



BHARATI VIDYAPEETH COLLEGE OF ENGINEERING

Sector-7, C.B.D. Belpada, Navi Mumbai-400614

Rescience II

"For all the unstable elements in you"

5th 6th & 7th March 2018

in association with



IIChE

***National Level Technical
Paper Presentation***

Organised by

Department of Chemical Engineering

Dedicated to.....



Late Shri.Abhijeet Dada Kadam



Dr. Patangrao Kadam
M.A. LL.B., Ph.D.
Founder, Bharati Vidyapeeth
Chancellor, Bharati Vidyapeeth Deemed University

Message

RScience is an attempt to provide a platform for all aspiring chemical engineers to flaunt their abilities and talents. It is their golden opportunity to shine in their chosen field. This event hopes to give them perspective and take them beyond the horizon where they can spread their wings and fly.

I congratulate Prof. S. M. Walke, Convener of RScience 2K13, Prof. M. A. Suryawanshi, Staff Coordinator of the Association of Chemical Engineering Students and the entire IChE Student Chapter for organizing this path breaking national event.



Hon. Vishwajeet Kadam
Secretary,
Bharati Vidyapeeth, Pune.

Message

It is heartening to know that the Chemical Department of Bharati Vidyapeeth College of Engineering, Navi Mumbai is conducting its very own fest "Rscience". Though the department has achieved remarkable heights in technical fields, the task of fulfilling the dream of changing India into a better nation comes from better thought process and cooperation.

I wish them a grand success.

With Best Compliments from.....



Prof. Dr. Shivajirao Kadam,
Vice Chancellor
Bharati Vidyapeeth Deemed University, Pune



Hon. Dr. V J Kadam
Director,
Bharati Vidyapeeth
Educational Campus, Navi Mumbai

Message

It gives me great pleasure to know that Chemical Department of Bharati Vidyapeeth College of Engineering, Navi Mumbai is conducting its very own fest “Rscience”.

India has set its vision to join the committee of the developed nations by 2020 and this would be achieved if Indians combine their minds with their hearts. We would touch new technical heights.



**Dr. M Z Shaikh
Principal,
Bharati Vidyapeeth
College of Engineering, Navi Mumbai.**

Message

One of the greatest landmarks of an engineering institution is the organization of a successful technical festival and I feel privileged to continue the tradition of “Rscience”.

“Rscience hopes to create a niche for itself in the technical world and provide students with a new vision to grow and think rationally and motivate them to come out of the box.



Prof.S.P.Shingare
Head of Chemical Engineering Department
BharatiVidyapeeth College of Engineering,
Navi Mumbai

Message

It is my privilege to announce that the Chemical department of BharatiVidyapeeth College of Engineering is back in the manifold of the Indian Institute of Chemical Engineers (IChE) and a technical festival has been organized as a result of this association. The staff and students are proud to present 'Rscience- For all the unstable elements in you'.



Prof.M.A.Suryawanshi,
Staff Coordinator,
Association of Chemical Engineering Students

Messages

R science 2K13 epitomizes the determination of our budding engineers to contribute to the chemical field in their own small way. It also promises to take forward the legacy set by its predecessor. RScience is merely an example of the changes that are taking place in the ever-so-changing field of chemical engineering.

Students of our chemical engineering department have put in a lot of effort in making this event successful. This event has given the students of Bharati Vidyapeeth College of Engineering, an opportunity to interact with not only the students of various colleges of Mumbai but also with eminent personalities in the field of chemical engineering. This event has provided immense exposure to our students and I hope that this trend continues for many years to come.

OUR SPECIAL THANKS TO....

Mr.Hanumant K. Kadam (Chief Guest)

RCF LIMITED

Mr. Vinayak Marathe (Chief Guest)

Vice-President, Reliance Technology Group

Dr.S.S. Bhagwat

Professor, ICT

OUR DISTINGUISHED GUESTS

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Reliance group

Mr. Vinayak Marathe

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S4S Technologies

Prof. Manoj Mandake

Bvcoe-chemical department

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Reliance industries ltd

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Bvcoe- chemical department

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Bvcoe- applied science department

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Bvcoe- chemical department

Mr. Arun Deshmukh

Jubilant chemical & pharma pvt. Ltd

Mr. Kathireshan

Technip

Dr.M.V.Bagal

Prog. V.B.Mane

Bvcoe- chemical department

Dr. Indrajit Yadav

Bvcoe- Chemical Department

Dr. Bhavna Singh

Bvcoe- Applied Science

Anuradha Shukla

Bvcoe- Applied Science

Mr. Anuj Tendulkar

Professor

Prof. M.A. Suryawanshi

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Mr.J.P. Ghosh

Reliance Industries ltd

Prof. S.S. Bhagwat

ICT

Dr. S.P. Shingare

Prof. M.A, Suryawanshi

Bvcoe- Chemical Department

THE JOURNEY OF RSCIENCE...

When I grow old and look back upon my college years, Rscience the technical fest of Chemical Department would be one thing that I would remember the most. It is not only because the milestones it has achieved but also for the wonderful journey it has been. It has been rightly quoted,

"Travel is better than to arrive."

It actually holds true. When you involve yourself in such magnanimous event, you realise you don't have to choose one path to take you where you want to be in life. But even if you do choose that one path you don't have to abandon all the other ones. It is actually what happens along the way that matters, the stumbles, the friendships; It is the evolved personality you find in yourself that counts. It is the journey not the destination. One such beautiful journey was weaved by Rscience. A journey of foundation, innovation, creativity last but not the least a journey of collaboration and connection.

A building never stands strong and tall if its foundation is feeble. So, the journey of Rscience began with its founder members, Punit Tripathi, Girish Ghosh, Siddhant Ranjan, Debsmita Roy, Girish Ghosh, Siddhant Ranjane, Sushant, Vishal Pandey and Manali Kavle from the batch 2k12. We owe this success of Rscience and the integrity within us to these founder members. They were merely not the founder members but also the building blocks of Rscience. Bringing in the novelty of ideas and giving birth to the technical innovation, Rscience was no longer just a fest but the HEART BEAT of Chemical Department. We lend our special gratitude to them.

As quoted by Albert Einstein,

"The mere formulation of a problem is far more often essential than its solution, which may be merely a matter of mathematical or experimental skill. To raise new questions, new possibilities, to regard old problems from a new angle requires creative imagination and marks real advances in science."

From its first edition till its seventh edition Rscience has proved to be a valley of creativity and innovation. With each year enthusiastic students come with the most innovative themes out of the clutter in their mind. Themes which not only focused on the Chemical Engineering aspect but also the social aspect, Rscience has seen it all. To begin with themes like "Go Green", "Don't Drink and Drive", "Save the Mangroves", "Educating the Street Children", "Industrial Safety", "Alchemy" last but not the least this year's theme, "ChemAllianz" they all have brought out the creative and innovative wave which rippled and made an impact on the students organising it as well as students participating in it.

Rscience is an amalgamation of mind bending events which not only makes you think once or twice but till you find your answer. A simple event like "Salt Act" which brings in the washed away chemistry to life, is an event where you simply have to identify the given salts. The motto of this event is to make everything as simple as possible, but not simpler. "Industrial Defined Problems" an event which gives you a connection between the knowledge you get in the books and its application in the industry. You get a solution only when you sit on the shoulders of the problem, so this event gives you the perfect encounter with the industrial problems. A thinker sees his own actions as experiments and questions.. as attempts to find out something. Success and failure are for him answers above all, one such event which compels you to dust out the ideas you have in your mind and

present them making it open for explanation, questioning and worth working on is "Technical Paper Presentation". At some point in your life, you're going to have to present something to someone, so it's important to master the art.? "Prototype Presentation Equipment Design" is an event where you have to create miniatures of Cooling Tower and Heat Exchanger. Presenting designs in a way that does not leave behind a void for the world to fill in with their imagination, ensures that your designs are understood to the maximum potential. As with every skill you've ever learned, you have to learn the technique and then practice, practice, practice. "Mock Placement" event will not only help you perfect your technique, but it will also allow you to get valuable feedback and coaching on your performance. An added bonus to preparing and practicing is the self-confidence you will gain. In today's competitive world, you must be prepared and in top shape. Last but not the least, "Inquisitive", this event has established itself as the mothership event of our Chemical Engineering fest RSCIENCE. It is specifically designed to test your concepts of chemical engineering as well as its application, that requires not only basic and advanced knowledge of chemical engineering but also faith in your partner to make the right decisions. Gather your chemical engineering arsenal and pair it up with your luck, because, **"You have to be the odd one to be number one"!**

Well, this is not the end of the journey because in the end you carry lot more with you than just the hardwork you put in, to make this event a successful one. One thing my Father always emphasizes on is, increasing your social circle. What he means by that is not only increasing the group of friends you can go out partying with, but the ones who can have your back when you're passing through your career development phase. Yes, Rscience does lot more than creativity and innovation. Only when you work with committee's like "PR", "Marketing",

"Operation" and "Hospitality" you know Rscience is a wholesome package of friendship, emotions and relations. Trust me when I say this, knowing people doesn't hurt, and knowing the ones who can help you in the future, is the best thing you can do at an age like yours.

"At the end of the day, life is about being happy, being who you are, and I feel like we are so blessed to have the support system and the best family to really just support each no matter what we are going through".

One such supportive family in this college while we students are busy working for Rscience is our beloved faculty. Right from supporting us to participate in different events to providing us notes for our lectures while we work for making this fest a magnificent one they do it all. "Thankyou" would be too clichéd word for this, I would simply end on a note, we students are a blank canvas without your support and love. My highest of the gratitude for shaping us in the way we are today.

~Asmita Jibhkate

BE Chemical.



BHARATI VIDYAPEETH COLLEGE OF ENGINEERING

DEPARTMENT OF CHEMICAL ENGINEERING

Science II

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: Surya Kumar

Secretary: ShrijayZanzane

Jt.Secretary: SnehaDhengre

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DhammadipGajbhiye	Kritikasharma	AtharvaDattar
RaghuvirBatwalkar	SatyajeetChavan	Sakshi Shrivastava

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	Ashwini Nair	PranitThuruthy
	UmeshRathod	Tejaspatil
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		Vishal Patel
		PrithviManek

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UdaySakat		
Maithili Hadkar		
MitaliVanage		
Vaibhav Shetty		

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	ShreyashZingade

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PurviKhubchandani (Head)	PrachiDoiphode	Owais
Priyankagaikwad (Co-Head)	AniketPagade	PrachiVijaywargiya
SahilPatil	Anuj More	
Prasad Terse	SagarPatil	
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	Manish Dhore	
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SamruddhiDeshmukh (Co-Head)		

HOSPITALITY:

COORDINATOR: - Prof. V. B. Mane and Mr. G. B. Kumbhar		
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AbhayMandavkar (Co-Head)	Ashwini Nair	Shraddha Singh
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ChinmayKhopkar		SonaliPawaskar
		SheebaTripathi

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FINANCE :

Final Year
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AmbikaPendu

WRITING PORTAL

Final Year
AsmitaJhibkate

SR. NO.	TOPIC	PAGE NO.
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EVENT HEADS:

Sr no.	Events	Faculty	BE	TE
1	Inquizitive	Dr. S. P. Shingare Prof.M.A.Suryawanshi	AshirwadTiwari Shankar Shukla	Surykumar
2	Jr. TPP	Prof. V. B. Mane Dr. SonaMoharir	VadirajHattimatur	SatyajeetChavan
3	TPP/Poster presentation	Dr. M. V. Bagal Dr. SonaMoharir	ShailendraChawdekar	JaydeepGhalawat
4	Salt Act	Dr. P. Zade Prof. A.G. Thokal	Dhammadip Gajjbiye	Kritika Sharma
5	Prototype	Prof. M.B. Mandake	SahilPatil ShubhamKamble SamruddhiDeshmukh	Amar Ghatge
6	Wolf of wall street	Prof. A.G. Thokal	RaghuvirBatwalkar	RiyaKejriwal
7	IDP (Industrial Defined Problem)	Prof. G.B. Kumbhar Prof.I.N.Yadav	Abdul Cyclewala	Ashwini Nair
8	Mock placement	Dr. M.V. Bagal	AmbikaPendur	ManasArekar,

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MICROBIAL ENHANCED OIL RECOVERY

ABSTRACT

Made by: anushavadnekar(8291174875, anushavadnekar@gmail.com) , shubham rode , suman yadav

From :DattaMeghe College of Engineering

World has enjoyed surplus oil for past few decades. We are slowly heading for oil crisis. Energy demands are constantly increasing. By 2030 the oil demand will be 50% higher than now. Governments are concerned about the supply of oil by geography , Energy & climate issues , Role of renewable energy sources. Research indicates that 1 trillion barrels of oil still exists, but extraction is difficult. Primary Recovery -Easy oil out. -10- 15% of OOIP. Secondary Recovery -Flooding & Injecting -15-30% of OOIP. Is applicable only after transition. Laboratory tests are conducted. It relies on SP flooding. 50% of OOIP reported. EOR:- 50 % Secondary Recovery:- 15%-30% Primary Recovery:- 10-25%

Bacteria are the only micro organisms suitable for the process. The produce metabolic products & tolerate harsh environment. Discovery:- 1. It was found that bacteria were active at high pressure& temperature. 2.Clostridium was grown at 75000ppm salt concentration.

Mechanisms:- Interfacial tension. Gas Production.Garzan Oil Study- Turkey Oil API 26o Shut in& water flooding tests conducted _ Clostridium used as the stimulating bacteria

Microbial description: ATCC 824 Anaerobic bacteria Produces gases in the first stage Produces acids & solvents in the second stage.Microbial Water Flooding tests. The microbe causes reduction in oil viscosity. Effective in depleted reservoirs. Optimum shut in is 2- 4days. Can be used in conjunction with other microbes. Bacterial population can tolerate harsh environments. Growth is rapid. Availability is widespread. Efficiency of recovery is high. Hence 3rd trillion of oil is present in these unicellular organisms

This report provides information of background , primary , secondary and tertiary recovery, microbial enhanced oil recovery, experimental procedure of MEOR.

Keywords: Primary Recovery , Secondary Recovery, micro organisms ,Microbial description

CAVITATION BASED PRETREATMENT FOR INTENSIFICATION OF BIOGAS PRODUCTION

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Abstract

Biogas, a clean and renewable form of energy could very well substitute for conventional sources of energy (fossil fuels, oil, etc.) which are causing environmental problems. Biogas can be produced using different methods like use of waste lignocellulosic biomass and anaerobic

digestion. The composition of biogas varies depending upon the origin of the anaerobic digestion process. The present work investigates the application of hydrodynamic cavitation (HC) for the pretreatment of biomass (wheat straw or rice straw) with an objective of enhancing the biogas production. This pre-treated biomass is mixed with industrial wastewater for production of biogas using anaerobic digestion. Effect of different parameters viz. rice straw to water ratio (0.5%, 1%, 2%, 3% and 6% wt/wt), operating pressure (1-5 bar) and also treatment time (5-30 min) has been investigated using orifice plate as cavitating device. This pre-treated biomass is mixed with industrial waste water in a glass bottle and kept in the incubator. Water displacement method is used for the analysis of quantity of biogas formation. It was observed that yield of biogas obtained by pretreatment (HC) is greater than the biogas obtained using untreated biomass. As industrial waste water is used in the present work, the harmful effect of wastewaters in human and aquatic life can be minimized. The effect of combined pretreatment using KOH and HC will also be studied for getting the maximum yield of biogas. Overall, it has established that the significant enhancement in the biogas production can be obtained due to the pretreatment using HC which can also be further intensified by combination with chemical treatment.

Keywords: Biogas, hydrodynamic cavitation, intensification, anaerobic digestion, Lignocellulose.

TITLE : - BIOGAS PURIFICATION USING CHEMICAL ABSORPTION

NAME : - NIKHIL SUBHASH CHIKHALE

COLLEGE: - DR.BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE, RAIGAD.

MOB NO: - 8850607013

ABSTRACT:-

Biogas is a developing alternative energy source produced from the anaerobic digestion of Organic matter by bacteria. It is composed of methane and carbon dioxide (CO₂) with trace amounts of Hydrogen sulfide (H₂S). The presence of CO₂ decreases the energy yield from the combustion of biogas. Past studies on biogas purification have used expensive and environmentally harmful chemicals to purify Biogas. This study will involve the construction of a biogas purification system that utilizes soda lime to remove carbon dioxide from biogas by absorbing in it through chemical reaction. This method has the distinct advantage of being simple and easy to use in rural areas. It is expected to purify biogas to a Degree similar to that of the most commonly used chemical methods while increasing cost-efficiency by this method.

Keywords: Biogas, anaerobic digestion, biogas purification, chemical reaction, soda lime.

Topic: Advanced Vehicle Control System

Presented by: Tejas .G. Pawar

These days' vehicle robbery cases are higher than any other times, it has gotten to be fundamental to give a vehicle superb security with the main solid hostile to burglary gadget. Our vehicle security gadget that offers fantastic insurance to your vehicle. This proposed work is an attempt to design an advance vehicle security system that uses GPS and GSM system to prevent theft and to determine the exact location of vehicle. The potential benefits of automating the guidance of automobiles are extensive especially with regard to better utilization of highway space and safety. Proposals for automobile automation have been made for at least fifty years but a practical system has not been possible because of technology limitations. Now, new advances in technology have brought a practical system within reach. This article discusses the potential benefits of automation, the associated technology requirements, and cost/benefit trades.

TITLE : CONSTRUCTION MATERIALS AND CONCRETE FROM PAPER WASTE

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Government Polytechnic Thane.

Guide: Dr. R.N.Thakur¹(HOD/CED), V.R.Sawant² (HOD/IF)

Abstract

Nowadays, the increasing amount of wastes is a concerning reality and the environmental aspects has become a major priority. Following this worry, the purpose of this study was to investigate the using of pulp and paper industry wastes in various articles and as construction material containing various contents of the waste to reduce environmental effects of these wastes disposal. The discussion includes pulp and paper industry waste management which have recently received considerable attention and considers grit, dregs, ash, and fiber. The mixes prepared with adequate amount of these wastes and water compared in terms of some tests especially strength with the conventional concrete/material. At the end, the advantages and disadvantages of the use of pulp and paper industry wastes in concrete formulations as an alternative to landfill disposal. The research on use of pulp and paper industry wastes can be further carried out in concrete manufacturing as a new recycled

Paper pulp, raw material for [paper](#) manufacture that contains vegetable, mineral, or man-made fibres. It forms a matted or felted sheet on a screen when moisture is removed. Rags and other fibers, such as straw, grasses, and [bark](#) of the tree have been used as paper pulp. Except for certain special papers (*e.g.*, asbestos paper), nearly all papers are made of cellulosic (vegetable) fibres. The most abundant source of [cellulose](#) is the forest, though trees differ in the value of their fibre for making paper. The fiber of [flax](#), cotton, jute, sisal, manila hemp, and the like usually comes to the paper industry as a secondary product, after serving other uses. Agricultural

wastes—straw, corn stalks, bagasse (sugarcane waste), bamboo, and some other grasses—are used for making certain grades. Finally, one of the most important sources of pulp is the fibre recovered from old papers, rags, and cardboard boxes.

Wood pulps may be classified into two general groups, mechanical and chemical. Mechanical pulp, generally called ground wood, is usually produced by a mechanical grinding process and is not further classified except as fine, coarse, or bleached.

SOLAR STEAM GENERATION

(TE Chemical, BharatiVidyapeeth College of Engineering, Navi Mumbai)

Atish P. Limbare, Nitesh B. Pardeshi, RohitR.Gurav

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ABSTRACT :Our sun is a natural nuclear reactor. A 2017 report from the International Energy Agency shows that solar has become the world's fastest-growing source of power marking the first time that solar energy's growth has surpassed that of all other fuels. The total solar energy absorbed by Earth's atmosphere, oceans and land masses is approximately 3850000 exajoules (EJ) per year. So we must use this abundant renewable source of solar energy in domestic as well as industrial used.

Here in this presentation we tried to use solar energy for production of steam with the help of solar water heating system. We take one real life system and modify it with solar energy. Basically Parabolic Reflectors are used for steam generation. But the main disadvantage of this parabolic reflectors is high maintenance. So we modify that system with pressurized hot water u-tube solar collectors. And design process for that system. For steam production generally fossil fuel like coal, oil, natural gases is used. But disadvantages of this non-renewable sources is they produced vast majority of global warming emission. We are trying to reduce climate change by using renewable energy instead of fossil fuels.

Renewable energy sources are never be depleted. Some examples of renewable energy sources are solar energy, wind energy, hydropower, geothermal energy, and biomass energy. These types of energy sources are different from fossil fuels, such as coal, oil, and natural gas.

CATALYTIC BENZYLATION OF ACETIC ACID TO BENZYL ACETATE OVER MODIFIED CATALYST

Rigved B. Samant, Pranay P. Sakre, RanveerRajeshirke & Mr. Nitish D. Galande

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Abstract:

Catalytic benzylation of acetic acid (AA) with benzyl alcohol (BA) is one of the commercial significant reaction processes to produce benzyl acetate, which finds extensive uses in perfumery, food and chemical industries. Catalytic benzylation of acetic acid (AA) with benzyl alcohol (BA) to benzyl acetate is studied over zeolites viz. H-ZSM-5 (microporous, medium

pore), Micro/Meso-HZSM-5 (combination of micro-pore and meso-pore), H-Beta (microporous, large pore) to investigate catalytic activity and selectivity towards benzyl acetate. Micro/Meso-HZSM-5 obtained by desilication post-treatment has been employed as a heterogeneous catalyst for benzylation reaction probably for the first time. Micro/Meso-HZSM-5 is found to be a promising catalyst for benzylation with AA conversion of 94%, selectivity towards benzyl acetate of 95%. Detailed optimization of process parameters like molar ratio, catalyst loading, reaction temperature and time was also presented. Micro/Meso-HZSM-5 catalyst was observed to be stable for six cycles (1 fresh and 5 recycles). The benzylation of acetic acid (AA) with benzyl alcohol (BA) has been carried out over zeolites H-ZSM-5, DH-ZSM-5 and H-Beta. The AA conversion was in the order of Blank < H-Beta < H-ZSM-5 < DH-ZSM-5. Dibenzyl ether being a bulky molecule is not formed within the pores of H-ZSM-5 at lower AA conversion, whereas the formation of dibenzyl ether was facilitated by large pores of H-Beta and micro-meso combination of DH-ZSM-5. The formation of dibenzyl ether was less with DH-ZSM-5 as compared to H-Beta.

The present method for production of benzyl acetate over DH-ZSM-5 catalyst offers greener methodology with potential advantages with respect to higher AA conversion of 92% and selectivity towards benzyl acetate of 93% with catalyst reusability for six cycles without considerable loss in activity. This DH-ZSM-5 can be regarded as promising heterogeneous acid catalyst to improve the selectivity of desired monobenzylated product in aromatic benzylation and has potential application for chemical and pharmaceutical industry.

KEYWORDS: Benzylation; Acetic acid; Benzyl alcohol; Benzyl acetate; Micro/Meso-HZSM-5.

MICROBIAL FUEL CELLS

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Abstract: Microbial fuel cells (MFCs) offer a novel method for treating wastewaters and simultaneously producing electricity. A microbial fuel cell (MFC) is essentially a bioreactor that converts chemical energy present in the chemical bonds in organic compounds to electrical energy by means of catalytic reactions of microorganisms under anaerobic conditions. It has been known for many years that it is possible to generate electricity directly by utilising bacteria to break down organic substrates. The impending energy crisis has revived interests in MFCs among researchers as a means to generate electric power or hydrogen from biomass with a carbon neutral process. Along with this application, MFCs can also be used in wastewater treatment facilities to break down organic matters. They have also been studied for applications as biosensors such as sensors for biological oxygen demand monitoring. In this paper, an extensive review of microbial fuel cells has been performed along with their applications and

limitations. The results of the experiments performed on a dual chamber microbial fuel cell used to treat dairy water have also been included in this paper.

Keywords: Anaerobic, Energy Crisis, Fuel Cells, Wastewater Treatment,

INDUSTRIAL WASTEWATER TREATMENT USING HYBRID TECHNIQUES

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Recent development in sonochemistry have led use to study its use to treat water and wastewater. The effect of ultrasound wave in hydrophilic chemical oxidation is mainly due to hydroxyl radical production during the cavitation induced water decomposition. Objective of this work is to evaluate the efficiency of sonochemical effect with combination of ultrasound with ozonation and sonocatalysis. In the present work we optimize the power intensity and operating parameter, the concentration of copper oxide catalyst for sonocatalysis and Ozonation at various concentration of CuO catalyst on real industrial wastewater. In all cases the degradation in terms of COD reduction increases with increase in catalyst loading and reaches its optimum range. Beyond this optimum, the degradation slows down and thereafter even decreases because higher concentration of the suspended particles may also disturb the transmission of ultrasound in water medium. The experimental results showed that the optimum conditions were obtained for pH 3 and catalyst loading 0.5 gm/lit. It was observed that less energy consumption when we combine three systems together. For the US/O₃/CuO combined system we found the COD reduction to be 75.6%.

Keywords: ultrasound, ozonation, sonocatalysis.

IDP PROBLEMS

Problem 1

In a specific reaction system continuous exothermic reaction takes place between Ethylene, Hydrogen & Butene-1 with partial pressures of 7, 5.6 & 0.6 Kg/cm² respectively to obtain a desired product (it is important to maintain these partial pressures to get the desired product). Pentane and Nitrogen are also continuously injected in the reaction system along with the other reactants, both works as inert in the reaction system. Pentane is used to remove the Heat of reaction and Nitrogen is used to maintain the total pressure of the Reaction system. The Total Pressure & Temperature of reaction system is to be maintained at about 21.5 Kg/cm² & 85°C to get the desired product.

The product formed in the reaction system is a solid material which, is withdrawn in a vessel having Pressure of 0.5 Kg/cm² and Temperature 67°C. Due to the pressure differential between the Reaction system and Withdrawal vessel some of the Process Gas (containing Ethylene, Hydrogen, Butene-1, Pentane& Nitrogen) also gets carried away with the product. Further Process gas is removed from the product and is removed from the top of the vessel and is recycled back to the Reaction system.

Recycled Process gas on its way to the reaction system (Flow rate of 4800 Kg/hr) passes through Cooler 1, First reciprocating compressor, Cooler 2 and then through the Second Reciprocating compressor.

First compressor compresses the gas to 3.5 Kg/cm².

Second Compressor compresses it to 24 Kg/cm².

In order to run the recycle process smoothly the Discharge Temperature of the First Compressor is to be maintained below 105°C to avoid failure of the compressor which can in turn affect the whole production Process.

Data for coolers

Cooling Fluid	Cooling Water
Flow	4500 Kg/hr
Differential Temperature	13°C

Molecular wt of Process gas is 33 kg.

Compression factor of First compressor is 1.4.

What will be the Probable ways which can avoid the failure of First reciprocating Compressor, without affecting the Production process and without replacing the equipments?

Note: 1.All the pressures are measured as Gauge Pressures.

2. Assume No heat losses in the Compressor.

3. All the Equipments in the Process are in healthy condition.

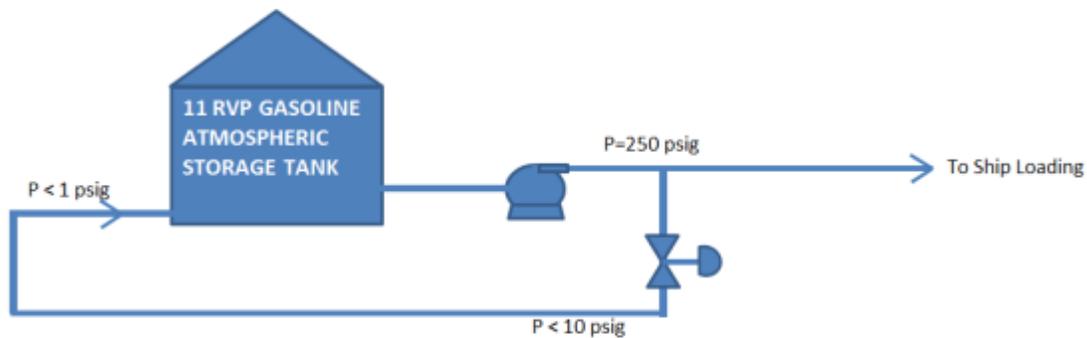
(Hint: 1. Assume Process gas to behave ideally for simplicity in calculation where ever it is necessary.
2. Simple Heat and Mass balance can fetch you to the solution).

Problem 2

In one of our process we are generating liquid waste called Sodium Sulphate solution. The rate of Sodium Sulphate generation is 1000 kg/hr having concentration of 8-10% (wt basis). We will be interested in getting cost effective solution to get this Sodium Sulphate converted in solid form.

Problem 3

A new pump was brought online to load out a ocean going vessel on the river, loading out gasoline with an RVP of 11 psia in an atmospheric storage tank. The rate was enormous and was designed to pump out gasoline to a ship at ~250 psig normal discharge pressure. Apparently there had been a problem and a leak and a fire broke out at some point. Try and figure out why?



On the discharge was a spill back / recycle valve (shown on PFD) to control flow back to the tank. If the ship stopped flow, then this valve would open to maintain a minimum flow on the pump either to allow mixing or keep the pump from dead-heading and potentially damaging the seals until Operations turned it off. The downstream pressure of the valve is minimal as the line returning to the tank was huge as well.

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SRNO	NAME OF THE EVENT	NAME OF THE STUDENTS	PRIZE	COLLEGE
1	WOLF OF WALL STREET	AJAY NIRMAL	1 ST	BVCOE
2	MOCK PLACEMENT	ADVAIT SWAMY	1 ST	BVCOE
3	SALT ACT	GANGAPRIYA KRISHNAKUMAR KUNAL JOGI	1 ST	BVCOE
4	INDUSTRY DEFINED PROBLEMS	SUSHMITA GAONKAR AMLA ADHIKARI	1 ST 2 ND	SSJCOE BVCOE
5	TECHNICAL PAPER PRESENTATION	RIGVED SAMANT ASHUTOSH KARKARE	1 ST 2 ND	GHARDA IT TSEC
6	COOLING TOWER DESIGN	KUNAL PATIL ROHIT GURAV	1 ST 2 ND	TSEC BVCOE
7	PROTOTYPE DESIGN	AKASH DESHMUKH AFROZE MARIKAYAR	1 ST 2 ND	DMCE BVCOE
8	TECHNICAL QUIZ (INQUIZITIVE)	DHAVAL CHANDAN	1 ST	DMCE
		TOTAL AMOUNT (PRIZE)		

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