaskar and Dr. M. Sinha** received project sanctioned order entitled on “**Structure, Interaction and Process for Energy Efficient CO₂ Separations Using Novel Ionic Liquids Supported Membranes**” Under CO₂ Capture Mission Innovation Scheme from DST, New Delhi, India.



Dr Ashish Unnarkat visited Centre of Excellence on Catalysis and Catalytic Reaction Engineering, Chulalongkorn University, Bangkok, Thailand (Hosting University for APCAT-8)



Dr Ashish Unnarkat presented a poster on Carbonaceous ZIF Catalyst for Cyclohexane Oxidation – this was done under the support of ORSP research grant.

Dr Ashish Unnarkat attended a short course on "Surface Area and Porous Material Characterization" at Vadodra arranged by Anton Parr



DEPARTMENTAL ACTIVITIES: EVENTS



Expert talk by **Dr. Bishwajit Ganguly**, *Principle Senior Scientist*, CSMCRI Bhavnagar on 16th September 2019, organized by **Dr. Suverna Trivedi**



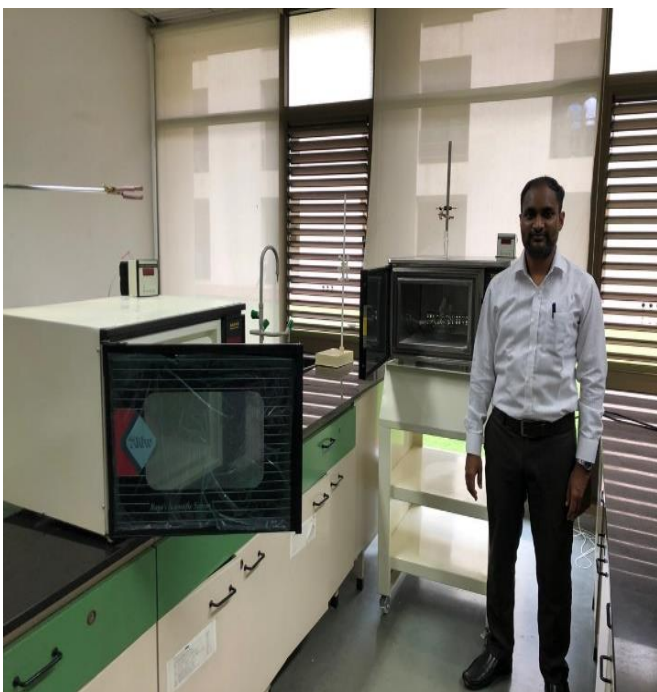
Expert talk by **Dr. Kaushik Nath**, *Head, Chemical Engineering*, GCET, Vallabh Vidyanagar on 23rd August 2019, organized by **Mr. Anirban Dey**.

DEPARTMENTAL ACTIVITIES: EVENTS



Expert lecture on *“The Environment: Air Pollution and Challenges”* was taken by **Dr. Anurag A. Gupta** on 20th Sept. 2019 The event was arranged by **Dr. Pravin Kodigre**

An interaction of 4th year students with recently graduated students was facilitated by **Dr. Pravin Kodigre** on 29th Aug. 2019



Dr. Dadi Suriapparao received two **research grade microwave reactors** having capacity of 700 W and 1500 W, respectively on 27th June 2019 installed in SFO lab. These reactors can be utilized for conducting research related to solid waste upgradation.

Students' ZONE: PUBLICATIONS/PROJECTS

❖ Projects:-



IICChE Students coordinators and volunteers Showcased glimpse of various previously conducted events, research activities and tinkering lab equipments during PDPU Convocation Day.

Publications:-

❖ *Mr. Arpit Patel and Mr. Vaibhav Bhandari*, Final year B Tech students attended '**2nd Edition Industry 4.0 Summit on 'Improving Competitiveness in Manufacturing Using AI & LOT'** on 12th September, 2019 Hotel Crowne Plaza, Ahmedabad.

❖ *Parwathi Pillai (PhD Scholar) and Swapnil Dharaskar* "**Synthesis, Characterization and Application of Calcium Peroxide as Low Cost adsorbent for fluoride removal from aqueous media**" *Journal of Water Chemical Technology*, September 2019 (Accepted). (Q2 Journal, Springer)

❖ *Parwathi Pillai, Swapnil Dharaskar, Surendra Sasikumar, Mohammad Khalid*, "**Zeolitic Imidazolate Framework-8 Nanoparticle: A Novel Adsorbent For Effective Fluoride Removal From Aqueous Solution**" *Applied Water Science*, **9**, 150-158, 2019. (*Scopus, Q2 Journal, Springer*)

❖ *Parwathi Pillai (PhD scholar), Yogesh Lakhtaria (UG student) Swapnil Dharaskar, Mohammad Khalid* "**Removal Of Fluoride Using Modified Iron Oxyhydroxide Coated With Rice Husk From Aqueous Media**" *Environmental Science and Pollution Research*, 1-10, 2019. (Q1 Journal, Springer, I.F. 2.9)