सत्यमेव जयते

Government of India
Ministry of Chemicals & Fertilizers
Department of Chemicals & Petrochemicals

8th NATIONAL AWARDS

for
TECHNOLOGY INNOVATION
in Petrochemicals & Downstream
Plastics Processing Industry
2017-18

Chennai

Thursday, January 24, 2019

Government of India
Ministry of Chemicals & Fertilizers
Department of Chemicals & Petrochemicals

8th

NATIONAL AWARDS

for
TECHNOLOGY INNOVATION
in Petrochemicals & Downstream
Plastics Processing Industry
2017-18

Chennai

Thursday, January 24, 2019

D.V. Sadananda Gowda

Hon'ble Minister of Statistics & Programme Implementation
and Chemicals & Fertilizers, Government of India

I am happy to learn that the Department of Chemicals and Petrochemicals, in association with Central Institute of Plastics Engineering & Technology (CIPET), is organizing the Presentation of "8th National Awards for Technology Innovation in Petrochemicals and Downstream Plastics Processing Industry" on 24th January, 2019 in Chennai.

The Petrochemicals sector is a key sector of the global and Indian economy, and Petrochemicals & Downstream Plastics Industries in India have been playing a predominant role in shaping growth of our economy.

Research & Development plays a critical role in the innovation process which sustains growth and enables industry to become competitive so as to meet the global challenges. These awards seek to encourage the petrochemicals and downstream plastic industries to strive for innovation, excellence and improvement of services delivered so that they can position their products well in the global market.

I congratulate the award winners on their success and look forward to higher level of participation in the future editions of the National Awards for Technology Innovation in the field of petrochemicals and downstream plastics processing industries.

D V Sadananda Gowda

Rao Inderjit Singh

Hon'ble Minister of State (Independent Charge)
of the Ministry of Planning and MoS in the Ministry
of Chemicals & Fertilizers, Government of India

I am very happy to note that the Department of Chemicals and Petrochemicals, Ministry of Chemicals and Fertilizers is holding a function on 26th November 2018 in Chennai to felicitate the Awardees of the 8th National Awards for Technology Innovation in Petrochemicals & Downstream Plastics Processing Industry.

The per-capita consumption of Plastics in India is far below the global average. Thus, there exists a huge potential for growth of the plastic segment in India through setting up new industries, and capacity expansion of existing units to produce innovative products for the use of common man. The start-up entrepreneurs need encouragement to work on the innovative ideas/products for fast growth of the segment.

Continuous research & development and new innovation in the field of polymer & petrochemicals are the need of the hour for sustained growth to enable the Indian industry to remain competitive and meet the global challenges.

I appreciate the efforts of the members of the Department, CIPET and the Expert Panel for their contribution in conducting the 8th edition of the National Awards in a row.

I wish all success to the Awardees in their endeavours.

Rao Inderjit Singh

P Raghavendra Rao
Secretary of the Govt. of India
Department of Chemicals & Petrochemicals
Ministry of Chemicals & Fertilizers, Shastri Bhawan
New Delhi - 110 001

The Department of Chemicals and Petrochemicals has instituted the National Awards for Technology Innovation for rewarding outstanding professional in the field of Petrochemicals and Downstream Plastics Processing Industry to open new avenues for further Research and Development.

The Scheme is being successfully implemented, through CIPET, since its launch in 2010 - 11. In these seven editions since their introduction, the Awards have achieved a very high stature among professionals and researchers from the industry and R&D Institutions. A total of 101 'Winners' and 59 'Runners up' have been awarded till date.

To improve competitiveness in manufacturing, research and development have a very important role to play. R & D enables organisations to achieve faster growth and to generate more wealth over a period of time.

The Eight National Awards fo Technology Innovation will also certainly bring out the most outstanding usage of technology to achieve excellence in performance through innovation in the various fields of Petrochemicals.

My hearty congratulations to all the awardees. I wish them all the best in their pursuit of excellence and hope that their innovation, enthusiasm and dedication will inspire others to embark on the path of innovation.

P. Raghavendra Rao

P Raghavendra Rao

Aparna S. Sharma
Joint Secretary of the Govt. of India
Department of Chemicals & Petrochemicals
Ministry of Chemicals & Fertilizers, Shastri Bhawan
Dr. Rajendera Prasad Road, New Delhi - 110 001

During the last few years, initiatives on setting up of PCPIRs, Plastic Parks etc. taken by the Department of Chemicals & Petrochemical have promoted the plastics & petrochemicals industry and facilitated their growth. To help the domestic industry realise its full potential, research & development has been recognized an area of focus.

In this background, the National Awards for Technology Innovation were instituted to improve the performance of the existing products and their quality to lead to a better acceptance and increase in demand of the products in the competitive market of polymers and plastics as well as benefit all segments of the enterprises, including MSMEs. Since their initiation, the National Awards of the Department have honoured creativity, become very popular and achieved peer recognition among professionals, entrepreneurs and researchers from various industries and R&D institutions.

I am confident that the 8th National Awards for Technology Innovation in Petrochemicals & Downstream Plastics Processing Industry will also work towards the most outstanding usage of technology in multi-disciplinary applications of Polymers.

I take ths opportunity to felicitate the Members of the Expert Committee, who spared their valuable time to scrutinize and evaluate the received proposals. I appreciate CIPET for taking up the challenge in executing this edition of the National Awards.

I convey my heartiest congratulations to all the awardees and hope that their hardwork and efforts brings outstanding results for the industry.

Aparna S. Sharma

Say Yes to Plastics
&
No to Littering

8th National Awards for Technology Innovation

Awardees


Dr. Raksh Vir Jasra


Dr. Vivek K. Srivastava


Shri Kundan Basant

Reliance Industries Limited (RIL), founded by Shri Dhirubhai H. Ambani four decades ago, is India's largest private sector company. RIL's activities span hydrocarbon exploration and production, petroleum refining and marketing, petrochemicals, retail and 4G digital services. RIL is India's largest private sector company, with a consolidated turnover of INR 430,731 crore ($ 66.1 billion), cash profit of INR 56,034 crore ($ 8.6 billion), and net profit of INR 36,075 crore ($ 5.5 billion) during the year ending March 31, 2018. RIL is the first private sector company from India to feature in Fortune's Global 500 list of 'World's Largest Corporations' - currently ranking 148th in terms of revenue and 99th in terms of profits, the most profitable Indian company on the list. The company stands 83rd in the 'Forbes Global 2000' rankings for 2018 – the top-most among Indian companies. It ranks amongst LinkedIn's 'Top Companies where India Wants to Work Now' (2018).

Dr. Raksh Vir Jasra, FNAE is Senior Vice President, (Head, R&D) at Reliance Technology Group, Vadodara. He is Ph.D. (Chemistry) with 36 years of experience in the petrochemicals, refinery, and polymer industries.

Dr. Vivek K. Srivastava is Lead Research Scientist at Reliance Research Development Centre, Mumbai. He is Ph.D. (Chemistry) with 13 years of industrial experience in the area of polymer, elastomers, catalysis, novel products etc.

Shri Kundan Basant is a Production Manager at PBR-1 and PBR-2 plants at VMD. He has B.E. degree in Chemical Engineering and looks after production of PBP polymer at RIL, VMD.

DEVELOPMENT OF NEW POLYMERS

"NOVEL POLYMER FOR HIGH PERFORMANCE AUTOMOTIVE TYRE APPLICATIONS"

Reliance Industries Limited, Vadodara, Gujarat

This innovation deals with production of novel Poly-Butadiene polymer by replacing methanol with an eco-friendly water as short-stop at commercial scale without changing the existing process operating conditions and hardware in the manufacturing plant. This work has undergone stages of ideation, aboratory research, pilot plant scale up followed by successful implementation in a commercial plant. The major benefits associated with the use of water as a short-stop are listed below;

- Novel PBP and corresponding compounded products for high performance automotive tyre applications.
- Lower effluent generation and better plant environment due to elimination of use of Methanol by Water.
- Elimination of use of extraction column and the operating cost.
- Total benefit is Rs. 2.0 crores per annum in terms of reduction in cost associated with catalysts and chemicals.
- Reduction of excess work loading to Effluent Treatment plant.
- Enhancement of the green quotient to PBP technology at commercial scale.

JOINT-WINNER

8th National Awards (2017-18) under the Category of "DEVELOPMENT OF NEW POLYMERS"


Dr. Vimal Katiyar


Dr. Arvind Gupta

Indian Institute of Technology Guwahati, the sixth member of the IIT fraternity, was established in 1994. At present the Institute has eleven departments and five inter-disciplinary academic centres covering all the major engineering, science and humanities disciplines.

Prof. Vimal Katiyar is the Coordinator of Centre of Excellence for Sustainable Polymers (CoE-SusPol), Department of Chemical Engineering at IIT Guwahati, India. He has supervised/supervising more than twenty five PhD students. He has authored more than eighty five research articles on biodegradable polymers in peer reviewed journals, 25 book chapters, one featured book on bioplastics for food packaging and more than 200 conference proceedings. Additionally, he is also a co-inventor of numerous granted patents in various countries. His research group has received multiple national and international innovation awards in the development of bio-based polymeric products, nanobiocomposites, and related technologies.

Dr. Arvind Gupta obtained his PhD degree on 'Studies on Stereocomplex Poly (lactic acid) and its Biocomposites' under the supervision of Dr. Vimal Katiyar. Currently, he is pursuing post doctoral fellowship in Chungbuk National University, South Korea. He has authored 10 papers in peer reviewed journals, co-inventor of three patent applications and co-authored three book chapters.

DEVELOPMENT OF NEW POLYMERS

"HEAT STABLE BIO-PLASTICS FOR HIGH TEMPERATURE APPLICATIONS"

Dr. Vimal Katiyar & Dr. Arvind Gupta

Polylactic acid (PLA), a bio-based, biodegradable, compostable polymer, is the promising candidate which can replace some of the conventional polymers such as polyolefin, polystyrene (PS), polyethylene terephthalate etc. The use of PLA extended from biomedical application to other applications such as textiles, agriculture, electronics, commodity and packaging. However, PLA has also few limitations namely, relatively low heat stability temperature, lower melting temperature, slow crystallization, and relatively poor oxygen barrier properties which restricts it towards the higher service temperature.

In this invention, we have overcome the above limitations by developing industrially viable melt extrusion based approach to manufacture high heat stable Stereocomplex PLA (Sc-PLA) based formulations and products which can be used for high temperature applications. The new formulation prepared by using modified chitosan (MCH) and others have the melting temperature more than 210°C with degree of crystallinity ~70%. Most importantly, heat deflection temperature is improved more than 140°C for MCH-sPLA. The ultimate tensile strength has enhanced more than 60 MPa along with significant reduction of oxygen permeability.

This is the first example to produce high heat stable PLA based plastics for high temperature applications through patent application number 201631022079.

JOINT-WINNER

8th National Awards (2017-18) under the Category of "DEVELOPMENT OF NEW POLYMERS"

Dr. Raja Shunmugam

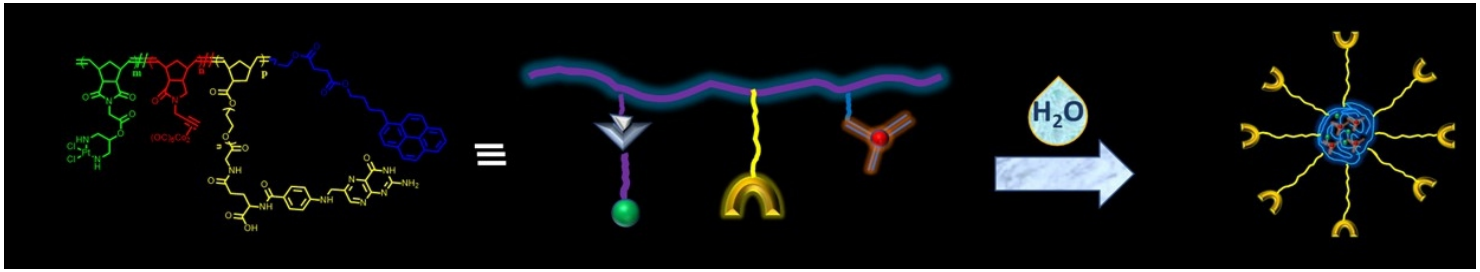
Dr. Raja Shunmugam received his Ph. D. from the Indian Institute of Technology Madras. Subsequently, he joined Professor Gregory N Tew's laboratory in the Polymer Science and Engineering Department at the University of Massachusetts, Amherst as post doctoral research associate. At present he is Associate Professor in the Department of Chemical Sciences at the IISER-Kolkata. He was a recipient of the prestigious Ramanujan Fellowship from the Department of Science and Technology, Government of India. He received Joint Runner-Up award in the 6th NATIONAL AWARD FOR TECHNOLOGY INNOVATION under the Polymeric Materials category, 20 January 2016. He also received Joint Winner Award in the 7th NATIONAL AWARD FOR TECHNOLOGY INNOVATION under the Polymeric Materials category, 01 March 2017.

DEVELOPMENT OF NEW POLYMERS

"MULTIFUNCTIONAL NANOCARRIER WITH A PLATINUM PRODRUG AS AN EFFICIENT DUAL-IMAGING, SITE-SPECIFIC CANCER THERANOSTIC AGENT"

Dr. Raja Shunmugam

Platinum-based chemotherapeutic agents are considered first-line treatments for various cancers. Despite their potential applications, these non-emissive drugs lack site specificity, which causes severe side effects. Multifunctional polymeric nano-aggregates offer the opportunity to site-specifically deliver different drugs by combining different functionalities into a single system. Herein, a new type of norbornene-based polymeric nano-aggregate was synthesized for application in site-specific theranostics. The cobalt carbonyl in the main polymeric chain and the end-functionalized pyrene facilitate the dual imaging of this system. The ester-linked Pt(II) drug showed sustained release, and functionalization of the polyethylene glycol folate moiety ensured water solubility and site-specific therapy. The emissivity of the nano-aggregate in water and its ability to alter the relaxation of water molecules supported the dual-imaging capability of this system. *In vitro* studies showed that nano-aggregate exhibited increased internalization and improved anti-proliferative effect in HeLa cells compared with free cisplatin. Cellular uptake studies showed uniform cytoplasmic distribution and preclinical pharmacokinetic studies in mice demonstrated slower elimination of nano-aggregate than free cisplatin. This new class of dual-imaging, site-specific drug delivery system is expected to lead new opportunities in the field of theranostics.



JOINT RUNNER-UP

8th National Awards (2017-18) under the Category of "DEVELOPMENT OF NEW POLYMERS"

Dr. Smita Mohanty

Shri S. Anthony Yesudass

CIPET: SARP, LABORATORY FOR ADVANCED RESEARCH IN POLYMERIC MATERIALS (LARPM) BHUBANESHWAR

Laboratory for Advanced Research in Polymeric Materials (LARPM) is the CIPET's focal point for multidisciplinary research which provides a platform for advancing the nation's science and technology agenda through the development of new polymeric materials through interdisciplinary collaborative Research Programmes.

Dr. Smita Mohanty was the Senior Scientist and In-charge of LARPM. She has more than 14 years of Research and Teaching experience, published more than 150 papers in peer reviewed International journals and has 06 Indian Patents to her credit. She has also initiated several advanced areas of research, which includes burning topics like E-waste Recycling, Biopolymers from Natural Resources, Smart coatings, Composites Polymer Electrolytes etc. She has guided 15 Ph.D and 35 M.Tech students. In the capacity of Investigator, she has successfully completed around 25 sponsored projects and has authored 7 textbooks / chapters, published under renowned publishers. At present Dr. Smita Mohanty is the Director (Principal Scientist) at CIPET-SARP-APDDRL, Bengaluru.

Shri S. Anthony Yesudass obtained his M.Sc. in Polymer Chemistry from University of Madras (2012). He has worked as an R&D chemist-II (Synthesis and development of new product in the coating sector) at Nanocoat Chemtech Pvt.Ltd., (2012-2013), Hyderabad; Project Assistant-II (Development of high solid polyurethane coatings) at CSIR-IICT, (2013-2015) Hyderabad. Currently, he is pursuing his Ph.D on Synthesis and development on zwitterionic-polyurethane coatings for foul release application at SARP-LARPM, CIPET-Bhubaneswar under the guidance of Dr. Smita Mohanty.

DEVELOPMENT OF NEW POLYMERS

"ZWITTERIONIC-POLYURETHANE COATINGS FOR NON-SPECIFIC MARINE BACTERIAL INHIBITION: A NONTOXIC APPROACH FOR MARINE APPLICATION"

Dr. Smita Mohanty & Shri S. Anthony Yesudass

The Bio-foul formation on the ship hull decreases cruise speed, increases fuel consumption by 40%, Thus resulting in a huge economic loss in maritime transport. Tributyltin (TBT) and copper based anti-fouling paints have been used for several decades to defend the foul formation. Later, these coatings were commercially banned by the international maritime organization due to their toxic nature.

Foul release coating technologies were introduced as an alternative to combat bio-foul formation. The foul release coatings are non-toxic and permit easy removal of fouling by the operating speed of ships due to their non-sticking surface. The foul release coatings made with PDMS based components exhibit low surface energy and low modulus. These combined properties attribute to the low adhesion between marine organism andsubstrate. Based on these strategies the current innovation has been developed.

The unique features of the innovation are:

- Polydimethylsiloxane (PDMS) bi-functional macro ATRP (atom transfer radical polymerization) initiator was synthesized.
- Zwitterionic triblock copolymer(Poly(SBMA)-PDMS-Poly(SBMA)) was synthesized through ATRP method using the PDMS macroinitiator and sulfobetaine methacrylate(SBMA) as a zwitterionic monomer.
- This triblock copolymer was formulated with an acrylic polyol and H_{12}MDI system to make zwitterionic polyurethane coatings.
- The coating showed good thermal stability and amphiphilic nature.
- The coating showed low pseudo-barnacle adhesion strength, excellent non-specific marine bacterial inhibition.
- This method reveals the development of zwitterionic-polyurethane coatings which can be efficient and eco-friendly technology to marine bio-fouling application.

JOINT RUNNER-UP

8th National Awards (2017-18) under the Category of "DEVELOPMENT OF NEW POLYMERS"


Dr. S. Sridhar


Dr. M. Madhumala


Smt. Harsha Nagar


Shri Shiva Prasad


Dr. Y.V.L. Ravikumar

CSIR-Indian Institute of Chemical Technology (IICT) based at Hyderabad is one of the leading Research & Development (R&D) laboratories in India that was established in 1944. IICT has been primarily engaged in solving challenging problems associated with several industries especially in the area of chemistry, pharmaceuticals, agrochemicals, polymer and engineering sciences and has an outstanding record in terms of basic research and product development.

Dr. S. Sridhar working as a Senior Principal Scientist and Co-Chair of Process Enginerring & Technology Division at the CSIR-Indian Institute of Chemical Technology, Hyderabad. He has designed and implemented several novel membrane technologies based on Nanofiltration, Pervaporation, Electrodialysis and Gas Separation for chemical process industries. Dr. Sridhar has published 131 research papers with 6053 citations and a h-index of 40. He has to his credit 12 Patterns, 2 Books, 35 Book Chapters.

Dr. M. Madhumala currently working as Research Associate at CSIR-IICT. Her research areas include the development of novel polymeric and mixed matrix membranes for separation and recovery of valuable organic acids and solvents using membrane contactors and forward osmosis. She has authored 2 patents, 9 research papers, 2 book chapters and 3 generic articles.

Smt. Harsha Nagar is a Ph.D Scholar of CSIR-IICT. Her research areas include synthesis of proton conducting polymeric membranes for fuel cell application and design of compact defluorination units which are subsequently installed in villages, schools and hostels. She has authored 4 research papers, 5 book chapters.

Shri Shiva Prasad is working as a Senior Research Fellow in Membrane Separations Laboratory at CSIR-IICT. His areas of research include synthesis of novel hollow fiber membranes for surface water purification, Hemodialysis and gas separation. He has 2 publications, one book chapter and one Indian patent to his credit.

Dr. Y.V.L. Ravikumar is working as a Principal Technical Officer at CSIR-IICT. His main areas of research include drinking water purification, thermodynamics, properties of liquids and gases, and industrial effluent treatment. He has contributed immensely to industrial development through different projects on reaction calorimetry and process development as well as urban and rural welfare through water purification. He is the author of 44 research papers, 2 book chapters, 4 patents.

NEW APPLICATIONS OF POLYMERS IN VARIOUS FIELDS

"INEXPENSIVE ULTRAFINE HOLLOW FIBER MEMBRANE MODULE FOR DRINKING WATER PURIFICATION"

Dr. S. Sridhar, Dr. M. Madhumala, Smt. Harsha Nagar, Shri Shiva Prasad & Dr. Y.V.L. Ravikumar

The presence of suspended particles, colloidal silica, turbidity and biological contamination in the form of pathogens degrades the quality of surface water and makes it unacceptable for drinking purpose. This innovation involves the development of ultrafine hollow fiber membranes of high surface area per unit volume for effective clarification and disinfection of surface water, at a low cost. The indigenously developed membranes prepared using an indigenous high precision spinneret of novel design enables 95-100% bacterial removal at a separation efficiency much more rapid than conventional membranes. An indigenous spinneret was designed and fabricated to produce these hollow fibers of dimensions ranging from 330 to 400 µm (outer dia) and 250 to 300 µm (inner dia), which are 4 to 5 times smaller thanthe current hollow fiber membranes available in the market. The fibers can purify water with high flow rates using hydrostatic pressure from overhead tanks, and do not require an electrically driven pump to produce safe drinking water. The high packing density of such ultrathin hollow fiber membranes within the module enables easy backwash, thereby improving system performance, with low chemical and bio-fouling potential over the membrane surface. The cost effectiveness and compact nature of the membrane module could be highly beneficial for flood affected regions and remote villages, which lack power supply. The device exhibits vast scope for scale-up and commercial application.

WINNER — **8th National Awards (2017-18) under the Category of "NEW APPLICATIONS OF POLYMERS IN VARIOUS FIELDS"**

Dr. Jitendra Sangwai

Dr. Jitendra S. Sangwai is currently working as an Associate Professor in the Department of Ocean Engineering at IIT Madras. Dr. Sangwai worked with Schlumberger for a brief period before moving to academia. Dr. Sangwai's research interest lies mainly in the field of gas hydrates, enhanced oil recovery, rheology of complex fluids, etc. He has published approximately 85 international journal papers and 75 conference publications. He has graduated seven PhD degree students and several master's degree students in the field of petroleum engineering. Dr. Sangwai is the recipient of the SPE's Distinguished Award for Petroleum Engineering Faculty of the South Asia and Pacific region in 2017, Young Faculty Recognition Award-2014 for excellence in teaching and research and Institute Research and Development Awards-2017 from IITM, six invention awards from Intellectual Ventures, an SPE travel Grant Award, and an SPE Regional Service Award (2015).

NEW APPLICATIONS OF POLYMERS IN VARIOUS FIELDS

"INSITU THERMAL POLYMERIZATION OF WATER-SOLUBLE POLYMERS IN PETROLEUM RESERVOIRS FOR IMPROVED PETROLEUM RESOURCES RECOVERY"

Dr. Jitendra Sangwai

Chemical EOR techniques such as, polymer flooding, polymer-surfactant flooding, alkaline-Surfactant-polymer flooding have been found to be an excellent candidate for enhancing recovery of petroleum resources. All the chemical EOR techniques involve the use of polymer for increasing the viscosity of the solution and sweep efficiency. The major problem in the conventional method is the retention of the polymer in the reservoirs resulting in the trapped oil in the reservoir and decreasing the efficiency of the process due to polymer retention. The invention focus on the improvement in the efficacy of the chemical flooding in general to address the heterogeneity of the reservoirs, and to improve the injectivity of polymer into the hard to reach part of the reservoirs, by optimizing the polymer molecular weight in-situ and to utilize the energy of the reservoir. In order to improve the efficiency of oil recovery process, it has been envisaged to use the water-soluble monomer for injection into petroleum reservoirs and use the thermal heat in-situ to carry in-situ polymerization. The porous media will act as polymer reactors and will develop the polymer of varying molecular size suitable for the heterogeneous porous media, which then can better improve the mobility ratio and recover more oil from the subsurface reservoirs. Even a marginal increase of oil recovery of 1 % from improved EOR operation is achieved, can lead to enormous economic advantage to the industry.

RUNNER-UP

8th National Awards (2017-18) under the Category of "NEW APPLICATIONS OF POLYMERS IN VARIOUS FIELDS"

Prof. (Dr.) Balasubramanian K

Prof. (Dr.) Balasubramanian K is Professor & Head of Metallurgical & Materials Engineering, Defence Institute of Advance Technology (DU), Ministry of Defence, Government of India, Pune since 2010. He was actively involved as an Academician and Visiting Research Fellow at the Department of Materials Engineering, Loughborough University (UK) and Birmingham University (UK). He was the recipient of most prestigious award for Technological Excellence in the year 2007 and 2010 at the UK MatRI, UK. He has been awarded Hind Rattan Award-2010 by NRI Welfare Society of India, Ministry of External Affairs, Govt. of India. He was honoured with National Technology Day Award-2013, Department of Defence R&D, Ministry of Defence and Outstanding Engineer of the Year 2013 by Cambridge University, UK. He is having rich experience in evaluation of DTI (UK), TSB (UK), FP6 and FP 7 European research programs, DST, Brussels, Belgium. He has guided 09 PhD Students (07 students on going) and more than 68 M Tech's in the last five years at DIAT (DU). He has authored about 250 peer reviewed research papers, 08 book chapters and 14 patents. As a Professor of Metallurgical & Materials Engineering he is supervising and guiding PhD & M Tech students of Armed forces, Defence Research Establishments and other PSUs.

NEW POLYMER PROCESSING MACHINE INCLUDING ENERGY EFFICIENCY

"INNOVATIVE POLYMER PROCESSING OF NANOCOMPOSITE BY CHAOTIC FLOW DESIGN"

Prof. (Dr.) Balasubramanian K

The present study manifests a novel method for the adoption of a controlled lamellar structure of the mollusc shell. Mixing was achieved through the presence of a chaotic flow that ensures the efficient stretching and folding of the viscoelastic material. Polycarbonate was injection blow moulded in the design of a Venturimeter with four holes of 3.2 mm diameter to hold the rheological flow arrestors and ultrasonicating horn tips. Viscous PVA/HA solution was made to flow through an in-house engineered equipment, designed by modifying a venturimeter and introducing the demountable rheological barrier plates of engineered dimensions in the downstream of the instrument, thereby fabricating a composite. The hydroxyapatite was surface treated with three individual coupling systems of titanate, zirconate and silane, with 2 wt% each. The agglomerated clusters of HA underwent splitting at the throat of the venturimeter where the acicular flower likearrangement gets disengaged into a random disembodiment of petals. As the fluid streams were led on pre-decided flow lines, the recombination of flow enhanced the mixing efficiency by exponentially enhancing the interfacial area in contact. The mechanism of excitation and disintegration of vortices at junctions aided for efficient mixing by the low frequency ultrasonication and periodic perturbation imposed on the flow streams, resulted in chaotic flow regime. The present system contains both geometric periodic perturbations and alternating ultrasonicators. Geometric perturbations tend to induce the stretching and folding of the two flow fields of HA and HA/PVA, whereas the ultrasonicating horns create cavitation bubbles, which explode and give rise to localized energy sources, resulting in chaotic mixing in fluid flows, with splitting and recombination. As the stream proceeds, the gradient in the velocity, due to the change in the dimensions, cavitation bubble explosion energies and flow arrestors, exerts a torque on the flow lines, leading to a "swirling" action in the system. As a result of the combined effect of the "swirling" and molecular adhesion achieved via surface treatment, the HA particles were aligned along the flow lines, and the final microstructure resembles the brick and mortar structure of the shell.

JOINT-WINNER

8th National Awards (2017-18) under the Category of "NEW POLYMER PROCESSING MACHINE INCLUDING ENERGY EFFICIENCY"


Dr. Jitendra Sangwai


Shri Chirag M. Khalde

Dr. Jitendra S. Sangwai is currently working as an Associate Professor in the Department of Ocean Engineering at IIT Madras. Dr. Sangwai worked with Schlumberger for a brief period before moving to academia. Dr. Sangwai's research interest lies mainly in the field of gas hydrates, enhanced oil recovery, rheology of complex fluids, etc. He has published approximately 85 international journal papers and 75 conference publications. He has graduated seven PhD degree students and several master's degree students in the field of petroleum engineering. Dr. Sangwai is the recipient of the SPE's Distinguished Award for Petroleum Engineering Faculty of the South Asia and Pacific region in 2017, Young Faculty Recognition Award-2014 for excellence in teaching and research and Institute Research and Development Awards-2017 from IITM, six invention awards from Intellectual Ventures, an SPE travel Grant Award, and an SPE Regional Service Award (2015).

Shri Chirag M. Khalde is currently working as a PhD Student in Gas Hydrate and Flow Assurance Laboratory of Department of Ocean Engineering at IIT Madras. His research interests include CFD Modeling, Process Intensification, Turbulence, Multiphase flows and Rheology. Khalde has authored 2 international journals, 6 international conferences and holds 4 patents.

NEW POLYMER PROCESSING MACHINE INCLUDING ENERGY EFFICIENCY

"HORIZONTAL RHEOMETER FOR MEASURING RHEOLOGICAL PROPERTIES OF COMPLEX POLYMERIC MULTIPHASE FLUIDS"

Dr. Jitendra Sangwai & Shri Chirag M. Khalde

Polymeric materials are often manufactured using multi-phase fluids containing different immiscible fluids. Polymer are made using various processes such as solution, emulsion, suspension, bulk polymerization, etc. Understanding the rheology of these multiphase fluids is an important precursor for getting desired properties of polymer end product. Emulsions show non-Newtonian behavior. Different types of emulsions (micro, nano, etc.) and even the derivatives, such as nanoparticles stabilized emulsions, etc., are observed and being investigated for several polymer engineering applications. These are typically categorized as complex fluids and offer challenge due to their complex rheological behavior. Understanding in-situ rheology of these complex polymeric systems is extremely important for several applications in polymer, paint and pharmaceutical industry where the flow of such fluid is common. For ex., in case of polymer screw extrusion, it is difficult to capture the rheological properties of the mixing polymeric fluids. This invention address important requirement in this direction which enable the measurement of rheological properties in horizontal set-up such as polymer extrusion. The proposed method is very much efficient method which can calculate rheological properties for any number of immiscible/being miscible fluids avoiding pre-mixer and hence reducing time and number of components required.

JOINT-WINNER

8th National Awards (2017-18) under the Category of "NEW POLYMER PROCESSING MACHINE INCLUDING ENERGY EFFICIENCY"


Shri Jigish R. Shah

FERROMATIK MILACRON INDIA PVT. LTD., AHMEDABAD

Shri Jigish R. Shah completed his Mechanical engineering and has 29 years of industrial Experience in Design and Development of Plastic Machinery. Presently he is working at Milacron and heading the technology and product development group worldwide. His portfolio includes the development of machinery for Plastic Injection Moulding, Blow moulding and Extrusion machines. He is also a member of steering committee of continuous improvement initiative.

NEW POLYMER PROCESSING MACHINE INCLUDING ENERGY EFFICIENCY

"DEVELOPMENT OF HYBRID PLASTIC INJECTION MOULDING MACHINE FOR CUBE MOULD"

Ferromatik Milacron India Pvt. Ltd., Ahmedabad

The machine is technologically advanced to accommodate the Cube Mold technology aligning both main and secondary IU to inject the melt in one stroke into the Cube Mold. This high-end technology enhances the processors' to enrich the value of their product, reduces cost and avoids duplication of final product.

MT servo *450 Cube* - is a Hybrid plastics processing injection molding machine, previously belonged to European make. Milacron India brought this newer technology to India – we are sure, our customers would enjoy and welcome this technology on Quality, Performance, Cost etc. It was a great challenge to design and manufacture the machine in India – Thanks to the partnership of Customer and mould maker.

Special requirement by the customer

- Cube movement in parallel with machine clamp movement to reduce cycle time
- Secondary injection unit to be mounted on Clamp Moving platen
- Integrated functions with several interlocks.
- Reduce the energy consumption.
- Ease of operating machine with user friendly control
- Ejection of the part from both side moving as well as stationary

As always, our customer is the driving force behind designing a better machine – special design of this machine is an example.

The equipment will compete with European in all aspects like –

- Quality & Performances
- Energy saving
- Price
- Services

RUNNER-UP

8th National Awards (2017-18) under the Category of "NEW POLYMER PROCESSING MACHINE INCLUDING ENERGY EFFICIENCY"

Dr. Nanda Gopal Sahoo

Dr. Nanda Gopal Sahoo earned his Ph. D. degree in material science from Indian Institute of Technology (IIT) Kharagpur in 2004. After pursuing his Ph.D. degree, he worked in several countries with eminent scientists for nine years in various fields of materials science especially in the field of carbon nano materials and gained expertise and scientific orientation in several streams.

After working for several years with different eminent groups, Dr. Sahoo has joined the Department of Chemistry, Kumaun University, Nainital as Associate Professor in 2013. He is among the few BASE fellows sponsored by Indo-US Science and Technological Forum for advancing their research in the field of solar cell development in Virginia Commonwealth University, USA, 2014.

Dr. Nanda Gopal Sahoo has published 81 journal papers in high-quality international journals. His total citations according to Google Scholar are 5500 and h index is 33.

INNOVATION IN POLYMER WASTE MANAGEMENT & RECYCLING

"SMART SYNTHESIS OF CARBON NANO MATERIAL ALONG WITH THE PRODUCTION OF HIGH VALUE ADDED FUEL AND ADDITIVES FOR THE CONCRETE MIXTURE FROM WASTE PLASTIC"

Dr. Nanda Gopal Sahoo

The non-biodegradable nature of the plastic waste has created challenge in front of scientific community. This innovation leads to the bulk synthesis of graphene from waste plastics, along with the production of value added fuels and additives for concrete mixture in step process. The process reveals the potential of Indian technology in front of international scientific community. While the Upcycling of this plastic waste making a bridge between the solid waste recycling technologies to get "waste to wealth", also it surely leaves a significant thumb impression to save the exponential deteriorating biodiversity and ecology of the country. This is the first attempt towards the complete utilization of waste plastic. The innovation will help the various developing countries in the synthesis of graphene, high value added fuel and additives for the concrete mixture and efficient materials for water purification also. This kind of upcyling of waste plastics to graphene and its other by products not only gives the more economical value, but it also helps to the every citizen of India to enjoy its charming properties. Thus the overall innovation seems to be cost effective and greener technique for the sustainable and environmentally friendly waste management to enhance the revolution of "Clean and Green India".

WINNER — **8th National Awards (2017-18) under the Category of "INNOVATION IN POLYMER WASTE MANAGEMENT & RECYCLING"**

Dr. Anagha S.Sabnis

INSTITUTE OF CHEMICAL TECHNOLOGY (ICT), MUMBAI

The Institute of Chemical Technology (ICT) Mumbai was established as the Department of Chemical Technology on 1st October 1933 by the University of Mumbai. The Institute was most popularly known as UDCT, Mumbai. Research has been an integral part of ICT since its inception and it has created over 500 first generation entrepreneurs. The UDCT grew significantly in stature and was granted autonomy under UGC regulations by the University of Mumbai and further converted into an Institute on 26th January 2002. Due to the recommendations of the Government of Maharashtra and the University of Mumbai, the ICT was granted Deemed University Status by the MHRD on 12th September 2008.

Dr. Anagha S.Sabnis received her Ph.D.(Tech.) degree from Mumbai University in 2006 and after working in industry for 2.5 years joined the Institute of Chemical Technology in late 2008. Currently she is working as Associate Professor in Department of Polymer & Surface Engineering at Institute of Chemical Technology, Mumbai. She has guided 4 Ph.D. students, more than 20 M.Tech. students and has authored more than 50 publications in last 10 years.

INNOVATION IN POLYMER WASTE MANAGEMENT & RECYCLING

"CHEMICAL RECYCLING OF PET AND PU FOAM WASTES USING ALTERNATE ENERGY RESOURCES FOR VALUE ADDED APPLICATIONS"

Dr. Anagha S.Sabnis

Polyethylene terephthalate (PET) is one of the most cost-effective and indispensable commodity polymers, having excellent thermal and mechanical properties which is widely used in variety of applications such as textiles, X-ray films, food packaging, especially soft drink and mineral water bottles. Similarly, polyurethane (PU) foam has also shown continuous and fast growth due to its physical and mechanical properties rendering them particularly suitable for many applications, such as upholstering, insulation, and packing. Rigid PU foam constitutes an important group of PU foams and its demand is increasing rapidly due to wide range of applications. Unfortunately these polymers do not decompose in the nature readily causing their disposal serious environmental problems.

The innovation deals with chemically recycling the polymer waste using various depolymerizing agents by alternate energy sources. The oligomeric product obtained in each case was subsequently used for synthesis of novel functional polymers for value added coating applications. The usage of alternate energy resources like microwave, gamma and electron beam irradiations offer uniform heating in short time. Reactions are carried out for a maximum period of 30 min-40 min in the microwave as against the conventional technique of heating. The various binders obtained from the recycling of waste PET and PU foam include Unsaturated PE, epoxy, Polyamide, poly(amide-imide), Polyester polyol, polyurea, Non-Isocyanate polyurethane etc.

The major significance of this innovation is reduction in the consumption of petroleum based functional raw materials in the synthesis of the above mentioned polymeric binders as these binders are developed using mainly the recycled product.

RUNNER-UP

8th National Awards (2017-18) under the Category of "INNOVATION IN POLYMER WASTE MANAGEMENT & RECYCLING"

Dr. Deepak Pant

Dr. Deepak Pant currently working as Professor in chemistry in Central University of Harayana (CUH), Mahendragarh is the recipient of Silver Jubilee Research Fellowship award for the year 2003 by Kumaun University, Nainital (India); UCOST Young Scientist Award 2009, INSA Fallow 2010, DST-SERC Visiting Fallow 2010 and DST- SERC Young Scientist Award 2011 for his research activities. He was also the chairman of Innovation club and active member for HP state innovation activities.

Dr Pant has 05 patents in the area of waste management by green techniques and published 10 books, 40 research papers in various national and international journals. He has guided 02 M.Phil & 04 Ph. D. thesis.

Before joining CUH he was working as Dean and Head, Environmental Science, Central University of Himchal Pradesh, Dr Pant was awarded by Visitor award 2017 by President of India for his innovation in the area of waste management.

INNOVATION IN POLYMER WASTE MANAGEMENT & RECYCLING

"WASTE PLASTIC TO GREEN EPOXY PAINT"

Dr. Deepak Pant

This is the process to convert Polyethlene Terphthalate (PET) plastic to paint composition. In the proposed paint there was no use of Volatile organic carcinogenic compounds (like aromatic solvents), so can be saying as green paint. The problem associated with plastic were primarily generate a big concerns and responsible for pollution in soil, water and land. Various chemical additives in plastics have a strong tendency to leach in whatever environment that they were discarded in. These chemicals expose humans to harmful toxins which have been linked to adverse health issues. Chemical exposure from plastics can be ingested through food and water, inhaled through air contamination and even just by touching someone's skin. In this new effort, we thought of a way to convert plastic into value added product through chemical recycling. An organised/systematic system need to be developed by concerned municipal authorities for collection, segregation, transportation and disposal of plastics waste, which makes it a costly affair. The cost of common epoxy paint is about 1200 per liters and with this process it was made at a cost of 200 per liter. In the proposed paint there was no use of Volatile organic carcinogenic compounds (like aromatic solvent), hence a safe process.

RUNNER-UP

8th National Awards (2017-18) under the Category of "INNOVATION IN POLYMER WASTE MANAGEMENT & RECYCLING"

Dr. Jayanta Haldar

Dr. Jayanta Haldar is an Associate Professor at Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), Bangalore. He did Postdoctoral Research from Department of Chemistry, Massachusetts Institute of Technology, USA. His research interests are towards the development of molecular strategies for the prevention and treatment of infectious diseases.

He has published many international peer-reviewed papers, book chapters and review articles. He has been awarded as a Ramanujan Fellow from the Department of Science and Technology, Government of India, in 2010. Inventions from his lab received two Biotechnology Industry Research Assistance Council (BIRAC-GYTI) awards in 2015 and 2016 and also received two Gandhian Young Technological Innovation appreciation awards in 2015 and 2016. He has been awarded CDRI-Awards 2017 for Excellence in Drug Research and received Chemical Research Society of India (CRSI) Bronze Medal 2017 and Sheik Saqr Career Award Fellowship in 2018.

"NEW TECHNOLOGY TO PREVENT SURGICAL SITE INFECTION: A NOVEL INJECTABLE WOUND SEALANT WITH STRONG ADHESIVE AND ANTIBACTERIAL PROPERTIES"

Dr. Jayanta Haldar

Infections at the surgical site result in prolonged wound healing, abscess formation and in severe cases whole body inflammation (sepsis). Bioadhesive materials are used as wound sealants and void fillers in clinical settings. However with current adhesives, infection still remains a major concern since these sealants are not inherently antibacterial. Materials which can be applied to the damaged tissue during surgery that act as adhesive as well as thwart infection would thus be clinically useful. Ideally a sealant should possess bioadhesive, antibacterial, hemostatic and wound healing properties in order to prevent/combat surgical site infections. Further, to be more efficient the sealant should possess ability to deliver antibiotics locally in a highly controlled manner and if possible, act synergistically. Our invention describes the development of such multifunctional injectable hydrogels from a biocompatible antibacterial polymer, *N*-(2-hydroxypropyl)-3-trimethylammonium chitosan chloride (HTCC) and polydextran aldehyde (PDA). The parent polymers of both the components are FDA approved and extensively used in medicinal applications, thus offering potential to be used in biomedical fields. The hydrogel was demonstrated to be non-toxic towards mammalian cells and an effective antibacterial sealant, killing human pathogenic bacteria and fungi including multi-drug-resistant clinical isolates. The gel also acted as bioadhesive and prevented sepsis in murine model. Further, natural source and single step chemical modification of both chitosan and dextran make the formulation cost effective. Further, antibiotics e.g., vancomycin were loaded into the hydrogel to impart additional bactericidal property. The composite material acted synergistically against bacteria, delivering antibiotics locally.

The sealant of this invention has the following advantages:

- Inherently antibacterial
- Bioadhesive
- Hemostatic
- Heals wound rapidly
- Less expensive
- Can be simply injected into target site
- Effective in delivering bioactive moiety such as antibiotics locally into target site

WINNER — **8th National Awards (2017-18) under the Category of "GREEN/BIO - DEGRADABLE POLYMER"**

Prof. Dr. A.G.Murugesan

Prof. Dr. A.G.Murugesan presently working as Professor and Head of Sri Paramakalyani Centre of Excellence in Environmental Sciences of the Manonmaniam Sundaranar University, Tamilnadu and he is currently doing research on environmental pollution and abatement, bioresource and microbial technology and natural resource management. He has guided Ph.D for 38 students, authored 8 books, edited 3 proceedings and authored 350 research papers in referred international and national journals in addition to 308 other other publications. Prof. A.G.Murugesan has successfully operated 38 major research projects funded by different national and international agencies. He has been bestowed with UGC-BSR Award, and two state awards for his research constribution in the field of environment. Dr.A.G.Murugesan is an elected fellow in 7 academies of the Nation.

GREEN/BIO - DEGRADABLE POLYMER

"PRODUCTION OF BIOPLASTIC / BIOPOLYMER PHB USING NUTRIENT RICH WASTE RESOURCE COIR PITH WITH HIGH COST EFFECTIVE TECHNOLOGY, LESS MACHINERY USES, HIGHLY STABLE, WATER CONSERVATION"

Prof. Dr. A.G.Murugesan

Production of Biopolymer is a green technology and it is a good alternative to plastics in environmental point of view. The production cost depends on the raw material (carbon source), nitrogen source, precursors, extraction and purification used for the synthesis of bioplastic. At present, for the industrial PHBs production starch, glucose, sucrose, maltose etc. which are high cost are used as raw materials originated from food crops. For avoiding exploitation of food products, the usage of inexpensive and abundantly available carbon based lignocellulosic feedstocks is one of the needful and indispensable solutions in bioplastic production.

Among different types of lignocellulosic substances, the coir waste or coir pith is a potential resource available in many regions around the globe. It is assessed that around 7.5 million tons of coir pith is being generated in India annually and they creates disposal and environmental problems year by year. Coir pith is fully made up of lignocellulose which comprises 30% of cellulose, 38% of hemicellulose and 28% of lignin.

The PHB biosynthesis from hydrolysate of coir pith is an aerobic fermentative process occurred within the cells of the bacterium used Bacillus cereus, Bacillus megaterium and Cupriavidus necator. Different acid and enzymatic hydrolysates of coir pith were used as the carbon source in fermentation medium and PHB production was done under optimized conditions in a bioreactor. Among the three bacterium used Cupriavidus necator was found as the best performer with enzymatic hydrolysate. The melting point of produced PHB is 166 °C.

Production of bioplastic PHB from the waste resource coir pith which has higher cellulose and hemicellulosic in nature by integrated technologies is an innovative method and is surely a sustainable and cost-effective technology with less machinery uses to mitigate pollution.

RUNNER-UP

8th National Awards (2017-18) under the Category of "GREEN/BIO - DEGRADABLE POLYMER"


Prof. Papita Das


Dr. Shubhalakshmi Sengupta

Jadavpur University situated in Kolkata, established on 24th December 1955 and since then it has established itself as a leading Indian university offering various courses and engaging in active research activities. It has been continuously ranked by various national and international agencies as a noted university striving toward excellence. This university gives high value to research works which have a potential to compete at a global level.

Prof. Papita Das, Professor, Chemical Engineering Department, Jadavpur University, has immense research experience in the fields of chemical engineering, environmental biotechnology and materials science. She has several high impact peer-reviewed research articles to her credit which have been cited worldwide. She has also received various awards and holds a patent to her credit. Till date she has published 110 research papers in International Journal, 12 books, 12 book chapters. She had been received Woman Scientist award and Malaviya Memorial Award (Young Faculty Category) by The Biotech Research Society of India

Dr. Shubhalakshmi Sengupta, Post Doctoral Researcher, Chemical Engineering Department, Jadavpur University is a young researcher working in the fields of environmental science, polymer engineering and environmental biotechnology. She had completed her Ph.D. from University of Calcutta, Kolkata in 2015 where she had worked on environmentally sustainable polymeric materials. Till date she has published 21 research papers in International journals and 4 book chapters along with presenting papers in conferences both in India and abroad.

"NOVEL BIODEGRADABLE NATURAL FILLER REINFORCED HYBRID POLYMER COMPOSITES"

Prof. Papita Das & Dr. Shubhalakshmi Sengupta

Our innovation emerges from the world's need for environmentally sustainable materials. Polymeric materials are required for developing products used in our daily life. However, these materials are often not biodegradable. Therefore, development of polymer composites from renewable resources renders biodegradability after their use. Thus, polymer composites were developed from polymers reinforced with natural fillers and fibres derived from renewable resources to form a hybrid composite system which has tailor made properties with various applications in packaging/structural applications. Along with these studies, the biodegradation potential of the composites by microorganisms were also studied. Various microorganisms (bacteria and fungi) were isolated and identified from natural environment which had the capability of taking polymers as food source. The biodegradability of these composites was studied extensively both in natural environment and also under simulated conditions. These studies provide ways for efficient bio-augmentation approaches.

Thus, significance of this innovation lies in the fact that these composites were developed using two types of fillers in a hybrid composite system rendering a synergistic effect of both to the polymer matrix. The composites have various application potential and they can also be degraded effectively using microorganisms which are capable of doing so. Thus these "green" composites if used commercially and biodegraded after its use will render environmental sustainability.

RUNNER-UP

8th National Awards (2017-18) under the Category of "GREEN/BIO - DEGRADABLE POLYMER"

"Say yes to Plastics & No to Littering"

8th National Awards for Technology Innovation in Petrochemicals and Downstream Plastics Processing Industry (2017-18)

by

Prof. (Dr.) S.K. Nayak
Director General - CIPET &
Chairman - 8th National Awards Committee

Emerging patterns such as globalization, free trade, and the mobility of capital forms the basis of the petrochemical industry in the 21st century. In the recent years, substantial challenges associated with increasing reliance on base organic chemicals which constitute the building blocks of our modern society are being encountered. Innovations in petrochemical sector shall play a critical role in preserving the natural resources while creating development of sustainable, cost advantaged methods of petrochemical production through overall energy consumption and optimum high performance products.

The national policy on petrochemicals was envisaged with an objective of institutionalization of National Awards for Technology Innovation in various fields of Petrochemicals and Downstream Plastic Processing Industry.

The Policy caters to (i) Development of value added, quality petrochemical products at globally competitive prices using eco-friendly processes and technologies and (ii) Innovation of newer application and products with focus on sustainable development achieved through promotion of Research & Development and Human Resource Planning & Development.

Central Institute of Plastics Engineering & Technology (CIPET) - an autonomous body under the administrative control of Department of Chemicals & Petrochemicals, Ministry of Chemicals & Fertilizers, Govt. of India was entrusted the responsibility of implementing the award scheme. Accordingly, the scheme on "National Awards for Technology Innovation in Petrochemicals & Downstream Plastics Processing Industry" was successfully implemented by CIPET for last 7 years. There has been an enthusiastic participation of awardees, stakeholders/petrochemical industries and associations.

The 8th National award has been designed for the following categories.

01. **Development of New Polymers:**
    Innovation in Polymers, Blends & Alloys, filled materials, fibers etc, Composites and Nano composites, Smart Material etc. Non conventional application / Replacement of conventional material etc. (eg. Metals, ceramics etc.).
02. **New Applications of Polymers in various fields:**
    New / creative product design, Modification of product design for performance improvements, Enhancement in the working environment, Lifecycle, Energy Efficiency, Recyclability, etc.

03. New Polymer Processing Machines Including Energy Efficiency:

Development of new processing techniques, Modification of machinery for higher efficiency / productivity / Automation, Energy conservation, product quality improvement, Improvement in moulds, dies and auxiliary equipments.

04. Innovation in Polymer Waste Management & Recycling:

Newer technology in plastic waste utilization into products / energy recovery, Recycling Technology, Plastic waste collection, segregation techniques, Product design for improved recyclability.

05. Green / Bio - degradable Polymer:

Biopolymers, Biodegradable / compostable Polymers, Time controlled degradation, Green material filled polymers, Biodegradability evaluation techniques.

06. Innovation in Packaging:

Emerging Packaging Technologies, Creative Design for improved recyclability, Packaging for improved shelf life, Consumer Convenience.

IMPLEMENTATION FRAMEWORK & OPERATIONAL MODALITIES:

210 applications were received under the aforementioned six categories. The duly constituted selection committee, scrutinized the application and recommended the list of Winners and Runners-up to the Prize Award Committee. Based on the recommendations of Prize Award Committee and approval from the Department of Chemicals & Petrochemicals, Ministry of Chemicals & Fertilizers, Govt. of India, 07 nominations were selected as Winners/Joint Winner and 08 nominations were selected as Runners-Up/Joint Runner-up. The 8th National Award Function was held on January 24, 2019 at Chennai to present the awards to the awardees in order to encourage and technology innovation in Petrochemicals sector.

CENTRAL INSTITUTE OF PLASTICS ENGINEERING & TECHNOLOGY (CIPET)

(Department of Chemicals & Petrochemicals, Ministry of Chemicals & Fertilizers, Government of India)

Head Office : Guindy, Chennai - 600 032, Tamil Nadu.

Tel : 044-22254781, Email : pdscipet@gmail.com

Central Institute of Plastics Engineering & Technology (CIPET) is a premier National Institute devoted to Skill development, Technology support, Academic, Research and Development (STAR) for the Plastics & allied industries in India. CIPET operates at 35 locations spread across the length & breadth of the country, which includes 5 – Institute of Plastics Technology (IPT), 24 – Centers for Skilling and Technical Support (CSTS), and 3 – School for Advanced Research in Polymers (SARP). All the CIPET centers have state-of-art infrastructural facilities in the areas of Design, CAD/CAM/CAE, Tooling, Plastics Processing, and Testing & Quality Control.

CIPET Offers a blend of various specialized Academic Programmes in the field of Plastics Engineering & Technology - Doctoral, Post Graduate, Undergraduate, Post Diploma or Diploma; in order to provide techno-skilled human resource to the plastics & allied industries.

CIPET renders Technology Support Services in Design, Tooling, Plastics Processing and Testing & Quality Assurance in India and abroad. CIPET's expertise as a third party inspection for plastic products is recognized by various Central & State Govt. Organizations for pre-dispatch / delivery inspection of plastics & allied products.

With a vision to be recognized as a global R&D hub, CIPET has established three R&D centers, Viz., (CIPET:SARP) Advanced Research School for Technology & Product Simulation (ARSTPS) at Chennai, (CIPET:SARP) Laboratory for Advanced Research in Polymeric Materials (LARPM) at Bhubaneswar and (CIPET:SARP) Advanced Polymer Design & Development Research Laboratory (APDDRL) at Bengaluru. These laboratories work towards developing novel indigenous technologies to cater the current requirements in the areas of Polymer Composites, Nano composites, Biopolymers, Functional Plastics, Carbon Nanotubes, Polymer membranes, Conducting Polymers, Fuel & Solar cells, E-Waste recycling, Water Purification, Coatings, Adhesives; Innovative product concept development & Commercialization by aid of CAD/CAM/CAE, Product evaluation & Commercialization along with training to Post graduate and Ph.D. students.

The Institute has signed various Memorandum of Understanding (MoU) for collaborative research and developmental activities, faculty & student exchange programmes with leading international Universities / Organizations at USA, Canada, Australia, Germany, France, Korea, Poland, Mexico, China, South Africa, Russia, Brazil & Durban. With strong Alumni base of about 70,000 professionals, CIPET has emerged as an apex Plastics Technology Institution, not only in India but also an unique institution of its kind, in South East Asia.

CIPET 's contribution, as a Quality Education and Technical service provider has been very well recognized by the professional bodies by bestowing many awards like Plast India Foundation, Plasticon Award 2005 and Greentech Environmental Excellence Silver Award 2002; Best Performance Award: 2015-16, Official Language Implementation, Dept. of Chemicals & Petrochemicals, Govt of India and Best Performance Award (Gold Category): 2018 for Best Skill Training Provider in India from Ministry of Social Justice & Empowerment, Govt of India.

As a part of social responsibility and creating various awareness among public, CIPET has been training entrepreneurs to set up plastic waste recycling ventures through its technology-cum-demonstration centre at Guwahati as a model in association with NGOs and Civic bodies. The model centre exhibits viable end-to-end chain from collection of plastic waste, organized segregation to processing in the plant and production of granules.

The institute is also involved in disseminating the information about Plastics Waste Management, educating the general public, organizing awareness camps for Corporation officials & NGOs, conducting training programs, participating / organizing National & International Conferences & Seminars on Plastics Waste Management.

सत्यमेव जयते

Government of India

Ministry of Chemicals & Fertilizers

Department of Chemicals & Petrochemicals

INVITES

Application for

9th NATIONAL AWARD FOR TECHNOLOGY INNOVATION

In Petrochemicals & Downstream Plastics Processing Industry

Organized by :

CIPET सि पे ट

CENTRAL INSTITUTE OF PLASTICS ENGINEERING & TECHNOLOGY (CIPET)

(Department of Chemicals & Petrochemicals, Ministry of Chemicals & Fertilizers, Govt. of India)

Head Office : Guindy Chennai - 600 032. Tamil Nadu.

Tel : 044 - 22254781, E-mail : pdscipet@gmail.com

For Details visit: www.cipet.gov.in, www.pds.gov.in & www.chemicals.nic.in

CATEGORIES OF AWARDS

(Individual, Team, Cottage/Micro/Small/Medium/Large Scale Industry, Academic, R&D Institutions etc.)

1. Innovation in Polymeric Materials
2. Innovation in Polymeric Products
3. Innovation of Polymer Processing Machinery & Equipments
4. Innovation in Polymer Waste Management
5. Innovation in Green Polymeric Materials & Products
6. Innovation in Packaging Techniques including creative Design
7. Polymers in Agriculture and Water Conservation
8. Polymers in Public Health care
9. Innovation in Automotive & Transportation System
10. Innovation in Robotics & Automation in Polymer Processing
11. Research in the field of Polymer Science & Technology
    (for Research Students of Academic Institute / Research lab.)

CIPET सि पे ट

Organized by:

सेन्ट्रल इंस्टिट्यूट ऑफ प्लास्टिक्स इंजीनियरिंग एण्ड टेक्नोलॉजी

CENTRAL INSTITUTE OF PLASTICS ENGINEERING & TECHNOLOGY (CIPET)

(Department of Chemicals & Petrochemicals, Ministry of Chemicals & Fertilizers, Govt. of India)
Head Office : Guindy, Chennai - 600 032. Tamil Nadu. Tel : 044 - 22254781,
E-mail : pdscipet@gmail.com

www.cipet.gov.in