DR.REDDY'S INSTITUTE OF LIFE SCIENCES

FLOW CHEMISTRY TECHNOLOGY HUB

Continuous Flow Chemistry Lab

CPI2025

2nd Edition

CONFERENCE CUM WORKSHOP

AGENDA

CONTINUOUS PROCESS INTENSIFICATION

11 - 13 September 2025

Aryabhatta Auditorium

Dr. Reddy's Institute of Life Sciences
University of Hyderabad Campus,
Gachibowli, Hyderabad, INDIA.

CPI2025
CONFERENCE CUM WORKSHOP

CONTINUOUS PROCESS INTENSIFICATION

AGENDA

SEPT 11, 2025 – THURSDAY

DAY 1

Time	Session
14:45 – 15:30	Registration
15:30 – 16:00	Dr. Srinivas Oruganti *(Director, DRILS)* *Introductory Talk: Choosing Right "Chemistry" in Flow*
16:00 – 17:00	Prof. Anil Kumar (IIT Bombay) - **TUTORIAL** *Rapidly Changing Face of Organic Chemistry and Chemical Manufacturing: A New Paradigm via Continuous Process Intensification*
17:00 – 17:15	**TEA BREAK**
17:15 – 18:15	Technology Exhibition & Showcase Facility Tour - FCT Hub

SEPT 12, 2025 – FRIDAY

DAY 2

Time	Session	
08:30 – 09:30	Registration	
09:30 – 10:00	Opening remarks • **Prof. Goverdhan Mehta** - *UoH Distinguished Professor, University of Hyderabad* • **Prof. B. J. Rao** – *Vice Chancellor, University of Hyderabad* • **Dr. D. Srinivas Reddy** - *Director, CSIR – IICT* • **Dr. Srinivas Oruganti** - *Director, DRILS*	
10:00 – 10:50	Prof. Oliver Kappe - *Univ. of Graz, Austria* – **PLENARY LECTURE** *(Towards Sustainable API Manufacturing Using Enabling Technologies)*	**CHAIR: Dr. Bhanu Manjunath** *Syngenta Biosciences*
10:50 – 11:30	**Group Photo, TEA BREAK & NETWORKING**	
11:30 – 12:00	Dr. Srividya R - *Aurigene Pharmaceuticals* *(Design And Control Of Flow Reactions Through Pat And Simulation)*	**CHAIR: Dr. Bhanu Manjunath** *Syngenta Biosciences*
12:00 – 12:30	Dr. Mike Kenny *AM Technologies, UK* *(Approaches to Multiphasic Flow Chemistry)*	
12:30 – 13:00	Dr. Sreepriya Vedantam - *CSIR – IICT, IN* *(Hydrodynamics Driven Process Intensification: Design of Continuous Multiphase Reactors)*	
13:00 – 14:15	**LUNCH BREAK**	
14:15 – 15:00	Dr. Karunanidhi G - *Anthem Biosciences* – **PLENARY LECTURE** *(Large Scale Application Of Air Oxidation And Mechnochemistry In Flow)*	**CHAIR: Dr. Manjinder Singh** *Cipla*
15:00 – 15:30	Dr. Satyanarayana T – *Laurus Labs* *(Reaction in flow - Cases Studies at Laurus)*	
15:30 – 16:00	**TEA BREAK & NETWORKING**	

DR.REDDY'S INSTITUTE OF LIFE SCIENCES

FLOW CHEMISTRY TECHNOLOGY HUB

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CPI2025
CONFERENCE CUM WORKSHOP

CONTINUOUS PROCESS INTENSIFICATION

AGENDA

SEPT 12, 2025 – FRIDAY

DAY 2

Time	Session
16:00 – 16:45	**Prof. Anil Kumar** - *IIT Bombay* - **TUTORIAL** *Rapidly Changing Face of Organic Chemistry and Chemical Manufacturing: A New Paradigm via Continuous Process Intensification*
16:45 – 18:00	**Dr. Mike Kenny** *AM Technologies, UK* – **WORKSHOP at FCT Hub** *Slurry handling in Coflore flow reactors*

SEPT 13, 2025 – SATURDAY

DAY 3

Time	Session	
09:30 – 09:45	Opening remarks • **Dr. Manjinder Singh** – *Senior Director, CIPLA* • **Prof. Anil Kumar** – *Continuous Flow Chemistry Lab, IIT Bombay*	
09:45 – 10:30	**Dr. David Cantillo** – *The Univ. of Queensland, Australia* – **PLENARY LECTURE** *(Intensifying Green Electrochemical Synthesis using Flow Reactors)*	**CHAIR: Dr. Rajeev Rehani B** *Dr. Reddy's Laboratories*
10:30 – 11:00	**TEA BREAK & NETWORKING**	
11:00 – 11:30	**Dr. Prashantha Kamath**- *Syngenta R&T Centre, IN* *(Process Intensification in Crop Protection Research)*	**CHAIR: Dr. Rakeshwar Bandichhor** *Dr. Reddy's Laboratories*
11:30 – 12:00	**Mr. Kumar Oza** - *Pi-Process Intensificaiton Experts LLP, IN* *(Experience In Practice - Illustrative Examples)*	
12:00 – 12:30	**Mr. Chandrakant Sethia** - *Corning Technologies, IN* *(Efficiency, Innovation, and Value: Continuous Chemical Manufacturing with Corning AFR)*	
12:30 – 13:00	**Mr. Suhas Jawlekar**- *Dr. Reddy's Laboratories, IN* *(Applications Of Flow Technology For Process Intensification & Improvement In Api Development)*	
13:00 – 14:00	**LUNCH BREAK**	
14:00 – 14:30	**Mr. Pradip Hosangadi** – *Evonik, IN* *(Evonik Catalysts - Let's make a difference in Flow Chemistry)*	**CHAIR: Prof. Anil Kumar** *IIT Bombay*
14:30 – 15:00	**Mr. Vilobh Shete** – *H.E.L Group, IN*	
15:00 – 15:15	**CLOSING REMARKS & SPONSOR MEMENTOS**	
15:15 – 16:00	**NETWORKING & HIGH TEA**	

DR.REDDY'S INSTITUTE OF LIFE SCIENCES

FLOW CHEMISTRY TECHNOLOGY HUB

Continuous Flow Chemistry Lab

CONTINUOUS PROCESS INTENSIFICATION

Dr. Srinivas Oruganti

Dr Reddy's Institute of Life Sciences

Speaker Bio

Dr. Srinivas Oruganti is the Director of DRILS and leads the Center for Process Research and Innovation. He earned his Ph.D. from the Indian Institute of Science in photoswitchable cluster glycosides and completed postdoctoral research at Centre de Biophysique Moleculaire, focusing on glycocluster–tumor antigenic peptide conjugates for dendritic cell targeting. He is a key figure in strengthening academia–industry partnerships in India's pharmaceutical sector and was instrumental in establishing the industry-oriented Center for Process Research and Innovation at DRILS. Dr. Oruganti has led multiple hit-to-lead and lead optimization programs across therapeutic areas such as diabetes, cardiovascular disease, multiple sclerosis, and cancer. He integrates his glycoscience expertise with synthetic and medicinal chemistry to address complex drug discovery and development challenges. His work spans early-stage process development, robust and scalable synthetic route design, and strategic contributions toward DMF filings and generic drug commercialization. His focus on sustainable chemistry includes the use of chemo-, organo-, and biocatalysis to simplify and optimize API manufacturing processes. He has also contributed to organo-electronic material development, stable-isotope labeling for nutraceuticals and NCEs, and process innovation for complex APIs. A member of PHARMEXCIL-India's Think-Tank, Dr. Oruganti plays a vital role in reducing India's API import dependence

Talk Title

CHOOSING RIGHT "CHEMISTRY" IN FLOW

Abstract

Flow chemistry is not a universal solution, but when matched with the right reaction profile it can deliver decisive benefits in safety, selectivity, and scalability. This talk will focus on how to identify transformations that genuinely profit from a flow platform, using examples across diverse reaction classes. Particular attention will be given to highly exothermic oxidations, reactive organometallic reagent based chemistries such as LDA/n-butyl-lithium, gas-liquid oxidations with molecular oxygen and time-sensitive transformations where product selectivity is critically dependent on residence time and mixing. By examining the challenges these chemistries pose in batch and the advantages flow offers in controlling heat transfer, mixing, and exposure time, we aim to provide a practical framework for choosing reactions that are best suited for flow. The discussion will touch base upon not only few of the many successful case studies we have demonstrate at DRILS, but also the boundaries where flow may not provide added value, helping researchers make informed decisions about deploying this technology.

AGENDA

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CONFERENCE CUM WORKSHOP

CONTINUOUS PROCESS INTENSIFICATION

Prof. Anil Kumar

IIT Bombay

Speaker Bio

Anil Kumar is currently a Professor at IIT Bombay, in the Department of Chemistry. He also serves as President of the Society for Polymer Science, India. His group's research interests are in the area of Process Intensification, Optoelectronic Devices and Materials, Nanomaterials, Flavors & Fragrance, polymers, and Continuous Crystallization. His group has also developed many technologies including transfer of technology in the domain of handheld explosive sensors and continuous flow processes. For his contribution in this field, he has been awarded with the 2017 NASI-RIL Platinum Jubilee National Award for application-oriented innovations.

Talk Title

RAPIDLY CHANGING FACE OF ORGANIC CHEMISTRY AND CHEMICAL MANUFACTURING: A NEW PARADIGM VIA CONTINUOUS PROCESS INTENSIFICATION

Abstract

The art and science of organic synthesis coupled with chemical manufacturing is undergoing tectonic shift due to the recent developments in continuous process intensification via Flow, Electro, photo and Mechano Chemistry. Continuous process provides a potential alternative to batch synthesis because of its inherent advantages such as very efficient heat exchange, high batch to batch reproducibility, fast mixing, high throughput, safety, and the ability to do multistep telescoping synthesis. Due to these advantages, these processes have been referred to as the most promising “Green Technology”. In fact, continuous flow processes are projected to be the “CHEMICAL FACTORIES” of tomorrow. Continuous flow processes also provide an “On-Demand” synthesis with complete control over reproducibility, size, shape and these parameters can be achieved at various scales (lab synthesis to pilot to bulk production) with excellent reproducibility. It also enables one to carry out chemical manufacturing without solvents or even without reagents. We have been exploring these continuous processes for the synthesis of conjugated polymers, nanoparticles and nanofibers, fine chemicals, miniemulsion polymerization etc. In this presentation, I will review some of the recent advances in these directions and some results from our laboratory..

AGENDA

CONTINUOUS PROCESS INTENSIFICATION

PROF. OLIVER KAPPE

UNIVERSITY OF GRAZ, AUSTRIA

SPEAKER BIO

C. Oliver Kappe received his diploma (1989) and his doctoral (1992) degrees in organic chemistry from the University of Graz and after two postdoctoral stays (University of Queensland and Emory University) returned to Graz in 1996 to start his indepenent acacdemic career and was appointed Full Professor in 2011. For the past two decades the focus of his research has been directed towards flow chemistry/microreaction technology, encompassing a wide variety of synthetic transformations and experimental techniques. Particular emphasis is placed on the application of sustainable technologies with respect to the manufacturing of pharmaceuticals.

TALK TITLE

TOWARDS SUSTAINABLE API MANUFACTURING USING ENABLING TECHNOLOGIES

ABSTRACT

Flow technology has considerable advantages in mass- and heat transfer, safety and ease of scale-up, when compared to traditional batch reactions. Furthermore, hazardous chemistries such as highly exothermic reactions, or those involving unstable or toxic intermediates can be operated safely in flow, whereby this technology acts as a powerful route-enabler. In this lecture, contributions from our research group in the field of continuous flow processing in the areas of using water as reaction medium, mechanochemistry, photochemistry and electrochemistry will be highlighted

AGENDA

DR. SRIVIDYA R
AURIGENE PHARMACEUTICALS

SPEAKER BIO

Srividya heads R&D for drug substance development at Aurigene Pharmaceutical Services Ltd, a wholly-owned subsidiary of Dr. Reddy's Laboratories Ltd., Hyderabad. She holds a B.Tech from Indian Institute of Technology, Madras, and Ph.D. from Princeton University in Chemical Engineering. She has more than 20 years of experience in the pharmaceutical industry, working at Bristol-Myers Squibb in New Jersey followed by Dr. Reddy's.

Srividya is passionate about advanced manufacturing technologies. Her team's success on the implementation of continuous manufacturing at Dr. Reddy's was recognized for Excellence in R&D at the CPhI India Pharma Awards.

Srividya has been recognized for Leadership Commitment at UN Women India 2020 WEPs (Women's Empowerment Principles) awards. She is one of the 51 women featured in "WiSTEM 2021", an e-book released by the Confederation of Indian Industry (CII) on Indian women in STEM. .

TALK TITLE

DESIGN AND CONTROL OF FLOW REACTIONS THROUGH PAT AND SIMULATION

ABSTRACT

AGENDA

CONTINUOUS PROCESS INTENSIFICATION

Dr. Mike Kenny

AM Technologies

Speaker Bio

Dr Mike Kenny is currently Commercial Director at AM Technology, having joined the company in 2021. Mike holds a PhD from the University of Bath in the UK, with a background in medicinal chemistry. Dr Kenny is the principal investigator on AM Technology's current Innovate UK grant, exploring biocatalytic nitro reductions in flow. AM Technology are experts in continuous chemical processing solutions for the chemical and pharmaceutical industries, providing reactor technology that can aid in the decarbonisation of chemical and pharmaceutical manufacturing.

Talk Title

APPROACHES TO MULTIPHASIC FLOW CHEMISTRY

Abstract

This talk will focus on how the team at AM Technology approach multiphasic reactions, such as reactions with slurries, and hydrogenations.

AGENDA

CPI2025

CONFERENCE CUM WORKSHOP

CONTINUOUS PROCESS INTENSIFICATION

Dr. Sreepriya Vedantam

CSIR - IICT

Speaker Bio

Dr. Sreepriya Vedantam is currently working as a Senior Principal Scientist in the Chemical Engineering and Process Technology Department of CSIR-IICT, Hyderabad. After formal education in Chemical Engineering, she received her PhD Degree in Chemical Engineering, in the year 2007, from Institute of Chemical Technology (ICT), Mumbai. in the area of Computational and Experimental Fluid Dynamics of Multiphase flows as applied to process intensified reactor systems such as Annular Centrifugal Extractors. After this she had a two-year post-doctoral stint at Gent University, Belgium in the Faculty of Bio-Science Engineering. After this, she worked at CSIR-National Chemical Laboratory (Pune) for a couple of years before joining CSIR-IICT. She carries over 2 decades of experience in the area of process-intensification, CFD modeling based design, integrated modeling techniques, compartmental modeling at various scales as applied to chemical, nuclear and environmental engineering systems. She has been handling several Industrial Projects in Process Engineering from lab to commercial scale and offering Industrial solutions. Her current active research includes the area of process development, design and scale-up; Process Innovations through intensification, design of multi-phase reactors, customized miniaturized reactors, Conversion of batch to scalable continuous processes and multi-phase flows including phase-change.

Talk Title

HYDRODYNAMICS-DRIVEN PROCESS INTENSIFICATION: DESIGN OF CONTINUOUS MULTIPHASE REACTORS

Abstract

Process intensification in chemical engineering increasingly relies on the efficient design of continuous multiphase reactors, where hydrodynamics play a pivotal role in enhancing performance. This lecture explores how flow behavior, phase interactions, and reactor geometry converge to optimize reaction environments, thus enabling improved mass, momentum, and heat transfer. Multiphase systems, particularly those involving gas-liquid, liquid-liquid, solid-liquid or even gas-liquid-solid interfaces which are central to numerous industrial applications. Understanding their complex flow regimes is crucial for scaling up efficient, compact, and cost-effective reactor systems.

An attempt will be made to retain primary focus on the role of hydrodynamics in governing transport processes in these reactor systems. Transfer coefficients such as volumetric mass transfer coefficients and heat transfer coefficients serve as critical parameters of reactor performance, and are highly sensitive to flow regimes, interfacial area, and turbulence.

To support design and scale-up, computational fluid dynamics (CFD) and integrated modeling approaches are employed to resolve detailed flow structures, predict transfer behavior, and evaluate reactor performance under varying conditions. These tools enable a deeper mechanistic understanding, bridging experimental insights with predictive capabilities.

The lecture highlights strategies to manipulate hydrodynamics for intensified operation, including phase-change systems and novel contactor configurations, guiding the development of next-generation continuous multiphase reactors.

AGENDA

CONTINUOUS PROCESS INTENSIFICATION

Dr. Karunanidhi

Anthem Biosciences

Speaker Bio

After completing post-graduation course in Chemistry at Madras University in 2001. Joined Syngene International Pvt. Ltd. as trainee scientist and associated with Syngene until March 2007. In April 2007 joined Anthem Biosciences as scientist and rose to Director – Head of Operations in a span of 18 years. Built a good cohesive group of 800 chemist/biologist with diverse chemistry/biological skills. Implemented flow development and scale up facility at Anthem. Successfully scaled up many processes using Batch/Flow. Anthem Biosciences is a CDMO based in Bangalore, India.

Talk Title

LARGE SCALE APPLICATION OF AIR OXIDATION AND MECHNOCHEMISTRY IN FLOW

Abstract

The integration of sustainable activation modes is reshaping modern synthetic chemistry, particularly in the pursuit of scalable, greener transformations.

Air oxidation has re-emerged as one of the most practical and environmentally benign oxidative methods, offering a readily available and inexpensive terminal oxidant. In parallel, mechanochemistry has gained significant attention as a solvent-free strategy capable of enabling unique reactivity under mild conditions while reducing the environmental footprint of chemical processes. In this talk, we present recent advances at the interface of air oxidation chemistry and mechanochemical activation, with a particular focus on how these approaches can be adapted or combined within continuous flow environments. Key case studies will highlight the mechanistic challenges in harnessing molecular oxygen efficiently, strategies for improving selectivity in oxidative transformations, and opportunities to overcome mass-transfer limitations through flow-based designs. By uniting principles of air oxidation, mechanochemistry, and flow technology, we demonstrate emerging methodologies that reduce reliance on hazardous oxidants, improve reproducibility, and pave the way for more sustainable reaction platforms. This perspective emphasizes not only the synthetic potential of these methods but also their implications for the future of scalable, environmentally responsible chemical manufacturing.

AGENDA

CONTINUOUS PROCESS INTENSIFICATION

Dr. Satyanarayana T

Laurus Labs

Speaker Bio

Dr Satyanarayana Thirunahari is currently working as a Senior General Manager at Laurus Labs Limited, Hyderabad, heading process safety & engineering department which is responsible for process safety, scale up, technology transfer, continuous manufacturing etc. He has 15+ years of experience in working with various industries like Dr Reddys Labs Hyderabad, Applied Process Company Limited Ireland, ICES Singapore etc. He holds a PhD degree in chemical engineering from National University of Singapore. He published 7+ articles in international journals and gave several talks in various national and international conferences. He has 17+ patents to his name.

Talk Title

REACTION IN FLOW - CASES STUDIES AT LAURUS

Abstract

Chemical reactions typically scaled up in batch reactors where mixing, mass and heat transfer are limited which may result in poor selectivity, conversion etc. Process safety is another aspect which also limit the scale up in batch reactors where the secondary decomposition reactions exist closer to the operating temperature of the desired reaction. In this talk, two case studies about scaling up reactions in flow reactors will be discussed.

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CONFERENCE CUM WORKSHOP

CONTINUOUS PROCESS INTENSIFICATION

Prof. Anil Kumar

IIT Bombay

Speaker Bio

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Dr. Mike Kenny

AM Technologies

Speaker Bio

Dr Mike Kenny is currently Commercial Director at AM Technology, having joined the company in 2021. Mike holds a PhD from the University of Bath in the UK, with a background in medicinal chemistry. Dr Kenny is the principal investigator on AM Technology's current Innovate UK grant, exploring biocatalytic nitro reductions in flow. AM Technology are experts in continuous chemical processing solutions for the chemical and pharmaceutical industries, providing reactor technology that can aid in the decarbonisation of chemical and pharmaceutical manufacturing.

Talk Title

DEMO: SLURRY HANDLING IN COFLORE FLOW REACTORS

Abstract

This demo will involve pumping a slurry feed through a Coflore flow reactor continuously.

AGENDA

CONTINUOUS PROCESS INTENSIFICATION

Dr. David Cantillo

The University of Queensland, Australia

Speaker Bio

David Cantillo studied chemistry at the University of Extremadura, Spain. In 2011, he obtained his PhD in organic chemistry at the same university under the supervision of Prof. Jose Luis Jimenez. Then, he moved to the University of Graz as a postdoctoral researcher within the group of Prof. C. Oliver Kappe. At the end of 2015, David joined the Research Center Pharmaceutical Engineering GmbH as a Senior Scientist, where he became Scientific Area Head in 2018. The same year, he started his independent academic career at the University of Graz as an Assistant Professor. David has joined the University of Queensland in 2023.

Talk Title

INTENSIFYING GREEN ELECTROCHEMICAL SYNTHESIS USING FLOW REACTORS

Abstract

Electro-organic synthesis is receiving increasing attention as an inherently sustainable methodology to effect redox processes. Electrochemical methods can be used to readily generate radicals and other high energy intermediates under mild conditions, substituting stoichiometric amounts of often harmful and environmentally unfriendly oxidizing or reducing agents by electrical current. In this seminar, examples of implementation of electrochemical synthetic steps for the preparation of active pharmaceutical ingredients will be presented, including an evaluation of the advantages and disadvantages of electrolysis vs conventional methods as well as the transfer of the procedures to flow electrolysis cells that enable intensifying the process and the preparation of large quantities of material.

AGENDA

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CONFERENCE CUM WORKSHOP

CONTINUOUS PROCESS INTENSIFICATION

Dr. Prashantha Kamath

Syngenta Biosciences Pvt. Ltd.

Speaker Bio

Dr. Prashantha Kamath received his M.Sc. in Applied Chemistry and PhD from Mangalore University. During his PhD he developed the HHIS methodology to access diverse heterocycles, under supervision of Dr. Mukul Lal. He started his industrial career as a research associate with SYNGENTA R&T CENTRE, GOA in 2006. At present he is a Group Leader, Process Research and Analytical chemistry in SYNGENTA R&T CENTRE, GOA. He has published 9 research papers till now and recognized PhD guide for Mangalore University. His research interest includes the development of new methodologies to access heterocycles, green chemistry and enabling technologies like flow chemistry and electrochemistry.

Talk Title

PROCESS INTENSIFICATION IN CROP PROTECTION RESEARCH

Abstract

This presentation explores the transformative role of continuous flow chemistry in revolutionizing early-stage research and development processes. Flow chemistry offers unique advantages in accelerating chemical discovery through rapid experimentation, precise control over reaction parameters, and enhanced safety profiles. We demonstrate flow platforms enable efficient reaction screening, optimization, and scale-out studies while minimizing resource consumption. Key highlights include applications in hit-to-lead optimization, route scouting, and quick scale up in Kilo lab where flow chemistry demonstrates superior performance over traditional batch methods. Case studies illustrate successful implementation in crop protection research, showcasing reduced development timelines and improved decision-making processes.

AGENDA

Mr. Kumar Oza
Pi-Process Intensificaiton Experts LLP

Speaker Bio

Did MSc in Chemistry by research from Mumbai University and joined Family business manufacturing Ion Exchange Resins in 1979. The journey through R&D, pilot and plant expansions involved fundamentals that helped in starting Pi-Process 2012 with Mr Vijay Kirpalani and Mr Madhav Sapre.

Talk title

EXPERIENCE IN PRACTICE - ILLUSTRATIVE EXAMPLES

Abstract

Process challanges and selective examples overcoming it

AGENDA

CONTINUOUS PROCESS INTENSIFICATION

Mr. Chandrakant Sethia

Corning Advanced-Flow Reactor (AFR) Technologies

Speaker Bio

Chandrakant is National Head – Sales & Business development, Advanced-Flow Reactor (AFR) Technologies and President for Corning Sustainability Network (CSN) India. He is responsible for growth and driving the Flow Reactors market to generate potential new business opportunities with a focus on flow technologies. Chandrakant has been with Corning Reactor Technologies for over Ten years and has 19+ years of broad and diverse experience in developing market for new products in reactors and mixing technologies for Pharmaceutical, Specialty Chemical & Agro companies. His key focus area is to develop markets for the adoption of continuous flow technologies from lab to production and take the projects from concept to commercialization. Prior to Corning, Chandrakant worked in the Process equipment industry, where he primarily focused on industrial agitators and mixers for various critical applications, reactor designs, and novel reactor application engineering across the commercial productions. Chandrakant holds a B. Tech in Chemical Engineering from University Department of Chemical Technology (UDCT).

Talk Title

EFFICIENCY, INNOVATION, AND VALUE: CONTINUOUS CHEMICAL MANUFACTURING WITH CORNING AFR

Abstract

Corning® Advanced-Flow™ Reactors (AFR) are continuous flow processing technologies addressing wide range of applications in chemical & pharma manufacturing. AFR increases the efficiency, scalability, yields, and quality of chemical processing — all while reducing environmental impact, performance variability, and cost. Corning Advanced-Flow Reactors offer significant advantages over both traditional batch reactors and other continuous flow reactors. Our patented fluidic module design provides vastly improved mixing (~100x), very narrow residence time distribution, and superior heat (~1000x) and mass transfer, which in turn enables faster, inherently safer reactions that produce better yields of higher purity output. AFR Technology is well suited for reactions where conditions related to process exothermicity, concentrations, mixing, etc., make batch processing difficult or impossible; where mass transfer is limiting (e.g., non-homogenous liquid-liquid, gas-liquid, gas-liquid-solid); and/or where residence time distribution has a direct impact on final quality (e.g., nanoparticles, microparticles, high-grade and technical polymers, etc.) Higher yields resulting from more consistent, higher purity output are just one of many ways in which Corning's reactors can reduce OPEX (operating expense) for manufacturers who currently use batch reactors. Corning's reactors can also lead to lower CAPEX (capital expenditure), particularly in greenfield projects, by massively reducing manufacturing footprint and infrastructure compared to batch processing. The footprint of the system itself is much smaller than that of a conventional batch reactor, and the continuous nature of the process – along with its high yield – can enable a 1000x reduction in material inventory (e.g., solvents and catalysts, unstable intermediates, machinery needed for now-redundant downstream separation processes, etc.), which can in turn reduce overall facility size by 70-90%. At a time when industry regulations are tightening, Corning AFR Technology offers an attractive solution for manufacturers concerned with safety and environmental impact, and Corning is committed to working closely with customers to ensure that they see the most value possible from their adoption of this breakthrough technology which offers continuous manufacturing through safer, greener and sustainable technology. Some of our commercial installations (running 24x 7 for over a year to 7 seven years and at a capacity of over 1000 TPA) includes reactor technology for handling of Nitration (Mono, Di & Tri Nitration), Selective chlorination, Lithiation, Selective Hydrogenation, Fluorination with F2 as a gas, Fluorination with HF (Anhydrous, Aqueous), Oxidation with O2, Handling of Ethylene Oxide and Propylene oxide, High pressure Ozonolysis, Photo Bromination, Vitamin Synthesis and many more. |23+ year expertise. 800+ installations. 3000+ chemistries. 200+ commercial-reactors. 50,000+ hrs production. Single plant of 200,000 TPA|

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CONFERENCE CUM WORKSHOP

CONTINUOUS PROCESS INTENSIFICATION

Mr. Suhas Jawlekar

Dr Reddy's Laboratories

Speaker Bio

Suhas Jawlekar is a Chemical Engineer from Institute of Chemical Technology, Mumbai (formerly known as UDCT). He has 22 years of experience in pharmaceutical industry & is currently working as process engineering expert at Dr. Reddy's. His area of expertise include technology transfer, scale-up and niche areas like API particle engineering, polymorph development, flow chemistry & continuous manufacturing. He has worked on scale up & process validation of 30+ API projects of various complexities in his journey so far. He has been part of flow chemistry & continuous manufacturing program of at Dr. Reddy's for past 7 years and is involved in design of lab process as well as an integrated continuous modular plant capable of handling tonnage level throughput. He is currently leading a team consisting of chemical engineers & chemists working on flow process development & scale up of API processes. He has patents & articles to his name in the area of crystallization, particle engineering & continuous manufacturing. He is a certified Six Sigma black belt.

Talk Title

APPLICATIONS OF FLOW TECHNOLOGY FOR PROCESS INTENSIFICATION & IMPROVEMENT IN API DEVELOPMENT

Abstract

Highly exothermic reactions, formation of unstable intermediates, competing impurity formation are some of the applications where benefits of flow reactors are leveraged.Some of these can also be established as platform technologies as in-situ generators. In one of the case, unstable nature of diazonium species resulted in yield & quality issues when scaled up in batch mode. Moreover, this chemistry is known for its explosive nature. The in-situ generation of diazonium complex in flow coupled with integration of subsequent reactions enabled significant improvement in purity & yield. Different flow rectors were preliminary evaluated to understand the performance & select the most suitable one for scale up.

In another case, competing impurity formation was observed during reaction & led to inconsistent quality from batch to batch. Effective heat transfer in flow reactor minimized temperature hot spots thus enabling better control on impurity & consistency. Use of self-optimization platform along with mechanistic understanding enabled faster identification of design space in robust way.

AGENDA

CONTINUOUS PROCESS INTENSIFICATION

Mr. Pradip Hosangadi

Evonik

Speaker Bio

Pradip Hosangadi is an accomplished Marketing and Business Development leader with over 30 years of cross-functional experience in the catalysts industry. His expertise spans Quality Control, R&D, Technical Services, Sales & Marketing, and Business Development, with a strong focus on Precious Metals Catalysts and Activated Metal Catalysts. As the Director of Technical Marketing & Business Development for the Business Line Catalysts at Evonik Catalysts India, Pradip plays a pivotal role in driving strategic market expansion and business growth across the Life Sciences, Fine Chemicals, and Petrochemicals sectors. His deep industry knowledge and strategic vision have consistently contributed to the advancement of innovative catalyst solutions and long-term customer partnerships.

Talk Title

EVONIK CATALYSTS - LET'S MAKE A DIFFERENCE IN FLOW CHEMISTRY

Abstract

The integration of heterogenous catalysis into continuous flow technology offers a transformative approach to chemical manufacturing: combining better process safety in a closed loop with process controls, scalability, and reduced use of chemicals and less waste, allowing further reduction of carbon footprint.

Flow technology puts new demands on catalysts, which are met by Evonik Catalysts' specifically engineered and adapted Noblyst®F series: various precious metals and dopants on Carbons with a significantly coarser particle size, suitable for flow conditions. These catalysts are ready to be used in reactors or cartridges for low to medium output process (kg to low tonnage per day). They ensure minimal pressure drop and high space time yields and have proven effective in various hydrogenation applications like Nitro Reductions, Double Bond Hydrogenation, Hydrogenolysis like Debenzylation, Deprotection, Dehydrohalogenation, and in CC-coupling reactions.

Evonik Catalyst's vast experience in both powdered heterogeneous catalysts and fixed bed catalysts helps us to further tailor these advanced heterogeneous catalysts for flow technology.

Evonik Catalysts Noblyst®F series have successfully helped our customers to establish flow processes which are also published as follows:

SQ Duan, al., Developing a Multistep Continuous Manufacturing Process for (1R,2R) 2-Amino-1-methylcyclopentan-1-ol, Org. Process Res. Dev. 2020, 24, 2734−2744
https://dx.doi.org/10.1021/acs.oprd.0c00405

AGENDA

Mr. Vilobh Shete
H.E.L Group

Speaker Bio

Mr. Vilobh Shete is a chemical engineer with extensive expertise in process safety, process design and development, scale-up, and PAT applications, bringing over 15 years of cross-functional experience across the pharmaceutical, chemical, and allied industries. He is currently Field Application Specialist at H.E.L Group, where he provides consultancy in process safety, scale-up strategies, instrument customization, and advanced application support, while also engaging in global knowledge-sharing through seminars, webinars, and technical trainings. Prior to this, Mr. Shete worked at Mettler Toledo as Deputy Manager – Technology and Applications, supporting South East Asia, Australia, and New Zealand in reaction engineering, calorimetry, particle characterization, and PAT implementation. His career also includes roles at Exide Industries, Xytel India, Ipca Laboratories, and Smruthi Organics, where he contributed to process development, engineering design, troubleshooting, and product optimization. He holds a Master's in Chemical Engineering from The City College of New York and a Bachelor's in Chemical Engineering from Shivaji University, with strong foundations in process modeling, crystallization, and particle system characterization.

Talk title

Abstract

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