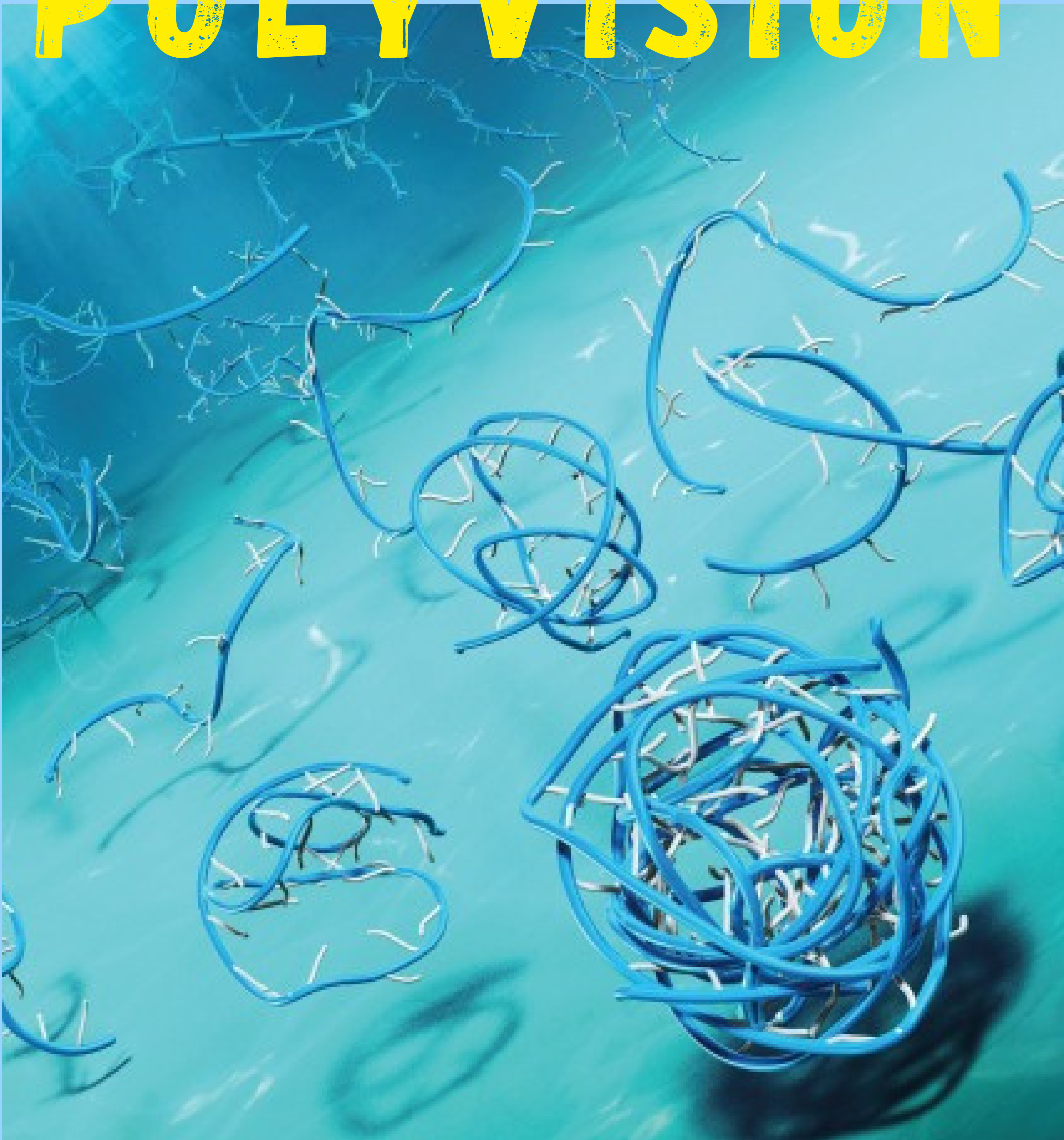
MAHARASHTRA INSTITUE OF TECHNOLOGY CHH. SAMBHAJINAGAR

(AN AUTONOMOUS INSTITUTE)

DEPARTMENT OF PLASTIC AND POLYMER ENGINEERING

POLYVISION



HOD's Message

Dr. Suranjana Mandal

Associate Professor and HoD

It is a great pleasure that our Department of Plastic and Polymer Engineering is releasing Issue VII of “POLYVISION”, for the academic year 2023-24 to explore the creative ideas and activities of our students. In an era of digitization and e-learning, it is apt to go digital to express our views on different socio-economic, political or cultural issues. It is an active platform for both staff and students to share information, latest technical knowledge and imaginations in all dimensions. This magazine would not have been possible without the enthusiasm and hard work of all student participants, editorial board members and all faculty members. I register my sincere appreciation to the students and editorial team for their timely effort to bring this issue to the magazine. I wish all the staff members and students for success in their future endeavours.

EDITORIAL MESSAGE

Dr. Saurabh Tayde
Assistant Professor

It gives us immense pleasure and satisfaction to introduce our fourth issue of 'E-POLYVISION' Magazine for the academic session 2023-24. So this time we have attempted to bring out the talent concealed within our student community, which would help to enhance the practical value of Plastic and Polymer Engineering. This issue includes informative technical as well as non-technical articles and many other things. Plastic and Polymers have given the speed and flexibility to humans to perform their day-to-day tasks. I express my happiness towards the steps taken by the Institute and the Department in strengthening.

Engineering and Technology through such a type of activity. We hope you will enjoy reading this issue as much as we have enjoyed while making it. I thank my editorial team, technical team, authors and well-wishers, who are promoting this magazine and making it informative.

STUDENT ISSUE EDITORS

SIDDESH NIRMAL
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VAIBHAVI GOSAVI
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RUDARAYANI KHADSE
(SYPPE)

YAMIN SHEIKH
(SYPPE)

Dear readers in your hand you have “**POLYVISON**” official E-magazine, Vol. 7. The Magazine plays an essential part in where the hidden talents of the students as well as faculty members are exposed. It is a time of Thanksgiving to our almighty for his abundant blessings and for leading the college to come thus far. It is also a time of retrospection, to appreciate the good things and resolve to do better. We thank the College Committee Board for giving me the opportunity to send this greeting and wish the publication a grand success.

MIT-Centre for Industry Relevance in Polymer Science and Technology (M-CIP)

TEAM M-CIP

Objectives

- Establish Training Centre for all Plastic manufacturing processes.
- Provide maximum facility to new comers in advanced industrial research and innovation.
- Provide support to the industry to student & industrial people.

Features of MCIP

- Skill Development
- Mould Testing
- Trial Runs
- Industrial Consultancy
- Material Testing In-
- Plant for Student

Student of B.Tech PPE learning Mould change in MCIP

TRAINING PROGRAMS @ M-CIP

FULL TIME PROGRAM

- Plastic molding supervisor
- Plastic molding operator/ technician
- Plastic molding helper
- Duration:2 to 6 months

SPECIALIZED SHORT TERM COURSE

- Injection machine operator
- Stretch blow machine operator
- Roto molding machine operator
- Industrial safety
- 3D Printing Technology
- Duration:7 to 30 days

OTHER TRAINING PROGRAMS

Other than above mentioned training programs, M-CIP can develop tailor made training programs as per the requirement of industries

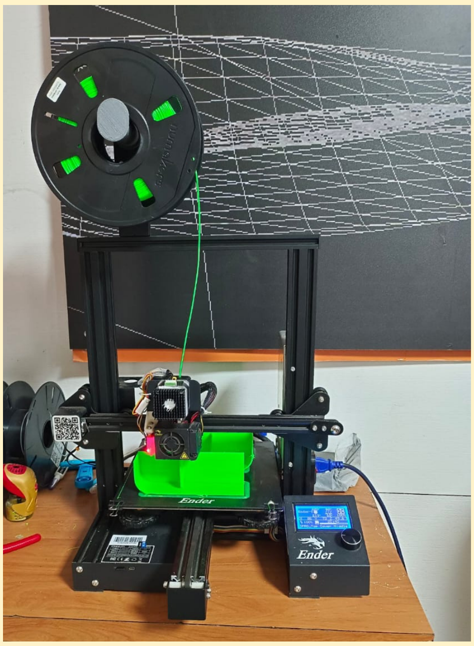
EQUIPMENTS @ MCIP

INJECTION MACHINE

Injection moulding machine moulds can be fastened in either a horizontal or vertical position. The majority of machines are horizontally oriented, but vertical machines are used in some niche applications such as insert moulding, allowing the machine to take advantage of gravity. Some vertical machines also do not require the mould to be fastened. There are many ways to fasten the tools to the platens, the most common being manual clamps (both halves are bolted to the platens).

ROTATION MOULDING M/C

Rotational moulding machines are made in a wide range of sizes. They normally consist of moulds, an oven, a cooling chamber, and mould spindles. The spindles are mounted on a rotating axis, which provides a uniform coating of the plastic inside each mould. Moulds (or tooling) are fabricated either from welded sheet steel or from cast. The fabrication method is often driven by part size and complexity; most intricate parts are likely made out of cast tooling.



3D Printing

3D printing, or additive manufacturing, is the construction of a three-dimensional object from a CAD model or a digital 3D model. The term “3D printing” can refer to a variety of processes in which material is deposited, joined or solidified under computer control to create a three-dimensional object, with material being added together (such as liquid molecules or powder grains being fused together), typically layer by layer.

M-CIP PLASTIC RECYLING UNIT

"OFTEN WHEN YOU THINK YOU'RE AT THE END OF SOMETHING, YOU'RE AT THE BEGINNING OF SOMETHING ELSE."

We at MIT strongly believe in this and hence to reduce the wastage done by the processing units at MCIP a recycling plant has been put in place to keep a check on the amount of waste discarded

EXTRUSION PLANT M-CIP RECYCLING SECTION

HIGH SPEED MIXER M-CIP RECYCLING SECTION

MIT-CENTRE FOR ADVANCED MATERIALS RESEARCH AND TECHNOLOGY LAB (M-CAMRT)

FACILITES AT MCAMRT

Processing

- Two roll mill
- Compression Moulding
- Single screw extruder
- Muffle furnace
- Vacuum furnace

Sample Preparation and Testing

- Ultrasonicator
- Notch cutter
- Tensile test specimen
- Universal tensile testing Machine
- Hardness tester
- Mooney viscometer tester

Characterization

- FTIR
- UV-Vis spectrophotometer
- Differential scanning
- Calorimeter
- Thermogravimetric Analyser
- Dynamic light scattering

OUR PRIORITIES

OBJECTIVES

- Facilitate
- Support
- Solve
- Develop Skills

SERVICES

- Training & Testing
- Research
- Safety Management
- Consultancy
- Customer Satisfaction

ISO CERTIFICATION

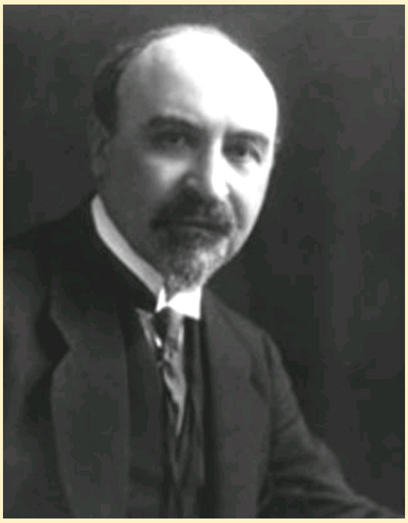
We at MIT believe in quality and what's better than an ISO certification to prove it.

ISO 9001:2015 Certification to M-CAMRT & M-CIP

STUDENTS SECTION

THE RENOWNED POLYMER SCIENTIST

Leo Hendrik Baekeland



Leo Hendrik Baekeland HonFRSE (November 14, 1863 – February 23, 1944) was a Belgian chemist. He is best known for the inventions of Velox photographic paper in 1893, and Bakelite in 1907. He has been called "The Father of the Plastics Industry" for his invention of Bakelite, an inexpensive, nonflammable and versatile plastic, which marked the beginning of the modern plastics industry. Leo Baekeland was born in Ghent, Belgium, on November 14, 1863, the son of a cobbler, Charles Baekeland, and a house maid, Rosalia Merchie. His siblings were: Elodia Maria Baekeland; Melonia Leonia Baekeland; Edmundus Baekeland; Rachel Helena Baekeland and Delphina Baekeland.

He told The Literary Digest: "The name is a Dutch word meaning 'Land of Beacons.'" He spent much of his early life in Ghent, Belgium. Proudly, he graduated with honours from the Ghent Municipal Technical School and was awarded a scholarship by the City of Ghent to study chemistry at the Ghent University, which he entered in 1880.

He acquired a PhD maxima cum laude at the age of 21. After a brief appointment as Professor of Physics and Chemistry at the Government Higher Normal School in Bruges (1887–1889), he was appointed associate professor of chemistry at Ghent University in 1889. Having been successful with Velox, Baekeland set out to find another promising area for chemical development. As he had done with Velox, he looked for a problem that offered "the best chance for the quickest possible results". Asked why he entered the field of synthetic resins, Baekeland answered that his intention was to make money. By the 1900s, chemists had begun to recognize that many of the natural resins and fibers were polymeric, a term introduced in 1833 by Jöns Jacob Berzelius. Adolf von Baeyer had experimented with phenols and formaldehydes in 1872, particularly Pyrogallol and benzaldehyde. He created a "black guck" which he considered useless and irrelevant to his search for synthetic dyes. Baeyer's student, Werner Kleeberg, experimented with phenol and formaldehyde in 1891, but as Baekeland noted "could not crystallize this mess, nor purify it to constant composition, nor in fact do anything with it once produced".
Baekeland began to investigate the reactions of phenol and formaldehyde.

He familiarized himself with previous work and approached the field systematically, carefully controlling and examining the effects of temperature, pressure, and the types and proportions of materials used.

The first application that appeared promising was the development of a synthetic replacement for shellac (made from the secretion of lac beetles). Baekeland produced a soluble phenol-formaldehyde shellac called "Novolak" but concluded that its properties were inferior.

It never became a big market success, but is still used to this day (e. g. as a photoresist).

Baekeland continued to explore possible combinations of phenol and formaldehyde, intrigued by the possibility that such materials could be used in molding. By controlling the pressure and temperature applied to phenol and formaldehyde, he produced his dreamed-of hard moldable plastic: Bakelite. Bakelite was made from phenol, then known as carbolic acid, and formaldehyde. The chemical name of Bakelite is polyoxybenzylmethylenglycolanhydride. In compression molding, the resin is generally combined with fillers such as wood or asbestos, before pressing it directly into the final shape of the product.

Baekeland's process patent for making insoluble products of phenol and formaldehyde was filed in July 1907, and granted on December 7, 1909. In February 1909, Baekeland officially announced his achievement at a meeting of the New York section of the American Chemical Society.In 1917, Baekeland became a professor by special appointment at Columbia University.

John Wesley Hyatt

John Wesley Hyatt (November 28, 1837 – May 10, 1920) was an American inventor. He is mainly known for simplifying the production of celluloid. Hyatt, a Perkin Medal recipient, is included in the National Inventors Hall of Fame. He had nearly 238 patents to his credit, including improvements to sugar cane mills and water filtration devices.

Hyatt was born in Starkey, New York, and began working as a printer when he was 16. Later, he invented plastic, receiving several hundred patents. Among the most well-known of his inventions was that of a substitute for ivory to produce billiard balls. An award of $10,000 had been instituted by Michael Phelan in 1863 due to the cost of ivory and concerns on its shortage.

Aided by his brother Isaiah, Hyatt experimented with Parkesine, a hardened form of nitrocellulose.Parkesine had been invented by the Englishman Alexander Parkes in 1862, and is considered the first true plastic, although it was not a success as a commercial or industrial product. Liquid nitrocellulose, or collodion, had been used as early as 1851 by another English inventor, Frederick Scott Archer, in photographic applications; it had also been used extensively as a quick-drying film to protect the fingertips of printers. Hyatt's eventual result was a commercially viable way of producing solid, stable nitrocellulose, which he patented in the United States in 1869 as "Celluloid" (US patent 50359; now a genericized trademark)In 1870 Hyatt formed the Albany Dental Plate Company to produce, among other things, billiard balls, false teeth, and piano keys, Hyatt's Celluloid Manufacturing Company was established in Albany, New York in 1872 and moved to Newark, New Jersey in 1873.

Hyatt's celluloid discovery went into court in a patent dispute with English inventor, Daniel Spill, who had patented essentially the same compound in the UK as "Xylonite". Spill and Hyatt clashed in court between 1877 and 1884. The eventual decision was that the true inventor of celluloid was Parkes, but that all manufacturing of celluloid could continue, including Hyatt's.

Hyatt's other patented inventions include the first injection moulding machine, sugarcane milling, juice extraction, roller bearings, and a multiple-stitch sewing machine. Hyatt was inducted into the Plastics Hall of Fame in 1974.

John Wesley Hyatt founded the Hyatt Roller Bearing Company in 1892 in Harrison, New Jersey. The company's customers included General Motors and the Ford Motor Company. In 1895 he hired Alfred P. Sloan, son of a major investor in the company, as a draftsman. In 1905 he made Sloan president. The company was sold to General Motors in 1916, and Sloan went on to become president of GM.

Impact Of Plastic Packaging On Food Safety And Preservation

YAMIN
(SYPPE)

Did you know the plastic and polymer materials have revolutionized various industries? They offer countless benefits such as durability, flexibility, and affordability.

They have a greatly impacted fields like packaging, construction, and healthcare. It's fascinating how such materials have transformed our everyday lives! Plastic packaging plays a major role in preventing food spoilage and extending its shelf life. By providing an airtight seal, plastic packaging helps create a barrier that keeps out bacteria, mold, and other harmful microorganisms. This helps maintain the freshness and quality of the food for a longer period. Plastic packaging also offers protection against temperature fluctuation, helping to preserve the food's taste, texture, and nutritional value. It's amazing how something as simple as plastic packaging can have such a positive impact on food safety and preservation.

Plastic packaging plays a crucial role in ensuring food safety and preservation. It helps create a protective barrier that safeguards food from contamination, moisture, and air exposure. This extends the shelf life of perishable items, reduces food waste, and maintains freshness. Plastic packaging is lightweight, easily sealable, and customizable, making it suitable for a wide range of food products. Its use in food packaging has significantly contributed to ensuring food safety standards and preventing foodbore illness.

Plastic packaging is a superhero in the world of food safety and preservation! It shields our food from harm, keeps it fresh and delicious, and reduces waste. With its protective barrier and customizable features, plastic packaging ensures that our food stays safe and reaches us in top-notch condition. So let'sgive a big round of applause to plastic packaging for its vital role in keeping our food secure and tasty!

Conductive Composites

HITESH PATIL
(TYPPE)

Conductive Composites are combination of Non Conductive Matrix material and Conductive Reinforcement material. In which matrix material consist of polymer such as High Density Polyethylene (HDPE), Polypropylene, etc. and resins such as Polyester , Epoxy, etc. reinforcement material consist of conducting fillers such as Carbon Fiber, Carbon Nanotube (CNT) ,etc.

There are three ways by which Conductive Composites are prepared :

1. Addition of Conducting Fillers: In this method Conductive Fillers are added in polymer to increase its Electrical Conductivity such as Carbon Fiber, Carbon Nanotubes (CNT), etc.

Fig. Preparation of Conductive Composite

2. Use Conductive Polymer as a matrix material: In this method we add Conductive Polymer as a matrix material such as Polypyrolene , Poltyaneline, etc.

3. Use Metal Powder as a reinforcement material: In this method we add metal powder as a reinforcement material such as Aluminium Powder, Copper powder, etc. to inhance the electrical conductivity of Polymers.

Applications of Conductive Composites:

Due to its Electrical Conductivity of Conductive Composites they found application in Electronics applications such as:
1.Electrochemical Sensors
2.Energy Storage Devices
3.Solar Cells
4.Biosensors
5.Electronic Devices

WHO SAYS NO TO PLASTIC…!

Who says no to plastic,
As it is fantastic…..
Less steel, glass and wood too expensive these days,
Plastic cars replace art now a days.
Still who says no to plastic!

Who says no to plastic,
As it is elastic
What if the sutures, bags and tubing are of metal,
As plastic doing its job better.
Still who says no to plastic!

Who says no to plastic,
As it feels us enthusiastic…
Thousands of crores annually,
Contributes the plastic Industry.
Still who say no to plastic!

Yes they say no to plastic,
Cause the way they use is barbaric…
Follow Reduce, Reuse, Recycle
And say yes to plastic!

- Rudrayani Khadse
(PPE 2nd Year)

PHOTO GALLERY

Felicitation Of Topper by Dr. Ashtaputre Award

PHOTO GALLERY

Induction Program of Direct Second Year students

PHOTO GALLERY

Social Activity Club Social Work

PHOTO GALLERY

Expert Talk on Training & Placement

PHOTO GALLERY

Expert Talk on Digitalization in Polymer

PHOTO GALLERY

Expert Talk on Total quality management (TQM)

PHOTO GALLERY

Expert Talk on Total productive maintenance (TPM)

Maharashtra Institute of Technology Chh. Sambhaji Nagar

(An Autonomous Institute)

MIT™ Quest for Excellence

Plastic & Polymer Engineering Department

Our Recent Placement 2023

Amit Rahangdale
Reliance Industries Ltd., Mumbai
CTC : 7.5 LPA

Tirth Deokar
Reliance Industries Ltd., Mumbai
CTC : 7.5 LPA

Gaurav Kasar
Reliance Industries Ltd., Mumbai
CTC : 7.5 LPA

Nirmay Raibaghkar
Supreme Petrochem Ltd. Mumbai
CTC : 5 LPA

Chintan Jadhav
Supreme Petrochem Ltd. Mumba
CTC : 5 LPA

Pravin Neharkar
Supreme Petrochem Ltd. Mumbai
CTC : 5 LPA

Yash Walla
Godrej & Boyce Mfg. Co. Ltd., Mumbai
CTC : 4.32 LPA

Namdev Warangule
Godrej & Boyce Mfg. Co. Ltd, Mumbai
CTC : 4.32 LPA

Rushikesh Kumawat
Mahindra CIE Ltd. Pune
CTC : 4.2 LPA

Prathamesh Khairnar
Mahindra CIE Ltd. Pune
CTC : 4.2 LPA

Sachin Dheple
A Raymond Fasteners India Pvt. Ltd.
CTC : 4 LPA

Komal Khandare
Oriental Rubber Industries Ltd., Pune
CTC : 3.5 LPA

Pranav Patil
Oriental Rubber Industries Ltd., Pune
CTC : 3.5 LPA

Ram Sakhare
Jabil India Mfg. Pvt Ltd, Pune
CTC : 3.5 LPA

Akash Mundhe
Varroc Polymer Pvt. Ltd.
Chh. Sambhajinagar
CTC : 3.5 LPA

Shivaji Jaybhaye
Cosmoplast India Pvt Ltd, Chh. Sambhajinagar
CTC : 3 LPA

Muzakkir Ambekar
Cosmoplast India Pvt Ltd, Chh. Sambhajinagar
CTC : 3 LPA

Zamir Shaikh
Cosmoplast India Pvt Ltd, Chh. Sambhajinagar
CTC : 3 LPA

Atharv Jamwadikar
All Time Plastics, Silvassa
CTC : 2.6 LPA

Vinayak Kajrekar
All Time Plastics, Silvassa
CTC : 2.6 LPA

Congratulations ....!

GATE CORNER

Polymer Science and Engineering (XE-F)

Section 1: Chemistry of high polymers

Monomers, functionality, degree of polymerizations, classification of polymers, glass transition, melting transition, criteria for rubberiness, polymerization methods: addition and condensation; their kinetics, metallocene polymers and other newer methods of polymerization, copolymerization, monomer reactivity ratios and its significance, kinetics, different copolymers, random, alternating, azeotropic copolymerization, block and graft copolymers, techniques for polymerization-bulk, solution, suspension, emulsion. Concept of intermolecular order (morphology) – amorphous, crystalline, orientation states. Factor affecting crystallinity. Crystalline transition. Effect of morphology on polymer properties.

Section 2: Polymer Characterization

Solubility and swelling, Concept of molecular weight distribution and its significance, concept of average molecular weight, determination of number average, weight average, viscosity average and Z-average molecular weights, polymer crystallinity, analysis of polymers using IR, XRD, thermal (DSC, DMTA, TGA), microscopic (optical and electronic) techniques, Molecular wt. distribution: Broad and Narrow, GPC, mooney viscosity.

Section 3: Synthesis, manufacturing and properties

Commodity and general purpose thermoplastics: PE, PP, PS, PVC, Polyesters, Acrylic, PU polymers. Engineering Plastics: Nylon, PC, PBT, PSU, PPO, ABS, Fluoropolymers Thermosetting polymers: Polyurethane, PF, MF, UF, Epoxy, Unsaturated polyester, Alkyds. Natural and synthetic rubbers: Recovery of NR hydrocarbon from latex; SBR, Nitrile, CR, CSM, EPDM, IIR, BR, Silicone, TPE, Speciality plastics: PEK, PEEK, PPS, PSU, PES etc. Biopolymers such as PLA, PHA/PHB.

GATE CORNER

Section 4: Polymer blends and composites

Difference between blends and composites, their significance, choice of polymers for blending, blend miscibility-miscible and immiscible blends, thermodynamics, phase morphology, polymer alloys, polymer eutectics, plastic-plastic, rubber-plastic and rubber-rubber blends, FRP, particulate, long and short fibre reinforced composites. Polymer reinforcement, reinforcing fibres – natural and synthetic, base polymer for reinforcement (unsaturated polyester), ingredients / recipes for reinforced polymer composite.

Section 5: Polymer Technology

Polymer compounding-need and significance, different compounding ingredients for rubber and plastics (Antioxidants, Light stabilizers, UV stabilizers, Lubricants, Processing aids, Impact modifiers, Flame retardant, antistatic agents. PVC stabilizers and Plasticizers) and their function, use of carbon black, polymer mixing equipment, cross-linking and vulcanization, vulcanization kinetics.

Section 6: Polymer rheology

Flow of Newtonian and non-Newtonian fluids, different flow equations, dependence of shear modulus on temperature, molecular/segmental deformations at different zones and transitions. Measurements of rheological parameters by capillary rotating, parallel plate, cone-plate rheometer. Visco-elasticity-creep and stress relaxations, mechanical models, control of rheological characteristics through compounding, rubber curing in parallel plate viscometer, ODR and MDR.

GATE CORNER

Section 7: Polymer processing

Compression molding, transfer molding, injection molding, blow molding, reaction injection molding, filament winding, SMC, BMC, DMC, extrusion, pultrusion, calendaring, rotational molding, thermoforming, powder coating, rubber processing in two-roll mill, internal mixer, Twin screw extruder.

Section 8: Polymer testing

Mechanical-static and dynamic tensile, flexural, compressive, abrasion, endurance, fatigue, hardness, tear, resilience, impact, toughness. Conductivity-thermal and electrical, dielectric constant, dissipation factor, power factor, electric resistance, surface resistivity, volume resistivity, swelling, ageing resistance, environmental stress cracking resistance, limiting oxygen index. Heat deflection temperature -Vicat softening temperature, Brittleness temperature, Glass transition temperature, Co-efficient of thermal expansion, Shrinkage, Flammability, dielectric constant, dissipation factor, power factor, Optical Properties – Refractive Index, Luminous Transmittance and Haze, Melt flow index.

Section 9: Polymer Recycling and Waste management

Polymer waste, and its impact on environment, Sources, Identification and Separation techniques, recycling classification, recycling of thermoplastics, thermosets and rubbers, applications of recycled materials. Life cycle assessment of polymer products (case studies like PET bottles, packaging bags).

APTITUDE QUESTIONS

1. Nylon-6 is manufactured from

1. caprolactam.
2. adipic acid and hexamethylene diamine.
3. maleic anhydride and hexamethylene diamine.
4. sebasic acid and hexamethylene diamine.

2. Caprolactam, a raw material for the manufacture of nylon-6, is produced from

1. phenol
2. naphthalene
3. benzene
4. pyridine

3. The monomer of polyvinyl chloride (PVC) is

1. chloroethene
2. ethylene dichloride
3. ethyl chloride
4. chloroform

4. Buna-S is also known as

1. Teflon
2. PTFE
3. SBR
4. polyacrylates

5. Neoprene is chemically known as

1. polybutadiene
2. styrene butadiene rubber (SBR)
3. polyurethane
4. poly chloroprene

6. Which of the following is the most important rubber compounding ingredient that is used to improve the wearing qualities of both natural rubber & and SBR by imparting toughness?

1. Phosphorous
2. Carbon black
3. Pine oil
4. Rosin

7. **____ is an addition polymer**

1. Nylon
2. Bakelite
3. Polythene
4. none of these

8. Branched chair polymers as compared to linear polymers have

1. higher melting points.
2. higher tensile strength.
3. lower density.
4. none of these.

9. Ion exchange resins are made of

1. Lucite
2. Sulfonated Bakelite
3. polystyrene
4. Teflon

10. Which of the following is not the commercial name of polymethylmethacrylate (PMMA)?

1. Perspex
2. Lucite
3. Plexiglass
4. Teflon

11. The density of low-density polythene is about ____ gm/c.c.

1. 0.38
2. 0.56
3. 0.81
4. 0.91

11. In step-growth polymerization, condensation occurs in a stepwise manner with or without the elimination of smaller molecules. An example of a step-growth polymerization product is

1. polyethylene
2. polybutadiene
3. PVC
4. polypropylene

12. Gutta percha rubber is

1. soft & and tacky at room temperature.
2. an isomer of natural rubber.
3. a thermosetting resin.
4. recovered by coagulation of rubber latex.

13. The major constituent of a laminate of safety glass, which holds the broken glass, pieces in their places during an accident (and thus minimizes the danger from flying glass fragments) is

1. polyvinyl alcohol
2. polyvinyl acetate
3. polyvinyl butyral
4. PVC

14. Identify the group in which all the polymers mentioned can be used to make fibers.

1. Butadiene copolymers, Polyamides, Urea aldehyde
2. Cellulose derivatives, Polyisoprene, Polyethylene
3. Cellulose derivatives, Polyamides, Polyurethane
4. Polypropylene, Poly vinyl chloride, Silicon

15. The molecular weights of plastics range from

1. 1000 to 5000
2. 5000 to 1000
3. 20000 to 25000
4. 109 to l011

16. Non-sulfonated hard bakelites are not used for making

1. ion-exchange resins
2. fountain pen barrels
3. formica table tops
4. combs

17. Which of the following is not present in bagasse fiber?

1. Cellulose
2. Lignin
3. Pentogens
4. None of these

18. Epoxy resin is

1. not used for surface coating.
2. a good abrasive.
3. an elastomer.
4. a polyester.

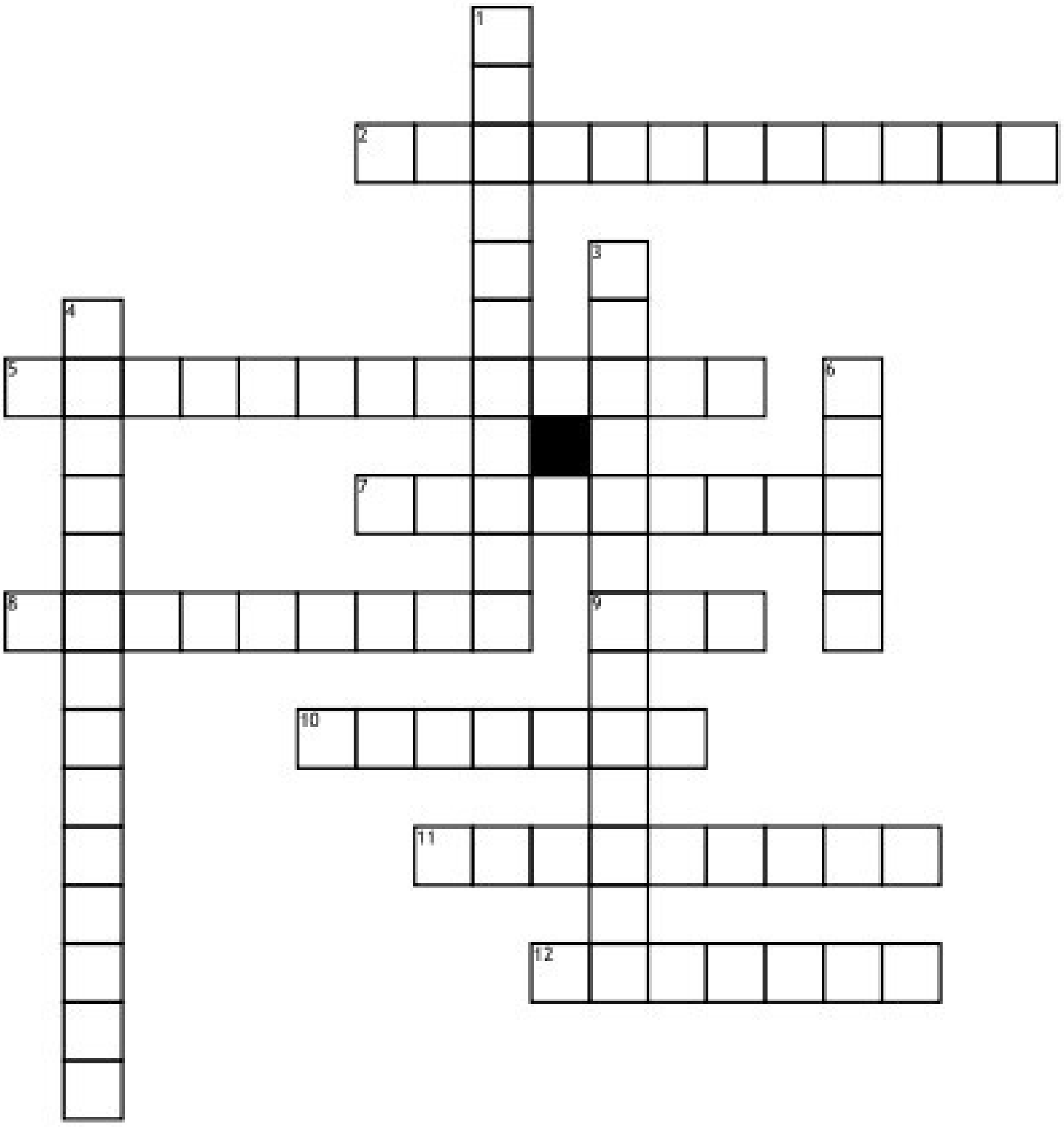
19. Rayon is a ____ fibre.

1. cellulosic
2. polyamide
3. polyester
4. natural

20. Diphenylamine is added to the rubber to

1. vulcanize it.
2. protect it from deterioration on exposure to air.
3. make it non-inflammable.
4. make it thermosetting.

POLYMERS CROSSWORD



Across

2. Items such as cling-film, sandwich bags, squeezable bottles, and plastic carrier bags are made from this easy to recycle plastic

5. Plastic bottle caps are often made from this plastic

7. ______________ plastics can only be heated and shaped once.

8. We can extract this type of plastic from Plants

9. Short for Polyvinyl Chloride

10. We can get this type of plastic from Insects

11. __________ plastics are chemically manufactured from Crude Oil

12. A common name for Polymethyl Methacrylate

Down

1. Disposable coffee cupsare normally made from this plastic

3. Type of plastic that can be softened when heated to form new shapes

4. The process of turing crude oil into plastics

6. We can sourse this type of plastic from some trees


YES
SAY ~~NO~~
TO PLASTIC