INDIAN RESINS MANUFACTURERS` ASSOCIATION

eNewsLetter
Edition: July 2023

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INDIAN RESINS MANUFACTURERS' ASSOCIATION

From The Editor's Desk

Dear Friends,

I am glad to inform you that this is the fourth edition of Irma e-Newsletter published under my editorship which will be of interest to you.

We are glad to share with you that IRMA Seminar on "Green Initiatives for Resin Industry" held on 8th & 9th July 2023 was a grand success with the support of our members, well-wishers and the industry in particular. The Chief Guest of our Seminar was Prof. Aniruddha Pandit, Vice Chancellor Institute of Chemical Technology. Under the Convenorship of well experienced IRMA Past President, Mr. Siddharth Shah and the Co-Convenorship of Mr. Manish Khandekar with the directions/stewardship of dynamic IRMA President, Mr. S. Mahadevan and the excellent team of IRMA made it a grand success. There were three technical session covering the subjects Green Epoxies for Sustainable Future, Chempart Eco Green Solutions for Resins & Solvents Based Paints, Coating Solutions, A leader for Sustainable Coatings under renewable solutions, Panel discussion on Challenges and Opportunities for Industries in Achieving Green and Sustainable Good. We had invited eminent, experienced and experts in their fields to deliver these lectures. There was also a motivational lecture, "Why Entrepreneurs Miss the Bus?. It was well received by the delegates More than 200 delegates attended the Seminar. All delegates appreciated the event and they want IRMA to conduct more such events.

On the occasion of Seminar IRMA felicitated and honoured two of our Past Presidents, Mr. Ashok Goklani and Dr. Prashant Samant by awarding them the "Lifetime Achievement Awards". The awardees gave an appreciation and emotive response.

Some of you must have seen the live broadcast of our Seminar through YouTube.

The present economic scenario is encouraging for the industry. We hope the industrial growth will increase and be profitable.

With all of your support and contribution I will make every effort to bring the magazine regularly with good and useful reading material. You are most welcome to give your suggestions to further upgrade IRMA e-Newsletter. We also request you all to give us articles on technical, commercial or any other subjects of educational value to our members.

HAPPY READING !

N. Kannan

From The President's Desk

S. Mahadevan
President

Greetings from IRMA,

On behalf of my team, I take privilege to thank the Industry for their support and the faith on my team in successful execution of our Biennial seminar Green initiatives for the Resin Industry on 8th and 9th June 2023 at Fariyas Lonavala. The Theme of the seminar was aptly coined looking at the current climate change and need to work towards a sustainable and cleaner Tomorrow. Sustainability is no longer about doing less harm. It is about doing more good and creating a better tomorrow for our next generation.

The event saw the highest number of participation in terms of delegates registered and rooms count in the history of IRMA. This goes to show the passion among members to be a part of our events and industry acceptance. With softening of raw materials prices, it will definitely bring cheer to the Industry. With the increasing pace of economic activities and the projected growth rate all across it will be good situation for all. A bountiful monsoon and the upcoming festival will definitely be a booster for demand. With India the shining jewel in the Global arena, it promises to be an exciting time for all.

A special thanks to my MC team for their support during my tenure as President and to our Executive secretary, Mr Kannan for successfully keeping the News Letter going.

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Wishing all a Successful and Festive Year ahead.

Regards,

S. Mahadevan
President

The Future of Comfort with Microencapsulated Temperature Management

Prajyot V. Dhawale, Devesh C. Sane, Akash B. Borkar
Institute of Chemical Technology, Mumbai

Introduction

CLIMATE change stands as a prominent global concern, prompting recognition and implementation of environmental solutions worldwide. As the world's third-largest greenhouse gas (GHG) emitter, excluding land use changes, India's contribution reached approximately 7% of global emissions between 2015 and 2020, totaling 22 billion tonnes of CO2e. India's trajectory indicates sustained growth and subsequent emissions[1]. The country's economic expansion has fostered a substantial demand for energy resources[2]. Throughout history, fossil fuels have been the bedrock of human energy consumption, fueling progress and fulfilling desires. Nonetheless, the finite nature of fossil fuel reserves and volatile pricing cast uncertainty on the continuity of energy supply. Moreover, the adverse environmental impact of conventional fossil fuels, through the release of pollutants and noxious gases into the atmosphere, cannot be underestimated[3]. Addressing the need for energy, resource scarcity, and environmental degradation, the exploration of sustainable renewable energy systems and management techniques emerges as a superior alternative to traditional energy generation methods. While novel energy sources are imperative, they sometimes lack optimal efficiency and are in a state of continuous development. Herein lies the significance of Energy Storage Systems (ESSs), which enhance efficiency, curtail energy consumption, and contribute to environmental preservation[4,5].

Thermal energy storage (TES)

Thermal energy storage systems employ a medium capable of retaining thermal energy, enabling the storage of energy for subsequent utilization[6]. The complete cycle of heat storage and release entails three phases: charging, storing, and discharging[7]. This mechanism effectively bridges the gap between energy generation and consumption, facilitating the accumulation of excess energy for later use. The Solar Thermal Energy Storage System (TES) is specifically designed to capture solar thermal energy during periods of solar abundance, such as peak sunlight hours, and subsequently employ this stored energy during off-peak hours and nighttime. The fluctuation of electricity consumption, particularly in regions with extreme temperatures, necessitates innovative solutions. TES systems strategically store thermal energy during periods of low demand and then release it during peak consumption hours, thereby mitigating the need for high-power consumption during those times.

By employing robust and adaptable energy storage methods, the inherent unpredictability and fluctuations associated with renewable energy sources can be effectively addressed. Nevertheless, rapid energy storage and retrieval remain among the most intricate challenges in this endeavor. These storage techniques can be categorized into sensible energy storage, latent energy storage, and chemical reaction energy storage, each offering distinct attributes. Sensible heat storage (SHS) hinges on the material's temperature-related properties, weight, and specific heat. This enables the capture and release of heat based on the material's temperature fluctuations. In latent heat storage (LHS), the process involves the absorption or release of latent heat during the phase transition of a material. The employed phase-change material (PCM) can manifest as solid-liquid, liquid-vapor, solid-vapor, or solid-solid, contingent on the specific phase transition being harnessed[8–10].

Phase change material (PCM)

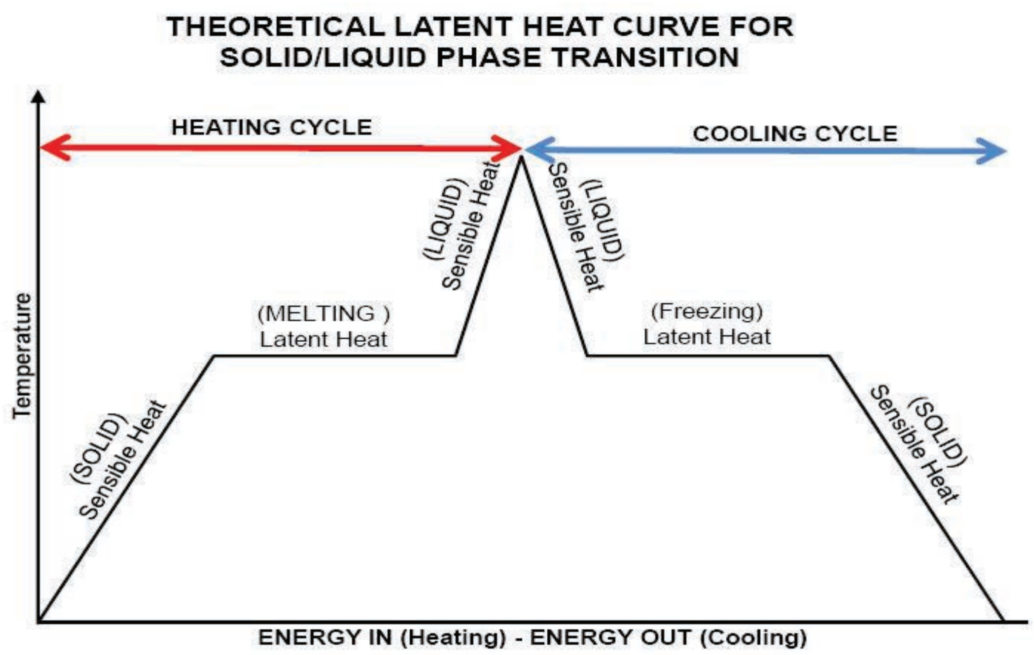

Fig.1: PCM heating curve

Phase Change Materials (PCMs) are substances with the unique ability to absorb and release a substantial amount of heat while maintaining a nearly constant temperature during phase

transitions. They have the capacity to store heat energy in both sensible and latent forms[11]. The visual representation illustrates how PCMs possess the capability to absorb or release heat without inducing significant fluctuations in temperature. This characteristic lends itself to applications that require temperature stabilization. An optimal temperature range for PCM utilization is around 20°C, during which PCMs can store approximately 3 to 4 times more heat per unit volume compared to the heat storage capacity of solids or liquids through sensible heat mechanisms[12,13].

Application of PCM

Phase Change Materials (PCMs) prove valuable in scenarios where there is a disparity between energy supply and demand. Various potential applications of PCMs have been explored by researchers such as K.A.R. Ismail et al [14], V. Chinnasamy et al [15], and Salyer et al[16], as indicated in the following instances.

- Cooling electronic equipment to prevent operation at excessively high temperatures.
- Predominantly, PCMs find application in the food industry for preservation cooling and transportation cooling purposes.

- Incorporation of PCMs in clothing, textiles, and accessories to enhance comfort in extreme hot and cold environments.
- Utilization of PCMs in photovoltaic cells and solar collectors to mitigate the occurrence of hot spots. Application of PCMs in thermal management systems.
- Enhancing the protection of data, cockpit voice recorders, and medical treatments in both hot and cold conditions.
- Integration of PCMs in vehicle cabins, batteries, and automotive engine cooling systems to achieve effective thermal control.
- Implementing PCMs in building designs for energy conservation.Composite foams can benefit from the integration of Phase Change Materials (PCM), specifically Microencapsulated PCM (MPCM).

Integrating Microencapsulated Phase Change Materials (MPCM) into polyurethane foam can yield a substantial enhancement in the foam's thermal insulating properties. This advancement holds considerable promise across various industrial sectors. For instance, within automotive interiors, the utilization of polyurethane foam infused with MPCM can yield superior thermal regulation. This, in turn, leads to elevated passenger comfort levels and heightened energy efficiency. Likewise, in the medical realm, the temperature modulation capabilities offered by MPCM-infused foam can be harnessed in products like mattresses and cushions. This ensures optimal patient comfort and effectively prevents overheating. The remarkable temperature- regulating capacity of composite foams enhanced with MPCM renders them applicable in an array of contexts, rendering them a valuable and versatile solution across diverse industries[17].

PCM in Coatings and Foams

Extensive literature has delved into Microencapsulated Phase Change Materials (MPCMs), focusing on their core compositions, fabrication techniques, and resultant properties. The microencapsulation process

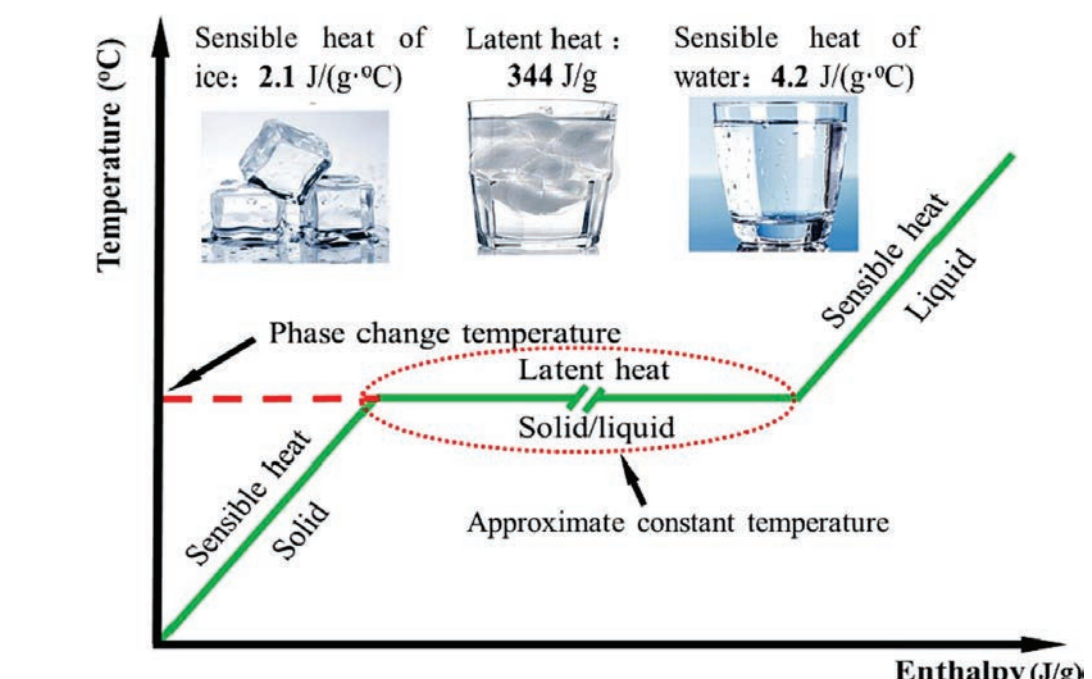

Fig. 2:Working principle of PCM

can be achieved through physical methods such as spray- drying[18,19], coating techniques[20], or chemical processes involving emulsion, coacervation, and gelatine interfacial polymerization[21–23][24,25]. Notably, a diverse spectrum of materials can be converted into shell materials for this purpose. Throughout microencapsulation procedures, formaldehyde resins, particularly those derived from urea and melamine, are frequently employed[26–32]. The methodology used for fabrication, including the utilization of electrospinning setups and apparatus, plays a pivotal role in shaping the desired morphologies and structures of electrospun fibers[33,34]. In the case of producing Porous Composite Fibers (PCFs), as depicted in the diagram (FIG.), three distinct electrospinning configurations are employed: uniaxial electrospinning[35], solution-solution electrospinning[30], and compound-jet electrospinning[36], wherein multifluid compounds are introduced into the process.

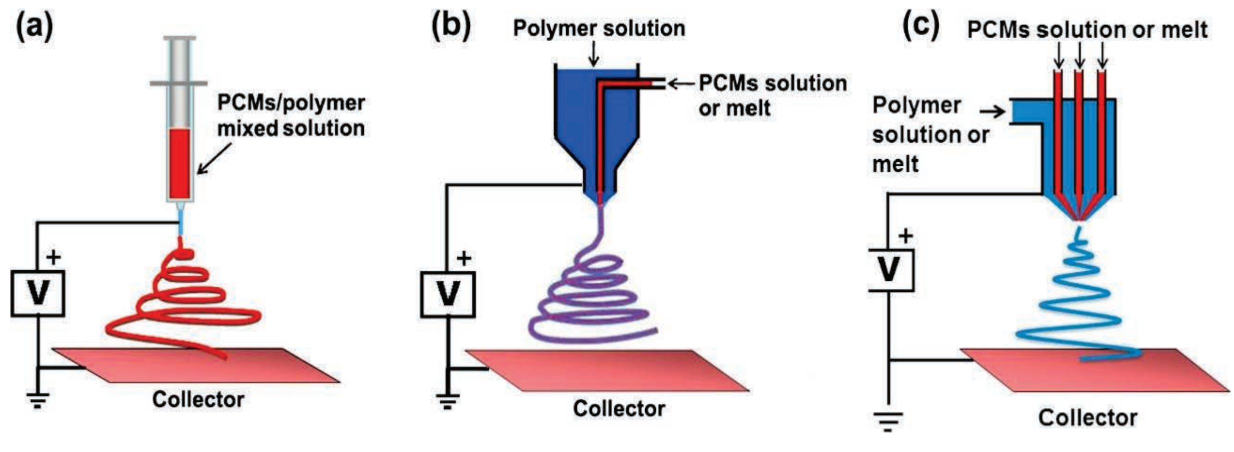

Fig 3: Electrospinning based nano fiber

Conversely, there remains a dearth of comprehensive studies concerning coatings embedded with Phase Change Materials (PCMs), designed to lower internal maximum temperatures and thereby reduce energy demands on buildings' HVAC systems. A recent investigation, for instance, involved the creation of micro-sized PCMs using melamine shells and paraffin cores, with an average diameter of 30 μm. Independently synthesized micro PCMs and UV-curable polyurethane acrylate (PUA) coatings were subsequently combined to function as an energy- storing and heat-insulating coating[37]. Another study juxtaposed an MPCM/hydrophilic paint composite with an MPCM/hydrophobic paint composite to determine the optimal paint composition for reducing peak indoor temperatures[38].

In a separate research endeavor, a regulated indoor temperature was achieved through the utilization of microencapsulated PCM, in the form of PCM-infused tiles utilized as roof finishing material. Experiments were conducted within a simulated environment that emulated real-world summer and winter conditions. The findings demonstrated that PCM-doped tiles effectively lower surface temperatures while concurrently maintaining a cooler chamber temperature under warm climatic conditions, while cool paints maintain a lower surface temperature but permit the chamber temperature to remain higher[39]].

Notably, previous research, to the best of the authors' knowledge, has not extensively covered the synthesis, characterization, and practical applications of coatings embedded with Microencapsulated Phase Change Materials (MPCMs). The literature also offers limited insights into ornamental coatings involving in-situ emulsion polymerization with dispersed MPCMs. Additionally, there is a scarcity of papers where

MPCMs-embedded paint composites are fabricated and subjected to real-world conditions to regulate indoor temperatures to desired levels.

Bio-PCM, its advantages, and working principle

The majority of Phase Change Materials (PCMs) are derived from paraffin-based compounds, which are highly flammable, posing challenges for their application in buildings[40]. However, a novel bio-derived organic PCM, referred to as Bio-PCM, has been developed recently. This innovative PCM is composed of a non-toxic and nutritionally inert fatty ester derived from rapidly renewable plants. This bio-based composition enhances safety by mitigating the hazards associated with traditional PCMs. Extensive research has been conducted on the effective synthesis and application of bio-based PCMs, encompassing approaches such as protein-derived sources[41], modified coconut oil[42], underutilized coconut fat feedstock[43], and vacuum-infused boron nitride[44]. Remarkably, the melting point of Bio-PCM can be adjusted within a range of -22.7°C to 78.33°C (73°F to +173°F), rendering it suitable for diverse climatic conditions. The operational concept of PCM is illustrated in the accompanying figure (fig.).

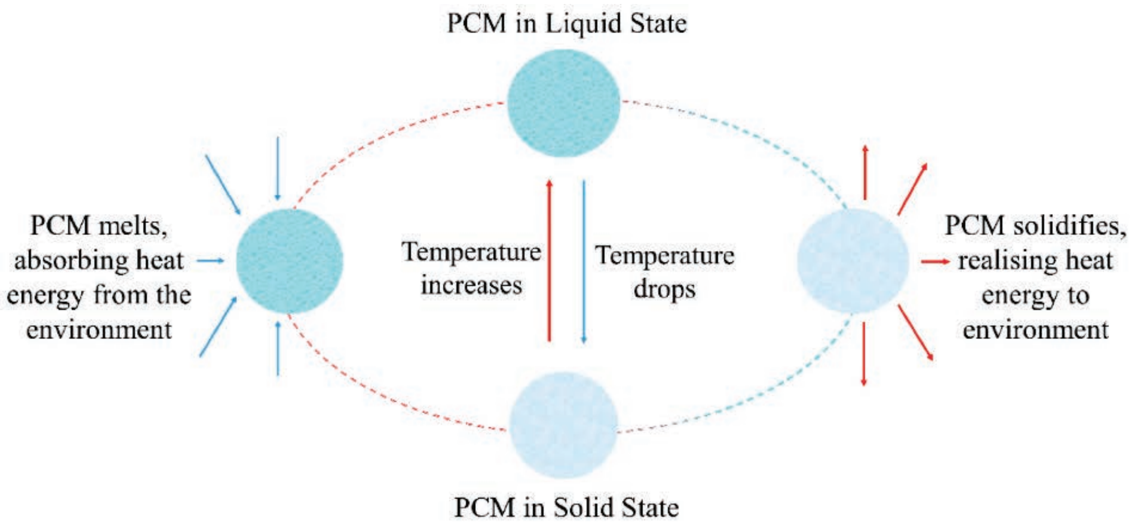

Fig. 4: The working principal of PCM

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EVENTS

IRMA Seminar on Green Initiatives for Resin Industry

Lighting of the traditional lamp

THE Indian Resin Manufacturers Association(IRMA) held it traditional annual seminar on Green Initiatives for Resin Industry at Hotel Fariyas, Lonavala on 8-9th June 2023. The chief guest on the occasion was Prof Dr A B Pandit, Vice Chancellor Insititute of Chemical Technology. The event started by invoking the blessing of Lord Ganesha with a vandana followed by the ceremonial lamp lighting by the dignitaries.

Convener, Mr Siddharth Shah, Macro Polymers welcoming the guests and delegates gave an insight into the selection of the theme - "Green Initiatives for Resin Industry" which is in tandem with the current global initiatives taken by various countries including India and the industry to reduce carbon footprints globally and which will help the future generations to have better and less polluting environment. He further said “We have tried our best to structure topics related to the theme and the rich content presented by well-known and experienced speakers on this subject will bring lot of knowledge and offer us better initiatives on how to drive our businesses towards greener goals. The idea is to have knowledge sharing for everyone from technical, regulatory and commercial aspects of business. This event is being held after four long years due to pandemic situation in between, a situation which was undesirable but also gave all of us more learnings and insights on various aspects of life and business.

Siddharth Shah

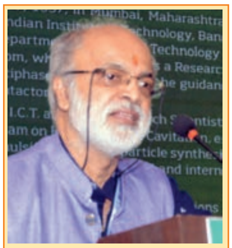
Co convener, Mr Manish Khandekar, REDA Chemicals India in his speech stressed on the importance of sustainability and the focus on green chemicals and initiatives which has gained importance both at the govt level and the industry level. With these ideas in mind they had structured the program with the selection of speakers and topics, he said.

Manish Khandekar

Inaugural session

The CS President Mr S.Mahadevan, Metcon Coatings & Chemicals welcoming the participants spoke about the association, its history to its present day activities. He thanked the supporters who had overwhelming this initiatives. He gave a gist of the activities of IRMA and spoke of the commitment of IRMA to support all activities tha promote sustainability in the industry. He also thanked the delegates for attending in huge numbers and creating new records in terms of participants.

S.Mahadevan



Prof Aniruddha Pandit

The Chief Guest: Prof Aniruddha Pandit, in his address, he recalled his experiences with the industry and remarked many a times the problems can be solved not technically but with proper HR policies to increase productivity and efficiency. He also recalled the journey of designing courses for the Resin plant operators. In keeping with the theme, he remarked that to large extent alkyds are green in their origins and manufacture and asked the manufacturers to explore the use of CNSL, lignin and methanol which would help in greening the industries. Water footprint, Carbon footprint in terms of energy consumption and sustainable raw material availability should be the key drivers for this journey into sustainability of the resin industry, he said.

Release of the Souvenir

Later the Souvenir specially brought on the occasion was released by the chief guest and other dignitaries.

As is the tradition two life time achievement awards were bestowed upon Mr. Ashok Gokhlani &

Life time achievement award to Ashok Gokhlani

Life time achievement award to Prashant Samant

Dr. Prashant Samant for their vision and contribution to the association. Both the Lifetime Achievement Awardees gave and interesting a heartfelt responses to the awards and gave wonderful tips.

Vice President IRMA, Mr Hiren Shah, Beeta Paint Industries vote of thanks:

Technical session


Pankaj Verma

Mr Pankaj Verma, Sr. General Manager Grasim Industries gave the first technical talk on Green Epoxies for Sustainable Future. He said: "Focus on Sustainability and Green Chemistry has become an important development area for the world. Western world is moving forward in providing sustainable solutions and providing greener products. We, at Aditya Birla Chemicals- Advanced materials, have taken Key steps to provide sustainable solutions using green chemistry, water based technology, Patented recyclamine technology for various application for epoxies such as Flooring, Coating, Composites, adhesives, Electrical and electronics etc".


Dr. Ashraf Mounier

The second technical lecture was on the topic Chempart Eco Green Solutions for Resins & Solvent base paints by Dr Ashraf Mounier, General Manager Chemical Partners Industry Ltd, Egypt. He elaborated on the the current work in CPSC done by a group of elite chemists and researchers in the field of Coatings, Inks, and other industries. He further said: "You can easily and simply turn your solvent base paints to green products not only that but also with lower cost and keeping your standard product quality also !!! This seems strange but it is the truth that you can solve this puzzle by using polysaccharide (Chempart SC400 and Chempart W-21) with the new technology to do that easily and safely So you can share in keeping your environment cleaner (lower VOC`s), your product cheaper and on the same quality Level. Without changing your raw material or using special ones. The same raw materials the same machines.


Dr. Jitendra Khanderay

Dr Jitendra Khanderay, Asst. Manager, R &D, Arkema Chemicals India Pvt.Ltd gave the third technical lecture on the topic Coating Solutions, A leader for Sustainable Coatings using renewable solutions. He said that Arkema's role is to support the transformation of the coating sector by focusing on four major aspects: phase out of hazardous substances, the quest for bio sourced raw materials, development of more efficient and sustainable technologies and the evolution of application processes toward greater industrial and energy efficiency. Bio sourced raw materials, low carbon applications and a focus on sustainability, recovery and recycling of materials: these are the three pillars of the bio circular concept designed by Arkema, under the acronym ABC ("Advanced, Bio based, Circular"), the central area of focus of its innovation and growth policy in the field of its High Performance Polymers. The grades of the resins currently manufactured at Arkema coating solutions - India are- Polyester (Powder and solvent borne), Alkyds, Acrylics, Polyamides.

An interesting and thought provoking panel discussion focussing on the topic 'Challenges and Opportunities for Industries in Achieving Green and Sustainable Goals' was held next. Dr B Venkatraman, President, Global Sales & Marketing - Advanced Material Business, Aditya Birla Group was the session

Panel discussion

moderator started the session. One interesting initiative by IRMA in this discussion was that all the PANEL Members were wearing specially made Tee shirts that were specially made for the occasion

Dr Prashant Samant, VP, Head R&D, Jubilant Agri and Consumer Products; Dr Deepak Yadav, Program Lead - Council on Energy, Environment and Water (CEEW); Mr Ashok Dubey, Site President, Reliance Composite Solutions; Mr Nitesh H Mehta, Co-Founder & Director, Green ChemisTree Foundation and Dr Subramanya Shreepathi, Chief Asst GM, Technology, Asian Paints were the distinguished panelist.

The Panel discussed about the challenges faced in driving the industry towards the greener future with the focus going well beyond reducing volatile organic compounds (VOCs) to include energy and resource conservation, waste minimization, process efficiency enhancement, use of renewable materials, and much more.

View of the audience

Mr Deepak Karanjikar, the well known motivational speaker gave an thought provoking interactive talk on 'Why Entrepreneurs Miss the Bus?'. He spoke about the four types of activities. Incompetent, competent, excellent and unique abilities. He gave details of the 10 rights for entrepreneur independence.

Deepak Karanjikar

This was followed by the Closing Ceremony with the vote of thanks by Mr Dhananjay Sathe in his inimitable humorous style. Later delegates interacted among themselves and enjoyed the entertainment programme as also the Cocktails & sumptuous dinner.

IRMA Seminar on Green Initiatives for Resin Industry



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LIFE TIME ACHIEVEMENT AWARDS

RAW MATERIAL SCENARIO

- Compiled by Hiren Shah

Rates are per KG for bulk buying. Rates prevailing as on 10/8/2023

Phthalic	-	104₹
Pentaerythritol	-	130₹
Glycerine	-	60₹
Benzoic acid	-	100₹
Maleic anhydride	-	85₹
Gum Rosin	-	104₹
Sorbitol (70%)	-	42₹
Fatty acids (130IV)	-	115₹
Fatty acids (145IV)	-	125₹
Mix xylene	-	90₹
Soya oil	-	96₹
Linseed oil	-	100₹
Castor oil	-	129₹
Slop oil reliance	-	70₹

Jokes

The banker fell overboard from a friend's sailboat. The friend grabbed a life preserver, held it up, not knowing if the banker could swim, and shouted, "Can you float alone?" "Obviously," the banker replied, "but this is a heck of a time to talk business."

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One day, a customer placed a huge order for numerous goods but suddenly the company realized they hadn't paid for the previous order. Immediately, they left a message on their machine saying the new order cannot be placed until the last bill has been paid. The next morning, they opened their emails to find a reply 'We would like to cancel our order, we just can't wait that long'.

●●●●●

'I can't believe you told me to put our business money with this bank
'Why, what's wrong?'
'The bank is in trouble'
'How? They're one of the biggest companies in the world'
'I don't know, my check returned with a note saying 'insufficient funds''

●●●●●

A man enters a lawyer's office and asks the lawyer: "Excuse me, how much do you charge?"
The lawyer responds: "I charge $1,000 to answer three questions."
The man replies, "That's a bit expensive isn't it?"
"Yes," says the lawyer. "Now, what's your third question?"

●●●●●

My boss just texted me: "Send me one of your funny jokes!"
I texted him back: "I'm busy working. I'll send one later."
"That's hilarious," he said. "Send another one!"

●●●●●

A man tells his doctor, "Doc, help me. I'm addicted to Twitter!"
The doctor replies, "Sorry, I don't follow you …"

●●●●●

If a neighboring business puts up a sign saying 'lowest prices', simply erect your own sign saying 'main entrance'!

●●●●●

"Boss I need a raise – there are three companies after me right now."
"Really? Which ones?"
"Gas, electric, and water."