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

6th NATIONAL AWARDS

TECHNOLOGY INNOVATION in Petrochemicals & Downstream Plastics Processing Industry 2015-16

Wednesday, January 20, 2016

New Delhi.

Shri Ananth Kumar
Hon'ble Minister for Chemicals and Fertilizers
Government of India
New Delhi - 110 001

I am happy to know that the Department of Chemicals and Petrochemicals under my Ministry is organizing the event of the **"6th National Awards for Technology Innovation in Petrochemicals and Downstream Plastics Processing Industry"** on 20th January 2016 in New Delhi.

India has a great potential for improving standard of living enhancing production and consumption of chemicals and petrochemicals, including raw materials for polymers and intermediates. We need state-of-the-art technologies for manufacturing in an efficient, competitive and cost effective manner. Such innovative technological developments will help in achieving the vision of 'Make in India', and would also contribute significantly towards economic growth and development of the country.

I appreciate the efforts made by the Department of Chemicals & Petrochemicals for successfully implementing this scheme to recognize excellence. I also take this opportunity to compliment the Awardees for their valuable innovations.

I again congratulate the Awardees and wish the function a great success.

(ANANTH KUMAR)

Shri Hansraj Gangaram Ahir
Hon'ble Minister of State for Chemicals and Fertilizers
Government of India
New Delhi - 110 001

I am very happy to note that the Department is holding a function on 20th January 2016 in New Delhi to felicitate the Awardees of the 6th National Awards for Technology Innovation.

The per-capita consumption of plastics in India is about 10 kg which 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 may be encouraged to work on these innovative ideas/products for fast growth of the segment.

Continuous research & development and new innovations in the field of polymers & 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 towards conducting the 6th edition of the National Awards in a row.

I congratulate all the Awardees and wish them all success.

(HANSRAJ GANGARAM AHIR)

Shri Vijay Shankar Pandey, I.A.S
Secretary to the Govt. of India
Department of Chemicals & Petrochemicals
Ministry of Chemicals & Fertilizers, Shastri Bhavan
New Delhi - 110 001

I am happy to note that the event "6th National Awards for Technology Innovation in Petrochemicals and Downstream Plastics Processing Industry" is being organized on 20th January 2016 in New Delhi.

These awards are in recognition of outstanding contribution to the field of R&D leading to conservation of energy, efficient management of plastic waste, increase in product life cycle, development of innovative products, quality standards, recycling and other emerging areas. As polymers are finding applications in all the key sectors of the Indian economy, viz. aerospace, automobile, agriculture, packaging, Information technology, medical, electrical & electronics etc., innovation is the key to sustainable growth of the sector.

I thank the members of the Expert Committee for expeditiously evaluating the proposals, and appreciate CIPET's support in conducting the National Awards function for the sixth year in a row.

I congratulate the award winners for their great contribution to the polymer segment, and believe that they will carry forward these initiatives in new areas.

12/1/2016.

(VIJAY SHANKAR PANDEY)

Shri Avinash Joshi, I.A.S
Joint Secretary
Department of Chemicals & Petrochemicals
Ministry of Chemicals & Fertilizers
Shastri Bhavan
New Delhi - 110 001

During the last few years, several initiatives, such as setting up of PCPIRs, Plastic Parks etc, have been taken by the Department of Chemicals & Petrochemicals to promote the plastics & petrochemical industry and facilitate their growth.

As research and innovation constitute the foundation of any industry, the National Awards for Technology Innovation have been instituted, and its 6th edition would be held on 20th January 2016 in New Delhi. These awards are envisaged to improve the performance of the existing products and their quality, leading to 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 Cottage Industry and MSMEs,

Since their inception, the National Awards of the Department have become very popular and achieved peer recognition among professionals, entrepreneurs and researchers from various industries and R&D institutions. I am confident that the 6th National Awards for Technology Innovation will also work towards the most outstanding usage of technology in multi-disciplinary applications of Polymers.

I take this 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 of executing the 2015-16 edition of the National Awards expeditiously.

I convey my heartiest congratulations to all the awardees and wish them all the best.

(AVINASH JOSHI)

Awardees


Dr. D. N. Tripathi


Dr. A. K Saxena


Dr. Vineeta Nigam


Shri M.K Pandey


Smt. A. Kerketta

Dr. D. N. Tripathi has obtained his Ph.D degree in chemistry from Jiwaji University, Gwalior. Currently he is serving as Scientist 'G' in DMSRDE, Kanpur. He has published more than 45 papers and filed 6 patents. His area of specialization is Rubber, Organic-Inorganic Polymers blends and fibers, seals, gaskets, O-rings and composites.

Dr. A. K. Saxena has completed his Ph.D degree in chemistry from Lucknow University. He is former Outstanding Scientist and Director, DMSRDE, Kanpur. He has published more than 90 papers and filed 50 patents. His area of specialization is Inorganic Polymers & Fibers, Nano Materials and Composites.

Dr. Vineeta Nigam has obtained Ph.D in Applied Chemistry from Kanpur University. Presently she is working as Scientist 'E' in DMSRDE, Kanpur. She has published more than 20 papers and filed 18 patents. Her area of specialization is Inorganic Polymers, Adhesives and Nanocomposites for strategic and versatile applications.

Shri M. K. Pandey is serving as Scientist 'C' in DMSRDE, Kanpur. He has filed 13 patents. He is working in the area of High temperature Resins, adhesives, Inorganic polymers, Blends, Fibers, Ceramic armour panels and high temperature lubricants.

Smt. A. Kerketta has obtained her Bachelor's degree in Polymer Science and chemical technology from Delhi college of Engineering, Delhi. She is working in DRDO as scientist and have 4 patents. Her area of specialization is synthesis and processing of inorganic polymers, development structural adhesives for defence application.

Organic polymers are vulnerable to fire, susceptible to UV radiation and are less thermal stable. To overcome these problems and maintaining their tenacity, stretchibility and porosity, we have innovatively added multifunctional polyphosphazene and successfully overcome the inherent problems of the organic polymers. The polyphosphazene are having P=N backbone and reactive pendant groups which are biodegradable, thus the polymers are biodegradable to a certain extent. We have innovatively added polyphosphazene in Polyacrylonitrile, Nylon and Polypropylene and made their continuous fibers by melt spinning process which is a green technology. We have also made PAN Nano fibers using the same compositions. All these fibers are fire retardant. As the PAN fiber are source of carbon fibers it is assumed that these fibers can be successfully converted into porous and non-porous carbon fibers for Nuclear, Biological and Chemical (NBC) and structural applications.

Team - Dr. D. N. Tripathi, Dr. A. K. Saxena, Dr. Vineeta Nigam, Shri M. K Pandey & Smt. A. Kerketta are JOINT WINNER of National Awards 2015-16 under the Category of "INNOVATION IN POLYMERIC MATERIALS"


Dr. K.V. Govindarajan


Shri B. M. Rao


Shri G. Rajesh


Shri P.M. Asseref


Shri P.S. Methia

Dr. K.V. Govindarajan obtained his Ph.D from Chandra Mohan Jha University, Meghalaya in 2012. Currently he is heading the Chemical department of BrahMos Aerospace Ltd, Hyderabad for technology transfer & production. Also assisting the various DRDO Missile development programme and putting into use of various chemicals / polymers / ablative liners / thermal insulation materials development. His recent research involves use of silicone sealants and coating scheme for Ceramic Radomes for Astra missile, use of the chemicals such as high temperature adhesives and paint coating scheme for Hypersonic vehicles development.

Shri B.M. Rao obtained Master Degree in Physical Chemistry from Banaras Hindu University (BHU) in year 1969. He joined Defence Research & Development Laboratory (DRDL), Hyderabad in the year 1971 and promoted to Scientist 'F' in the year 2005. Presently he is working as consultant in BrahMos Aerospace Pvt Ltd, Hyderabad. His main areas of interests are explosives, corrosion science & engineering, polymeric composites. He has filed 5 patents, published articles in 30 journals.

Shri G. Rajesh obtained Master Degree in Rubber Technology from Indian Institute of Technology (IIT), Kharagpur, in 2009. He joined Advanced Systems Laboratory (ASL), Hyderabad of Defence Research & Development Organisation (DRDO) as Scientist 'B' in year 2003 and promoted to Scientist 'E' in the year 2015. His main area of interests are rubber compounding, speciality elastomers, life prediction of elastomeric components, Radar Absorbing Rubber Materials and Sealing Technology. He has filed 2 Indian patents, published articles in 3 journals.

Shri P.M. Asseref obtained his B.Tech in Polymer Science & Rubber Technology from Cochin University of Science & Technology. He joined Advanced Systems Laboratory (ASL), Hyderabad as Scientist 'B' in year 2005 and presently working as Scientist 'D'in the Elastomers Division. He has filed 3 Indian patents, published in 2 International journals. His main interests are seal design, life prediction of Rubber Components, Radar Absorbing Rubber Materials, Compression stress relaxation studies and Rubber compounding.

Shri P. S. Methia obtained his Master Degree in Aerospace Propulsion Technology from Indian Institute of Technology, Bombay (IITB) in 2012. He joined Defence Research & Development Laboratory (DRDL), Hyderabad as Scientist 'B' in year 2004 and promoted to Scientist 'D' in the year 2013. His main areas of interests are sealing technology and propulsion systems.

"Special Thermal Protection Low Molecular Weight Polymethylphenyl Silicone Rubber with Chopped Carbon Fiber Reinforcement Polymeric Material for Aerospace & Missile Applications"

Shri K.V.Govindarajan, Shri B.M. Rao, Shri G. Rajesh, Shri P.M.Asseref & Shri P. S. Methia

Polymeric materials with its flexibility, light weight and thermal/electrical insulation characteristics are widely used in aerospace and missile structures. Thermal insulation properties are crucial for many aerospace subsystems due to severe operating conditions of temperature and velocities. The present application demands a low density foam, low abrasion, flexible material along with low thermal conductivity with excellent bonding characteristics on different substrates. The component must have structural integrity under high temperature and flow conditions. In order to achieve the functional properties, matrix of low molecular weight Room Temperature Curable (RTV) Polymethylphenyl silicone rubber is chosen with temperature flexibility ranging from -70°C to 300°C. Hollow glass microspheres is the choice material for imparting low thermal conductivity and foam characterstics. Asbestos fibres and carbon fibres is used in relatively lesser quantities for imparting insulation characteristics/flame resistance and flexibility respectively to the component. Condensation cure is preferred over addition cure system for greater pot life and inter-compatibility with reinforcing fillers.The innovation in the product lies in adjusting the quantities of the various particulate and fibrous fillers in the matrix with proper dispersion without affecting the thermal conductivity, density and pot life of the component. The technological challenge of this rubber-composite is to enable the system to which it is mounted qualifies various aerodynamic and thermal loads with optimum thickness of the component.

This innovation "Special Thermal Protection Low Molecular Weight Polymethylphenyl silicone rubber reinforced with various particulate and fibrous fillers for aerospace & missile applications" deals with the development and successful use of thermal protective material on the aluminium airframe in supersonic cruise missile (BRAHMOS) imparting insulation characteristics to the structure and protecting the payload without increasing the weight of the system. The scope of the material could be expanded to fabricate light weight thermal protecting applications in Aircraft / Missile / Space industries. M/s Anabond Ltd, Chennai has been chosen as an industry partner for bulk production of this thermal protection material in India.

Team - Dr. K.V.Govindarajan, Shri B. M. Rao, Shri G. Rajesh , Shri P.M. Asseref & Shri P. S. Methia are JOINT WINNER of National Awards 2015-16 under the Category of "INNOVATION IN POLYMERIC MATERIALS"

Shri D. Sen

Indian Oil Corporation Limited is India's largest commercial enterprise, with a sales turnover of Rs 4,50,756 crore (US$ 73.7 billion) and profits of Rs 5,273 crore for the year 2014-15. It is also the leading Indian corporate in Fortune's prestigious 'Global 500' listing of the world's largest corporate, ranked at the 119th position currently. IndianOil has a sprawling world-class R&D Centre that is perhaps Asia's finest. This Centre is India's foremost commercial centre of research excellence in the areas of lubricants, refinery processes, pipeline transportation, alternative fuels fuel additives, engine testing, materials sciences, environmental sciences, petrochemicals & polymers. The Centre holds 438 active patents, including 257 international patents.

Shri D. Sen is serving on the board of IOCL as Director (Plg and Business Development). Shri D. Sen heads Petrochemicals business, Gas business, upstream and renewable Energy business verticals of Indian Oil, the largest Indian Enterprise ranked 119th in fortune 500 global listing. Shri. D. Sen is also Director on the boards of Petronet LNG Limited (PLL), IndOil Montney Limited (IML) and IndOil Global B.V. (IGBV).

A Bachelor in Mechanical Engineering from Jadavpur University with one year advanced course in Lubes and Fuels from IIP Dehradun, Mr. Sen possesses rich experience of over 35 years in all aspects of Petroleum Products marketing including brand building, new product launches, customer segmentation, niche marketing etc. in India as well as abroad.

8 MFI High Density Polyethylene (HDPE) is widely used in various molding applications like houswares, caps & closures, crates and pallets and its market size is ~120,000 MTA. One of the biggest challenges in injection molding is its never ending demand in cycle time reduction for achieving higher productivity. Hence for a resin manufacturer, innovation in raw material becomes inevitable. With the above objective, a new high performance HDPE grade 080M60 was developed in-house at Indian Oil's Product Application & Development Center (PADC) & launched commercially in Feb'2015.

Significance:
Indian Oil has successfully developed this high performance grade in a very cost effective manner so that customers can realize the benefit of higher productivity as well as reduced energy consumption besides superior product aesthetics without any additional price increase.

Benefits:
Compared to equivalent grades from co-produces, High Performance 080M60 offers following benefits to plastic processor (Indian Oil customers):

- Cycle time reduction up to 10% (depending on product & equipment) & lower energy consumption.
- Higher stiffness showing flexural modulus more than 940 Mpa. (Possibility of reduction in part weight).
- Very good dimensional stability and low warpage in moldings.
- Easy demolding (mold release) of the product.
- Industry standard impact test such as drop test & ball drop test for crates & dimensional stability, printability and fitment test for caps & closures are well within the desired specification.

M/s Indian Oil Corporation Ltd., New Delhi is the JOINT WINNER of National Awards 2015-16 under the Industry Category of "INNOVATION IN POLYMERIC MATERIALS"

Shri. S. T. Kulkarni

Shri O. C. Vyas

M/S ESTER INDUSTRIES LTD.,
GURGAON

Ester Industries Ltd. is India's leading producer of BOPET Films, Engineering Plastics and has started a new division on Specialty Polymers in 2012 for catering global needs of Specialty Polyesters in Textiles, Packaging, Carpets and Engineering Applications.

Shri S. T. Kulkarni Business Head, Specialty Polymer Division of Ester Industries Ltd. He is a Chemical Engineer from KREC (now recognized as NITK-Surathkal) and has extensive experience of 35 years in Polyesters, Nylon & Engineering Plastics. He has been the main inventor in about 47 patent applications filed till date (out of which about 20 have already been granted) in the USA, EU & India.

Shri O. C. Vyas obtained his Master degree in Organic chemistry from North Maharashtra University in 1996. Shri Vyas has active experience and in depth knowledge in various specialties Polyester. He Joined Ester industries Ltd – Uttharakhand in 2011 and currently responsible for all pilot plant operations, R & D functions. He has been the inventor in 23 Patents filed till date (out of which, 1 patent has been granted already) in the USA, EU, and India.

PET Polymer is widely easy being used for packaging application, both in rigid and flexible. PET is gaining wide popularity because of various advantages, such as ease processability, un-breakable nature, transparency, light weight, suitability for food contact application & recyclability. But PET bottles are not suitable for filling at temperature higher than 60°C, as its glass transition temperature is 76°C and softening temperature is 65°C.

ESTER, has developed novel co-polyester, where the glass transition temperature is increased to 92°C and this polyester can be processed into containers which can be hot filled at 90°C. Further the bottles can be produced by normal injection stretch blow molding (ISBM) on existing machine without need of Heat set blow molding. This product and the process of manufacturing is unique and ESTER has filled Patents in India and PCT. The principle involved is to modify polyester to increase its glass transition temperature from 76°C to 92°C, while maintaining transparency & colour of polymer. For this ESTER has used number of special additives and co-monomers to achieve required results. Currently, though there is huge demand of a PET polyester for the hotfill application there is no suitable polymer which can enable manufacturing of bottles of good transparency and colour, which are Hot fillable at 90°C. ESTER has developed the product and the process and filed Patent. The product has been tested and approved by reputed European converter.

Features & Benefits:

- Hot Fillable: Used to produce PET bottles/containers capable to be hot filled up to 90°C by normal injection stretch blow moulding (ISBM)
- Improved Shelf Life: Hot filling increases shelf life of product
- No Deformation and Shrinkage: No shape deformation and shrinkage while hot filling at high temperature Good Color and Transparency: Used to make bottles/containers of superior color and clarity without heat set blow molding process
- Environment Friendly: Recyclable
- FDA Compliance: suitable for food contact applications as per US FDA and EU regulations
- Energy Saving: Normal cycle time during processing and good productivity

Application:

- Food and Beverages: Most suitable for beverages and other food packaging applications requiring hot filling

M/s Ester Industries Ltd., Gurgaon is the JOINT WINNER of National Awards 2015-16 under the Industry Category of "INNOVATION IN POLYMERIC MATERIALS"


Dr. Vimal Katiyar


Smt. Neelima Tripathi


Shri A. K. Pal

Dr. Vimal Katiyar is Associate Professor in the Department of Chemical Engineering at Indian Institute of Technology Guwahati. He has obtain Ph.D in Chemical Engineering from IIT Bombay. His area of research includes development of biodegradable polymers, bio-inspired nanomaterials, clean energy, etc. He jointly owns several granted patents including few granted in various countries. He is coauthor of 35 articles in international journals and 6 book chapters in the area of biodegradable polymers.

Smt. Neelima Tripathi obtained her M.Tech in Chemical Engineering from MNIT, Jaipur in 2011. She is currently pursuing PhD in Chemical Engineering at IIT Guwahati. She is a co-inventor in two Indian patent applications.

Shri A. K. Pal completed his M. Tech. in Chemical Engineering from MNIT Jaipur in 2011. Currently, he is pursuing PhD in Chemical Engineering at IIT Guwahati. He is co-inventor in one Indian patent application and published one book chapter and one research article.

Present invention describes a bio-based additive formulation prepared by simple industrially viable process in short time, i.e. around 30 minutes to few hours and its subsequent dispersion into biodegradable polymers, leads to the improved high gas barrier films. The process is cost-effective and yields an elegant formulation capable of reducing gas permeability when dispersed in hydrophobic polymers. When the additive disperses in hydrophobic polymer through melt extrusion process at pilot scale,it produces excellent degradable polymer films having comparable gas barrier properties with commercial polyethylene terephthalate (PET) and other conventional polymers of its kind. The melt extrusion of biodegradable polymer films has been processed by using pilot scale twin screw extruder. The prepared bionanocomposite films show excellent gas barrier properties as compared to pristine biodegradable films.

The unique feature of the current invention is the formulation of dispersible biobased additives for polymer packaging which are capable of improving gas barrier properties of pristine polymers. The invented formulation and process are environmental friendly. In the present invention, the polysaccharides with or without nitrogenous element are modified in such a way that the master-batches, when blended with biodegradable polymer, impart excellent oxygen and water vapour barrier properties. This invention is not only limited to fabrication of films but can also be applied to other geometries such as bottles, trays, cans etc. In the current work, the problems related to lower barrier properties and degradation have been solved, and the prepared bionanocomposite films are completely degradable and have shown extremely higher barrier properties which is highly recommended for food packaging application.

Indian Institute of Technology (IIT) - Guwahati is the WINNER of National Awards 2015-16 under the Academics and R&D Institution Category of "INNOVATION IN POLYMERIC MATERIALS"


Shri Nirmal C


Shri Elbin George


Shri Lakshmikanth RV


Shri Mathew Daniel


Shri Thomas CR

Shri Nirmal C is M.Tech in Polymer Sci & Tech from IIT, Delhi. Currently he is Scientist SE & Deputy Manager, RPDF/RPP. He has authored 2 international journals and 10 international conference publications. His area of interest includes development of thermal insulation systems and different elastomeric flight components for launch vehicles.

Shri Elbin George obtained his Bachelor's Degree in Aerospace Engineering from IIST, Trivandrum and currently working as Scientist SC in RPP. His area of interest includes design and development of space grade rubber components.

Shri Lakshmi Kanth RV has graduated from IIT, Madras in Mechanical Engineering. As Scientist SC in RPP, he is working in field of design and development of elastomeric moulded components for flight applications.

Shri Mathew Daniel is a graduate in Chemical Engineering. Currently he is Scientist SG & Deputy General Manager, Rubber Products Development & Propellant Finishing Facility (RPDF), RPP. He has filed two patents and authored 14 national & international conference publications. Presently he is working in the field of thermal insulation for solid rocket motors and inhibition resins for trimmed propellant grain surface.

Shri Thomas CR owns M.Tech in Industrial Production from BITS, Pilani. Currently he is Scientist H & General Manager, Rocket Propellant Plant (RPP), VSSC. He has authored several international conference publications. His area of specialization includes pyrotechnics & propellants.

INNOVATION IN POLYMERIC MATERIAL

"Development of Low Density Thermal Insulation System for Case Bonded Solid Rocket Motors"

Shri Nirmal C, Shri Elbin George, Shri Lakshmikanth. RV, Shri Mathew Daniel & Shri Thomas. CR

Solid motors of ISRO's launch vehicles rely on in-house developed silica filled nitrile rubber (NBR) compound as internal thermal insulation material. The evaluation of elastomers like EPDM to replace NBR in Indian space and missile programmes is currently under progress, in view of EPDM's reduced specific gravity/density, wider operating temperature ranges and excellent weather resistance. EPDM insulation with density 15% lesser than conventional material can yield tremendous pay off, especially in gigantic solid booster motors, where the insulation weight contribution is about 1.3 to 1.5% of the propellant tonnage. Even then, this system remains in the state of infancy, for solid motor thermal insulation application, in view of its inferior rubber to metal/propellant interface properties.

The innovation is on the development and performance demonstration of an advanced low density thermal insulation material, by blending EPDM and NBR to utilize the excellent interface, mechanical and chemical resistant property of NBR, coupled with low density of EPDM. The system developed, showed rubber-to-metal interface properties four times better than systems developed elsewhere, and further comparable with existing NBR based insulation material. The material showed better surface finish, mechanical, thermal and erosion resistance, at 15-20% lower density values. The new system's thermal insulation performance was found to be superior than existing NBR system, with 17-29% less material erosion, while tested in sub-scale solid motor level. The system has demonstrated its potential as futuristic light weight high performance case bonded solid motor's thermal insulation material, capable for delivering quantum jump in launch vehicle payload capabilities, by considerably reducing the inert mass and insulation thickness.

Team - Shri Nirmal C, Shri Elbin George, Shri Lakshmikanth RV, Shri Mathew Daniel & Shri Thomas. CR are JOINT RUNNER- UP of National Awards 2015-16 under the Category of "INNOVATION IN POLYMERIC MATERIALS"

Dr. Swapan K. Dolui

Dr. Pronob Gogoi

Dr. Swapan K. Dolui obtained his Ph.D from IIT Kharagpur in 1986. Currently he is Professor in the Department of Chemical Sciences, Tezpur University, India. He has guided 21 PhD students, authored more than 130 research papers and 6 book chapters, and inventor in 9 patents. His area of interest includes polymerization in supercritical carbon dioxide, olefin polymerization using Ziegler Natta catalyst, conducting hydrogels, vegetable oil based alkyd resins, conducting polymers, nanocomposites, conjugated polymer based solar cells, core shell polymers, etc.

Dr. Pronob Gogoi obtained his Ph.D degree on vegetable oil based polymeric materials from Tezpur University, India in 2015. He authored 15 papers in international journals and one book chapter. He has guided 5 M.Tech students. His area of interest is synthesis of polymeric and composite materials based on renewable resources.

Due to the high rate of depletion of petroleum resources and the environmental concerns, the utilization of renewable resources is currently in the spotlight of the chemical industries. Vegetable oils are considered to be the most important class of renewable raw materials due to their world wide availability, inherent biodegradability, low cost, and superb environmental credentials. A variety of chemical modifications can be performed on vegetable oils, yielding functionalized vegetable oils (FVOs) that can be used to produce diverse value added products with versatile applications, particularly as major ingredient in paints and coatings.

The present innovation entitled green synthesis of epoxidized soybean oil and citirc acid based bio-nanocomposites with excellent performance characteristics revealed a class of green bionanocomposites which was prepared by an in situ solvent free and catalyst free method. The bionanocomposites possess excellent performance characteristics in terms of gloss, hardness, dying time, chemical resistance, etc. and hence they can find suitable applications in surface coating industry. The technique avoids the use of any conventional petroleum based materials.

Team - Dr. Swapan K. Dolui & Dr. Pronob Gogoi are JOINT RUNNER- UP of National Awards 2015-16 under the Category of "INNOVATION IN POLYMERIC MATERIALS"

Shri Raja Shunmugam

Shri Raja Shunmugam received his Ph.D from Indian Institute of Technology Madras. He then 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 from 2003 to August 2008. From September 2008 to 2013, he was an Assistant Professor in the Department of Chemical Sciences at the IISER-Kolkata. Since January 2014 he has been Associate Professor in the Department of Chemical Sciences at the IISER-Kolkata.

The name "Arsenic" is very familiar in the chemical industry for its hazardous nature and is listed by World Health Organization (WHO) and Environmental Protection Agency (EPA) as a well-known carcinogen. The combination of high toxicity and widespread occurrence has created a pressing need for effective monitoring and measurement of arsenic in a variety of environmental samples such as soil and groundwater. In particular, the occurrence of arsenic in well water has received significant attention during recent years. In many regions of the world, local populations are exposed to arsenic through ingestion of contaminated water.

Sensing As (III) by simple and efficient method is the biggest challenge for the researchers. There is no viable technology available today for the efficient removal of As(III) while compared to As (V).

We have also demonstrated norbornene attached thiol monomer and it's polymer for As(III) removal as Arsenic (III) has specific affinity towards thiol based ligands. As expected, the ability of the polymer in removing As (III) was 10 times greater than that of its corresponding monomer due to the availability of more number of thiol group in polymer to bind arsenic.

Reference: Sourav Bhattacharya, Santu Sarkar and Raja Shunmugam* "Unique norbornene polymer based "in-field" sensor for As(III)"

Shri Raja Shunmugam is the JOINT RUNNER- UP of National Awards 2015-16 under the Individual/Team Category of "INNOVATION IN POLYMERIC MATERIALS"

Shri S. T. Kulkarni

Shri O. C. Vyas

M/S ESTER INDUSTRIES LTD.,
GURGAON

Ester Industries Ltd. is India's leading producer of BOPET Films, Engineering Plastics and has started a new division on Specialty Polymers in 2012 for catering global needs of Specialty Polyesters in Textiles, Packaging, Carpets and Engineering Applications.

Shri S. T. Kulkarni Business Head, Specialty Polymer Division of Ester Industries Ltd. He is a Chemical Engineer from KREC (now recognized as NITK-Surathkal) and has extensive experience of 35 years in Polyesters, Nylon & Engineering Plastics. He has been the main inventor in about 47 patent applications filed till date (out of which about 20 have already been granted) in the USA, EU & India.

Shri O. C. Vyas is obtained his Master degree in Organic chemistry from North Maharashtra University in 1996. Shri. Vyas has active experience and in depth knowledge in various specialties Polyester. He Joined Ester industries Ltd – Uttharakhand in 2011 and currently responsible for all pilot plant operations, R & D functions. He has been the inventor in 23 Patents filed till date (out of which, 1 patent has been granted already) in the USA, EU, and India.

The Polyester Masterbatch is made by polymerizing polyester prepolymers with a metal sulfonates co-polymer in presence of fast crystallizing polyester block to obtain amorphous sulfonated co-polyester.The co-polyester is further crystallized to from crystallized sulfonated co-polyester masterbatch.

The masterbatch is developed by incorporating specialty additives in the polymer matrix that inhibits the absorption of stain in the polymer matrix. Hence Nylon carpet may easily be washed in case ofany accidental spillages. The carpet can easily be washed without adverse effect. The modified polyester also improves the life of the carpet at least 5 to 7 years longer than carpet made from the conventional polymers.

Features & Benefits:

- Improved Stain Resistance : Imparts excellent stain resistance to Nylon carpets
- Improved Shelf Life : Improves carpet life up to about 7 years
- Cost Effective : Superior and cost effective alternate to sulfonated Nylon and stain resistance coating
- Melt BlendableMasterbatch:Can be melt blended with both PET and Polyamide (PA-6 as well as PA-66)
- Excellent processability

Application:

- Carpet Applications
- Textile applications

M/s Ester Industries Ltd., Gurgaon is the JOINT RUNNER-UP of National Awards 2015-16 under the Industry Category of "INNOVATION IN POLYMERIC MATERIALS"

Shri V. K. Gupta

Shri S. Dhamaniya

The Reliance Group, founded by Dhirubhai H. Ambani (1932-2002) is india largest private sector enterprise with business in the energy and materials value chain . The Flagship company , Reliance industries Ltd , is a fortune global 500 company and enjoys global leadership , RIL is 6th largest polypropylene (PP) producers at global level with manufacturing capacity of 2.7 million ton/annum and holds 1st position in Indian market for PP with total 69% market shares and maximum shares in raffia / injection molding / TQ/ fiber grades.

Shri V. K. Gupta is currently Head, Research and Development (Polymer), Reliance Industries limited Navi Mumbai. He obtained his PhD from Banaras Hindu University in 1984. He has worked for last 30 years in the area of polymer science and technology and inorganic materials at University of Alabama at Birmingham, USA, R&D Centre IPCL, Gharda Chemical Limited and Reliance Industries Limited. He has 130 Patents and 70 Internal Publications to his credit. He has been nationally and internationally recognized for his technology development in the area of polyolefins and engineering thermoplastics through more than 15 awards.

Shri S. Dhamaniya obtained his Ph.D from Indian Institute of Technology Delhi, in the field for polymer science. He has 4 years of experience in Reliance Industries Limited. He has 4 international publications, 6 patent applications and paper presentations in 6 international conferences.

The novel polymerization process based on in-house developed catalyst system produced different grades of polyethylene including novel ultra-high molecular weight resins. The polymerization process is highly energy efficient as compared to conventional system due to production of desired grades at relatively low temperature. These new grades of UHMWPE resin have morphological control and narrow molecular weight distribution that is suitable for different niche applications. The developed catalyst system offers economic advantage of producing different grades as compared to conventional system due to reduction in number of unit operations.

M/s Reliance Research & Development Centre, Navi Mumbai is the JOINT RUNNER- UP of National Awards 2015-16 under the Industry Category of "INNOVATION IN POLYMERIC MATERIALS"

Prof. (Dr.) A.G. Murugesan

Manonmaniam Sundaranar University (MSU) is a dynamic institution of higher learning, set in a rural milieu of southern Tamil Nadu, with a campus spread of 550 acres. The University was established by the Government of Tamil Nadu as a teaching-cum-affiliating University on 7th September, 1990 to cater to the long-felt needs of the people of the three southern most districts of Tamil Nadu viz., Tirunelveli, Tuticorin, and Kanyakumari. It is named after the renowned Tamil Poet scholar, Professor P. Sundaram Pillai (1855-1897), the author of the famous verse drama Manonmaniam.

Prof. (Dr.) A. G. Murugesan is working on industrial pollution and abatement, bioresource technology, environmental toxicology and natural resources management. Prof. Murugesan has published more than 120 research papers in leading journal with high impact factors in addition to 677 other research publications, and written 5 books on environment and global warming. He has guided and produced 34 PhDs, 35 M.Phils and 90 PGs. To his credit, he has 17 Gen Bank on hydrogenase producing isolates and one patent submission Prof. A.G. Murugesan has successfully operated 30 major research projects, in addition to several minor projects, funded by national and international agencies.

Production of Biopolymer from Natural Resource –The Water Hycanith, The usage of inexpensive and abundantly available carbon based feedstock (lignocellulosic waste) is one of the indispensible solutions for the bioplastic production. Among various types of lignocellulosic substances, the aquatic weed water hyacinth (Eichhornia crassipes) is a potential resource available in many tropical regions of the world. It is considered as a noxious weed since it grows very fast and depletes nutrient and oxygen rapidly from water bodies, adversely affecting the aquatic flora and fauna. Also it evapotranspirates water and adds to water crisis in all the places where it grows. Water hyacinth grows in an extremely rapid rate and produces almost 2 tons of biomass per acre and its population doubles every two weeks days. It typically contains 50% to 80% (dry basis) carbohydrates that polymers of 5C (eg. Xylose etc) and 6C (eg. Glucose etc) sugar units and this can be processed biologically to yield Polyhydroxy butyrate. The PHB biosynthesis from hydrolysate of water hyacinth is a aerobic fermentative process occurred within the bacterial cells (eg, Cupriavidus necator). Hydrolysates of water hyacinth were used as the carbon source in fermentation medium and PHB production was performed under optimized conditions in a bioreactor. About 580 gm pretreated water hyacinth powder can be obtained from 1Kg of raw dried water hyacinth from which about 164 gm PHB is produced.

Production of bioplastic from natural resources like aquatic weeds and agricultural wastes by integrated technologies is an innovative method to mitigate pollution.

Manonmaniam Sundaranar University, Tirunelveli is the RUNNER-UP of National Awards 2015-16 under the Academic and R&D Institution Category of "INNOVATION IN POLYMERIC MATERIALS"


Shri T. H. Samiullah


Shri A. S. Kumar


Shri P. M. Shivaiah


Shri K. N. A. Ramu


Shri L. Srikanth


Shri M. R. Prakash

Shri T. H. Samiullah is Senior Principal Scientist and Deputy Head at Center for Societal Missions and Special Technologies (CSMST), CSIR-National Aerospace Laboratories, Bengaluru. He obtained his Bachelor's degree in Mechanical Engineering with a distinction from Bangalore University and joined NAL in 1992. He specializes in composite product development and has nearly two decades of experience. He has lead the strategic development and installation of the first and second generation of composite radomes for the Doppler Weather Radar (DWR) of BEL/ISRO across the country.

Shri A. S. Kumar is Sr. Technician at Centre for Societal Missions & Special Technologies (CSMST), CSIR-NAL. He has 12 years of experience in machining of intricately shaped metallic parts for wind tunnel models and their assembly.

Shri P. M. Shivaiah is Sr. Technician at Centre for Societal Missions & Special Technologies(CSMST), CSIR-NAL. He has 8 years of experience in machining of metallic parts & fabrication of composite radomes, wind turbine blades & wind tunnel models.

Shri K. N. Anatha Ramu is Sr. Technician at Centre for Societal Missions & Special Technologies(CSMST), CSIR-NAL. He has 8 years of experience in machining of metallic parts & fabrication of composite radomes, wind turbine blades & wind tunnel models.

Shri L. Srikanth is Senior Scientist at Center for Societal Missions and Special Technologies (CSMST), National Aerospace Laboratories, Bangalore. He obtained his Ph.D. in Mechanical Engineering Sciences from Visvesvaraya Technological University, Karnataka.

Shri M. R. Prakash is a Senior Technical officer at Center for Societal Missions and Special Technologies (CSMST), National Aerospace Laboratories, Bangalore and Apart from mechanical testing of composites, he has been involved in transfer of technology of radome manufacturing to BEL, Navi Mumbai.

"Indigenous Manufacture & Installation of Mark II Radomes for Doppler Weather Radar"

Shri T. H. Samiullah, Shri A. S. Kumar, Shri P. M. Shivaiah, Shri K. N. Anatha Ramu, Shri L. Srikanth & Shri M. R. Prakash

The Ground Based Mark II Weather Radome is a spherical radome of diameter 12.88m that acts as a protective housing for the DWR system. The radome has 66 polygonal panels fabricated using PolyUrethane (PU) Foam core glass epoxy sandwich composite. A cost-effective wet lay-up and Room Temperature Vacuum Bag Moulding process has been adopted. The innovative contributions such as a single universal master pattern, composite tooling for in-situ moulding of spherical sandwich composite panel joint interface for radome assembly (thus entirely eliminating machining of composites), foam core casting technique for panels of large area (~7m2), contoured drilling fixture for machining of spherically curved composite panels, ingenious techniques for radome installation at heights of 80ft. above ground level ensuring complete closure of the spherical structure, etc. are the hallmark of cost effective radome manufacturing technology development at NAL to meet the societal and strategic needs of the country. After successful development and demonstration of Manufacturing technology and installation of country's largest indigenous state-of-the-art DWR Mark II Radomes (protecting Rs.12 Cr worth ISRO/BEL Radar), the technology has been disseminated through transfer of technology (ToT) to industry (BEL) for production. Precious foreign exchange savings of nearly 30% has been achieved vis-à-vis imported radomes.

The radome protected DWRs are vital to the country as they are used by IMD to forecast meteorological information for weather sensitive activities such as agriculture, irrigation, and severe weather phenomena like the cyclones, monsoon rains, etc.

The radome manufacturing technology development has placed India in a select group of privileged countries, which possess ground based radome technology. It has given a strong impetus to the development of vendors and skilled HR in this segment of fibre reinforced polymer composites.

Team - Shri T.H. Samiullah, Shri A. S. Kumar, Shri P.M. Shivaiah, Shri K. N .Anatha Ramu, Shri L. Srikanth & Shri M. R. Prakash are WINNER of the National Awards 2015-16 under the Category of "INNOVATION IN POLYMERIC PRODUCTS"

Shri Appasaheb Malagaudanavar

Shri Hitendra Saundankar

M/s Hindustan Aeronautics Limited, Aircraft Division Nasik, established in the year 1964 for licence manufacture of MiG-21FL aircraft & K-13 Missiles, is located at Ojhar, in the state of Maharashtra. The division since then manufactured other MiG variants; viz MiG-21M, MiG-21 BIS, MiG-27 M and the state-of-the-art aircraft ie Su-30 MKI. Along with manufacturing, the division also carries out overhaul of the MiG series aircraft and started ROH of Su-30 MKI. With the introduction of New a state-of-the art project ie Su-30 MKI and for smooth activities and operation of the division the Aircraft Division, Nasik is de-lineated into two Divisions viz Aircraft Manufacturing Division (AMD) for manufacturing activities and Aircraft Overhaul Division (AOD) for Repair & Overhauling (ROH) activities.

The Aircraft Division has been accredited with ISO-9001 Quality System Certification and is in pursuit of Total Quality Management. Also accredited with AS 9100C.

Shri A. Malagaudanavar has completed post-graduation in Machine design from IIT Chennai in 1987. He was responsible for design development of integral fuel tank for HPT-32 aircraft, role equipment integration and capability enhancement of DO-228 as maritime reconnaissance and intelligent warfare (MRIW) aircraft leading to Raksha Mantri Award for the team. Responsible for establishing the CADD center and culture of paperless design. Responsible for salvaging many HPT-32 and DO-228 aircraft damaged during accident. Currently heading aircraft upgrade research and design center (AURDC) HAL Nashik.

Shri H. Saundankar obtained his master's degree in Plastic engineering from UICT Mumbai in 2005. He is presently working as Manager (Design Indigenisation), AURDC as group head for Nonmetallic & consumable materials. He had indigenously developed many types of nonmetallic materials and consumables directly used in military aircraft such as MiG series, SU-30MKI etc.

Canopy Inflatable seal is designed to round out with the Introduction of N2 at pressure of 2 Kg/cm2 to form tight barrier between mounting and sealing surface. Upon introduction of inflation by N2, it quickly expands and provides positive sealing. When the inflation pressure is removed, sealing hose retracts naturally to deflated mould configuration and this provides clearances for free movement of one or both the surfaces of SU-30MKI military aircraft. Inflatable seal i.e. Canopy sealing hose, which consist of elastomeric tube molded in desired shape having layers of fabric as reinforcement. It has unique product size i.e. 3345 mm length, 800 mm width (total perimeter 7860±30 mm) and 21 mm height. Canopy sealing hose of SU-30MKI Military aircraft is used for providing airtight joint of aircraft cockpit, whenever canopy is closed, locked, and hose is in inflated condition. Hose had been manufactured from silicon rubber and synthetic fabric. Airworthiness Authorities (DRDO) had approved this innovative product after successful evaluation of product oriented/end use tests considering the various aspect of airworthiness like cyclic inflation /deflation test at high, low and Room temperature, proof pressure, burst pressure, ozone resistance, aging test, UV resistance test, air tightness checks, flight test of 10 sorties etc, Raw material verification.

- Hose working pressure is 2±0.5/0.2 Kgf/cm2.
- Height of cross-section in free condition 12±0.5 mm.
- Hose inflated condition needs to be in between 18-24 mm.

The innovation "Indigenous development of canopy inflatable seal made from elastomeric material and used in Indian military aircraft" has significant advantages and benefits for Indian air force and India are-better quality and performance of hose providing full service life i.e. 10 years, use of silicon as raw material instead of conventional raw material, Achievement of Self-reliance for India, Earning in country's foreign exchange due to export potential of Indigenous product, Accelerate economical Growth and increase in efficiency of Indian Industries involved in development and supply of Indigenous products, materials.

M/s Hindustan Aeronautics Limited, Nashik is the WINNER of the National Awards 2015-16 under the Industry Category of "INNOVATION IN POLYMERIC PRODUCTS "

Prof. (Dr.) Siddaramaiah

Prof. (Dr.) Siddaramaiah obtained Ph.D degree from University of Mysore, Mysore. He worked as a Post Doctoral Research Fellow at Chonbuk National University, South Korea.

He is currently working as Professor, Department of Polymer Science & Technology, Sri Jayachamarajendra College of Engineering (SJCE), Mysore, affiliated to Visveswaraya Technological University, Belgaum. SJCE, Mysore. He has authored more than 280 research articles in reputed journals, more than 215 conference papers, five book chapters, two review articles, one book, one monograph and is a co-inventor of 2 Indian patents. Twenty students have successfully completed their Ph.D degree under his supervision and he has also supervised 9 students for M.Sc (Engg) by research, MDS, M.Pharm and M.Phil degree.

The cesium zincate (Cs2ZnO2) nanofillers were successfully integrated into a highly flexible, reversibly stretchable, transparent, conductive and particle-stabilizing poly(vinyl alcohol) (PVA) matrix by eco-friendly solution intercalation technique (Fig. 1(a)). The fabricated new series of PVA/Cs2ZnO2 nano composite hybrids is one of its first kind of indigenous (in our laboratory) fluorescent membrane probes with a high flexibility coupled with visible transparency. The fabricated nano composites show a visible green emission on exposing to UVA radiations. Furthermore, the fluorescence is so intense that the spectral transition from colorless to green is clearly visible to naked eyes (Fig. 1(b)). The integrated fillers brought about an increase in RI and optical dielectric constants of PVA films in addition to novel blue–green fluorescence (2.48–3.1 eV) with emission intensity increasing filler content. PVA/Cs2ZnO2 films can be employed as fluorescent polymeric membrane probes to sense and quantify the leakage of UVA radiations. The fabricated films with excellent optoelectronic properties along with ultra flexibilities and strechabilities finds potential application in power integrated stretchable opto-electronic systems and also employed as flexible UVA filters for optoelectronic devices.

The results published by my research team have opened up the technological gateway towards the development of low cost UV sensors. Further, the wealth of the data generated by us will aid the researchers and industrialists to reduce the operational cost in the development of UV sensors. We have also tuned the optoelectronic properties of PVA by integrating different nano fillers and have been successful in extracting some novel material properties arising from the synergistic filler/matrix interactions.

Dr. Siddaramaiah is the RUNNER-UP of the National Awards 2015-16 under the Individual Category of "INNOVATION IN POLYMERIC PRODUCTS "


Shri D. D. Welukar


Shri D.K. Gandhi

M/s Mutual Industries Limited established in 1979, promoted by late Mr J.M.Gandhi and Mr D.K.Gandhi is a family owned company managed by professionals with long experience in the field. Mutual offers to their customers plastic based solutions from concept stage to development, mass manufacturing and supply logistics. Product and parts are developed through a comprehensive program management system, utilizing the experience and knowledge built across the organization to ensure delivery of time bound projects at the required standards of quality and cost. Our Programs encourage innovative solutions, developed from an idea to mass scale production, delivered with Just in Time and Just in Sequence Logistics.

Shri D. D. Welukar obtained his Master of engineering degree in CAD/CAM from SGGSIE&T at Nanded . He had worked continuously in innovative plastic product development& composite material technology in Automotive & non-automotive area from last 12 years & applied 8 Patent.

Shri D. K. Gandhi is the Managing Director of Mutual Industries, with experience spanning more than three decades. Mr. Dharmendra, a graduate in Commerce, along with Mr. J.M Gandhi co-founded MIL in 1979 with a vision to provide the industry with innovative state-of-the-art manufacturing solutions in engineered polymer based components, systems and related services.

The present invention provides a manhole cover assembly for infrastructure requirement. The manhole cover assembly consist of upper plate, a Modular reinforcement part and plurality of reinforcement features. Upon application of load on an upper plate, the plate transfers load on the assembly of reinforcement part which subsequently transfers the load to the surrounding frame thus facilitating distribution of the load on the frame body. The manhole cover assembly as per claim wherein the parts are being formed by injecting fiber glass reinforced thermoplastic& supported by reinforced parts.

Following are the advantages of the present innovation:

Our Composite Manhole cover are characterized by their lightweight & ease of handling advantage over Concrete & Metal casted one, Prevent injuries and contribute to safer job site, high volume production process, Protect from possibility of accidental electrical shock, Slip resistance & not skid surface pattern, Reduce the energy consumption in manufacturing as compare to metal casting process, are of the materials that offer a little interference with radio frequency, satellite and cell phones signals associated with modern utility automation, remote switching & event detection system.

M/s Mutual Industries Ltd., Vasai is the RUNNER-UP of the National Awards 2015-16 under the Industry Category of "INNOVATION IN POLYMERIC PRODUCTS "


Shri B. T. Shriram


Shri S.B.M. Guruvayurappan


Shri N. A. Baker


Shri S. Mukherjee


Smt. Elizabeth John


Shri C. S. Nair

Shri B. T. Shriram completed his M.E.(Chemical) from BITS, Pilani. Presently, he is working as a Scientist/Engineer in Propellant Engineering Division of Vikram Sarabhai Space Centre. His expertise and research interest include development of composite solid propellants, their processing, rheo-mechanical characterization of solid propellants, polymers & elastomeric systems, solid propellant burn rate evaluation and design and development of novel test methodologies for characterization of viscoelastic materials, material behaviour modelling and modelling of chemical systems.

Shri S.B.M. Guruvayurappan is working as a Senior Technical Assistant in the Propellant Engineering Division of VSSC. He co-authored 6 international / national conference papers. Currently he is working in the area of Non-destructive testing of pyrogen igniters and various subsystems such as Polyimidpiple lines, insulation systems of Launch vehicles viz, PSLV, GSLV, LVM3.

Shri Nazar A. Baker obtained his B.Tech. in Mechanical Engineering from College of Engineering, Trivandrum. He is working as Scientist/Engineer in the field of design and realization of metallic moulds and fixtures required for R&D in propellant and polymers area.

Shri Suhas Mukherjee received his B.E degree in Chemical Engineering from Haldia Institute of Technology, West Bengal University of Technology, Kolkata in 2008 as Scientist/Engineer. He is working a Scientist/Engineer. His primary research interests and field of working include characterization, property modelling, and design of characterization equipments for viscoelastic materials like propellants, rubbers, and elastomers, and modelling and design of chemical systems.

Smt. Elizabeth John took her ME in Chemical Engineering from IISc, Bangalore. She is currently working as Head, Propellant Engineering Division in Vikram Sarabhai Space Centre (VSSC), Trivandrum. During her career spanning 30 years in VSSC, she has contributed immensely to the launch vehicle and satellite programmes of ISRO. As Head, Propellant Engineering Division, she is responsible for the development and supply several critical products required for ISRO's launch vehicles programmes. Her current interests are in the area of propellants, polymers and rubbers which also includes specialized characterization methodologies for performance evaluation of these materials.

Shri C. Sreekumaran Nair earned his M.Sc in Chemistry from Mahatma Gandhi University, Kottayam. He worked in Vikram Sarabhai Space Center (VSSC) Thiruvananthapuram for four decades in various capacities. He has contributed significantly to all ISRO missions starting from SLV-3. Currently he is working as Lab in-charge at department of Chemistry, Indian Institute of Space Science and Technology (IIST), Thiruvananthapuram.

"Novel Technique to Evaluate Biaxial Tensile Properties of Filled Polymeric Materials like Composite Solid Propellant"

Shri B. T. Shriram, Shri S.B.M. Guruvayurappan, Shri N. A. Baker, Shri S. Mukherjee, Smt. Elizabeth John & Shri C. S. Nair

Relates to the development of a novel and cost effective technology for evaluating equi-biaxial tensile properties of strategically important solid propellant systems. The development involves design of a specially configured test specimen and a test set up compatible with UTM for achieving bi-axial stress field.

The state-of-the art composite solid propellants are highly filled polymeric composites and being of strategic nature, propellant technology is closely guarded secret. In a typical solid rocket motor (SRM) like S-200 strap-on motor of heavy lift GSLV MkIII has 200 tons of solid propellant is loaded in motor casing lined with elastomeric insulation. The solid propellant grain experiences multi-axial stresses, predominantly biaxial in nature, at varying strain rates during its life cycle. Knowledge of the biaxial strain experienced by the solid propellant at different strain rate is very critical for accurate structural integrity analysis of solid rocket motor and prediction of structural margin of safety based on its capability to withstand induced loads. Technologies that have been developed and are being employed for evaluation of biaxial properties materials such as metals, films, plastics, etc. have limitations and are not suitable for solid propellants or similar polymeric composite materials.

The developed test method can potentially be used for evaluating equi-biaxial properties of other polymeric composite systems as well for ensuring robust design of structural systems or components made from such materials.

Team - Shri B. T. Shriram, Shri S.B.M. Guruvayurappan, Shri N. A. Baker, Shri S. Mukherjee, Smt. Elizabeth John & Shri C. S. Nair are WINNER of National Awards 2015-16 under the Category of "INNOVATION OF POLYMER PROCESSING MACHINERY & EQUIPMENTS"

Shri P M Jariwala

M/S KABRA EXTRUSIONTECHNIK LTD.,
MUMBAI

M/s Kabra Extrusiontechnik Ltd. (KET) is a part of renowned Kolsite Group. With over 5 decades' experience, more than 11000 installations and presence in more than 84 countries in Americas, Middle East, Asia and Africa, KET enjoys leadership position in the extrusion market.

KET offers following major product lines -

Twin screw extrusion lines for RPVC/ cPVC pipes, PVC profiles & pellets Single, screw extrusion, lines for PO & PP-R pipes High Speed Flat/Round Drip Tube linesMonolayer, Multilayer Blown Film, Lines High Capacity Mixer-coolers Downstream and auxiliary equipment for pipe & film plants.

Shri P. M. Jariwala has done M. Tech. (Machine Tool Design) in 1973 from IIT, Kharagpur, India. He is working as a Sr. Vice President (R & D) with Kabra Extrusiontechnik Ltd. He has rich experience of more than 40 years in the plastics extrusion & processing industry.

With his in-depth knowledge and experience, Mr. Jariwala has played a key role in developing various machinery for PVC & HDPE Pipe Extrusion, Profile Extrusion, Compounding Lines and multilayer blown film lines for KET.

With Government announcing Digital India program to empower and bring together India's social-commercial ecosystem, need for better communication infrastructure has seen a boost like never before. This machine contributes to the telecom infrastructure development.

Producing Micro-duct at high line speed is a challenge in terms of maintaining good finish, wall thickness & ovality. Ovality is the most critical parameter which needs to be controlled for consequent operations of bunching & sheathing. This has been made possible by special design of vacuum tank with closed loop control of vacuum and capstun belt haul-off.

With its unique micro-duct extrusion process that adheres to global standards, machine is capable of delivering consistent output of micro-duct without any change in design, configuration & characteristics of micro-duct.

Significance & benefits:

- High output rate to manufacture any type of micro-duct ranging from 5 mm to 16 mm OD.
- Ovality of the duct: 3 – 4 % of OD
- Winding capacity: up to 4 km - helps in longer production run while making bundled sheathing.
- Import substitute and export grade with much lower price than foreign manufacturers. Contributes to India's foreign exchange saving.
- Unique design with less space requirement & lower production cost.

M/s Kabra Extrusiontechnik Ltd., Mumbai is the WINNER of National Awards 2015-16 under the Industry Category of "INNOVATION OF POLYMER PROCESSING MACHINERY & EQUIPMENTS"

Dr. Jitendra S. Sangwai

Indian Institute of Technology (Madras), is one among the foremost institutes of national importance in higher technological education , basic and applied research. The institute has sixteen academic departments and a few advanced research centre's in various disciplines of engineering and pure sciences, with nearly 100 Laboratories organised in a unique pattern of functioning.

Dr. Jitendra S. Sangwai is currently working as an Associate Professor in the Petroleum Engineering Program, Department of Ocean Engineering at Indian Institute of Technology (IITM) Chennai. He holds Ph. D. in Chemical Engineering from IIT Kanpur. His research interest are in the field of gas hydrates, enhanced oil recovery, rheology of complex fluids, and nanotechnology for oil and gas engineering. He has published around 45 international journal papers and 60 conference publications. He has filed 10 Indian patents and 6 international patents. He has graduated 5 PhD students and 14 M. Tech. in the field of petroleum engineering. His current research group consists of 8 PhD students and 9 M. Tech. students.

Complex fluids, such as emulsions, suspensions and slurries, are frequently encountered in various industrial applications, such as in chemicals, paint, polymer, pharmaceutical, and oil and gas industry. Information on the insitu rheological properties of complex polymeric emulsions, slurries, suspensions and polymerizing systems is very important to understand their flow properties. The flow properties of these complex systems depend on shear conditions in addition to various other factors. Conventional methodology of rheological measurement requires that the emulsions and slurries should be stable during the course of measurements, which may not be the real case during the flow of these fluids, and does often involve creating them in a separate pre-mixer before measurements. Conventional cup and bob mixing is poor, especially at low shear rates, therefore unstable, pre-mixed emulsions tend to separate out, a fundamental issue with such an apparatus design. For the real application, the insitu dynamic rheological properties are necessary, which by the conventional geometry cannot be measured. The research work and the invention entitled, "Apparatus and method for rheology of complex and multiphase polymer or polymerizing systems" deals with the development of apparatus and methodology for the rheological measurement of complex fluids. The invention provides modification over the existing geometry which helps to enhance the mixing of multiphase fluids in situ and measures absolute rheological properties of complex multiphase fluids and polymerizing systems prepared using emulsion and suspension polymerizations.

Indian Institute of Technology (IIT)- Madras is the WINNER of National Awards 2015-16 under the Academic and R&D Institution Category of "INNOVATION OF POLYMER PROCESSING MACHINERY & EQUIPMENTS"


Dr. B. P. Panda


Dr. Smita Mohanty


Dr. S. K. Nayak

Laboratory for Advanced Research in Polymeric Materials (LARPM) is an exclusive R&D wing of Central Institute of Plastics Engineering & Technology (CIPET) set-up in 2008-09 with an objective of developing high-end polymeric materials in the area of Polymer Blends and Alloys, Composites and Nanocomposites, Polymer Synthesis, Fuel Cells, E-waste Recycling and Biodegradable Polymers. Over the years, LARPM has established its recognition in terms of high global citations through International Publications in Peer-Reviewed Journals, Patented Technologies, Textbooks, Industry-Academic Tie-Ups and Collaborative Research with Universities in India and abroad.

Dr. B. P. Panda presently working as Scientist at LARPM, Bhubaneswar completed his Ph.D from Biju Patnaik University, Rourkela in Fracture mechanics and composite structure. He is possessing more than 06 years of experience in Teaching, Research and Industrial background, especially in the areas of Polymeric Materials, composites, Testing & Processing.

Dr. Smita Mohanty is Senior Scientist and In-charge of LARPM with more than 12 years of Research and Teaching experience. She has completed her Ph.D and D.Sc degree in the year 2004 & 2013 respectively. She has published more than 150 papers in major International Journals and has 05 Indian Patents to her credit. She has also initiated several advanced research at LARPM, which includes E-waste Recycling, Biopolymers from Natural Resources, Polymer Electrolytes etc. She has so far guided 10 Ph.D students. She has successfully completed several sponsored projects and has authored 10 textbooks / chapters, published under renowned international publishers.

Dr. S. K. Nayak holds the position of Prof. & Chair of R&D wings of CIPET with 30 years of experience in Teaching and Research. He is an active researcher in the field of Polymer Science & Technology with several publications in peer-reviewed International Journals and Patented Technologies in the area of Advanced Polymeric Materials & Characterization.

"Production of Highly Controlled Deposition and Alignment of Carbon Nanotube - Polymer Composites; Apparatus and Applications"

Dr. B. P. Panda, Dr. Smita Mohanty & Dr. S. K. Nayak

The present innovation relates to the fabrication of device comprising of various embodiments using in-house facility for production of highly controlled deposition and alignment of Carbon nanotube (CNT) on to the polymer matrix. The developed device utilized both magnetic interactions and alternating current (AC) fields for spatial manipulation and positioning of CNTs into the polymer matrix. Test results showed that thermal and electrical properties of CNT-polymer composites are significantly enhanced by magnetic and electric alignment during processing. The versatility of the fabricated device is owed to its controllability of both magnetic and electric field strength for architecture of alignments for making high-density interconnects.

The present invention provides controlled alignment and production of aligned polymer composites. The methods of the present invention can be used to form polymer nanocomposites for use as highly conductive continuous wires, continuous fibers, tapes, and thin films. Such nanocomposites can find numerous applications, including electrical, mechanical and thermal applications. A novel and cost-effective device has been fabricated which demonstrated to have potential for making assembly of complex networks without disruption of initial alignments. The developed proof-of concept provided superior thermoelectric and mechanical properties in comparison with previous efforts include post growth electric-field-assisted alignment.

Team - Dr. B. P. Panda, Dr. Smita Mohanty & Dr. S. K. Nayak is the RUNNER-UP of National Awards 2015-16 under the Category of "INNOVATION OF POLYMER PROCESSING MACHINERY & EQUIPMENTS"

Shri R. N. Doshi

M/s Rajoo Engineers Ltd. with modest beginning in 1986 from a relatively unknown town of Mandavar(Junagadh) in Gujarat has witnessed the transformation to an expansive global foorprints by its quality, price and extrusion technology.

Shri R. N. Doshi (CMD), co-founder of the Rajoo Group, is very hands-on and responsible for the overall operations of the Group. He comes with over 2 decades of experience in plastic processing, machinery manufacturing and product developments. His astute identification of new technologies and the novel paradigm to 'control cost without compromise' are responsible for the sustained technology and business edge enjoyed by the group. Project execution remains a strong forte of Mr. R. N. Doshi.

The USP of industry has always recognized Rajoo as an innovator, quality supplier and a forefront runner in empowering the plastic processing industry with advanced technologies. This recognition was further reinforced when the Rajoo addressed the long-standing demand of the industry for stacking solutions for low weight disposable glasses, high productivity and comfort of use with minimal manpower. Rajoo introduced India's first ever Tilting Mould Thermoformer. The disposable containers market witnessed an integrated thermoforming, stacking, counting and packing solution; Rajoo fulfilled its market commitment.

Aesthetics : Rajoo's machines have always been widely recognized for its aesthetic features and design excellence. Rajoo's Dispotilt is India's first Auto stacking Thermoforming machine for manufacturing glasses with robust structure.

Benefits & Advantage

Cost Benefits: Rajoo's Dispotilt is high production glass making machine with Automatic stacking solutions, capable of producing and stacking even 1.4 grams water glass. With a production speed of 40 cycles per min and a forming area of 750 mm x 450 mm, the production is three times more than any other available Indian thermoforming machine. It requires only 3 personnel compare to 30 in conventional thermoforming machine thus resulting in cost benefits in terms of power, labour and space.

Time Benefits: High productivity and less down time because of auto stacking, counting and packing system. Easy and quick start - up of production.

Energy Consumption: Due to high production and stacking solution, energy consumption is 50 % lower than manual thermoforming machine for same production capacity.

Business Opportunity: Dispotilt is design to produce round containers (Glasses) which holds 90% share of total disposable market in Indian thermoforming industry. Most hygienic way to produce containers for food packaging with no human touch in the entire process. High productivity and reduced manpower with an automation.

M/s Rajoo Engineers Ltd., Rajkot is the JOINT RUNNER-UP of National Awards 2015-16 under the Industry Category of "INNOVATION OF POLYMER PROCESSING MACHINERY & EQUIPMENTS"

M/s. Toshiba Machine (Chennai) Pvt. Ltd. (Abbreviated as TMIC), is among the leading high-end plastics injection molding machines and auxiliary equipment manufacturers in India. TMIC is a wholly owned company of Toshiba Machine (Japan).

With Toshiba Machine factories spread across Japan, China, Thailand and India, we offer competitive products and services to our clients.

The various product range manufactured at our state-of-the-art factory in Chennai (India)caters to application segments in Packaging, Electrical, Automotive, White-goods, Writing instruments, Construction etc.,

Our continuous efforts to make the products more energy efficient triggered this project. The originality of the innovation is about modifying the existing concepts without introducing new parts and within a very short period of time. Objective set was to improve the energy efficiency of existing model STS150-900 servo machine by at least 20% from the present level. The improvised machine is designated to be called as TS150-900 machine. The principle followed was to optimize the hydraulic circuitry to reduce losses during each actuation of the machine and thereby improve the energy efficiency of the machine. The final results 27.91%, (i.e., energy saving), from the mould trial was found to be higher than the set target value of 20%. Also, horizontal implementation of the improvised concept in other machine models is in progress which will further strengthen our product portfolios and thereby our Business.

M/s Toshiba Machine (Chennai) Pvt Ltd., Chennai is the JOINT RUNNER-UP of National Awards 2015-16 under the Industry Category of "INNOVATION OF POLYMER PROCESSING MACHINERY & EQUIPMENTS"

Shri Joseph Bensingh R

Advanced Research School for Technology and Product Simulation (ARSTPS), R&D wing of Central Institute of Plastics Engineering & Technology (CIPET) offers high-end solutions for complex & critical engineering problems in the area of product design and development. ARSTPS is working with a wide range of companies in the field of Automotive, Defence, Aerospace, Consumer Products, Agriculture and Health Care for developmental work and to solve the most challenging technical issues. ARSTPS is a committed R&D centre in the field of Conceptual Design, Product and Process Development, Functional Proto development, Computer Aided Design & Engineering, Product & Process simulation, Value Engineering, Product validation for NVH & Fatigue and Advanced Tooling.

Shri Joseph Bensingh R, working as Scientist and heading ARSTPS, Chennai obtained master degree in Engineering with specialisation of Product Design & Development (PDD) and pursuing Ph.D in Anna University, Chennai. He is co- inventor of 4 patents (published), guided 22 M.E/M.Tech & 16 B.E/B.Tech Students. He published 5 papers in international journal and 30 papers in international conferences. He has 20 years of experience in design and developmental activities for product & Tooling with CAD/CAM/CAE & CNC Machines. Currently, he is working in design and optimisation of plastic products and process Development.

In mass production techniques like injection, compression, transfer moulding and pressure die casting dies cores are used to create internal features of the products. The cores are withdrawn from the moulded or die cast part, after moulding or casting, to remove the product from the mould or die. Certain features of the products call for different treatments for withdrawal of core features. One such feature is circularly curved withdrawal of the core. Traditionally, circularly curved withdrawals are made using rack and pinion mechanism with complex hydraulic and pneumatic parts. However, due to its inherent nature, the said mechanism has restrictions on the number of products to be produced per shot. The cost of such production is high. Therefore, a novel withdrawal device for withdrawing curved cores in moulds and dies which has unique advantage of allowing multiple products per moulding or casting cycle having cost benefit is required.

The present invention overcomes the problems of limitations on the number of products per moulding or casting cycle, as is seen from the prior art, being faced by the existing withdrawal method using rack and pinion with complex hydraulic and pneumatic parts. The innovation implemented where component needs very high production volume & quality and the geometry of the component is curved undercut.

Advanced Research School for Technology and Product Simulation (ARSTPS), Chennai is the RUNNER-UP of National Award 2015-16 under the Academic and R&D Institution Category of "INNOVATION OF POLYMER PROCESSING MACHINERY & EQUIPMENTS"


Dr. Vimal Katiyar


Shri Prodyut Dhar


Dr. Amit kumar

Indian Institute of Technology, Guwahati the sixth member of the IIT fraternity, was established in 1994. The academic programme of IIT Guwahati commenced in 1995.

At present the Institute has eleven departments and three inter-disciplinary academic centres covering all the major engineering, science and humanities disciplines. Within a short period of time, IIT Guwahati has been able to build up world class infrastructure for carrying out advanced research and has been equipped with state-of-the-art scientific and engineering instruments.

Dr. Vimal Katiyar is Associate Professor in the Department of Chemical Engineering at Indian Institute of Technology Guwahati. He has obtain Ph.D in Chemical Engineering from IIT Bombay. His area of research includes development of biodegradable polymers, bio-inspired nanomaterials, clean energy, etc. He jointly owns several granted patents including few have been granted in various countries. He is coauthor of 35 articles in international journals and 6 book chapters in the area of biodegradable polymers.

Shri Prodyut Dhar obtained his B.Tech in Chemical Engineering from NIT Durgapur in 2012. Heis currently pursuing Ph.D. in the Department of Chemical Engineering at IIT Guwahati. He has published 7 research papers, 3 book chapters and 4 conference papers. His research interest is fabricating bio-based polymer nanocomposites through sustainable approaches.

Dr. Amit Kumar is currently an Assistant Professor in the Department of Chemical Engineering at IIT Guwahati. He obtained his B.Tech. in Chemical Engineering from IIT Kharagpur and Ph.D. in Chemical Engineering from the University of Delaware, USA. He has published several research articles in reputed international journals and has also co-authored three book chapters. His current research interests include molecular modeling and simulation,polymers and polymer nanocomposites, and gas adsorption, transport and separation in porous materials.

"Value Added Cellulose Nanocrystals Production from Waste resources and its high end Applications"

Dr. Vimal Katiyar, Shri Prodyut Dhar & Dr. Amit kumar

Cellulose Nanocrystals (CNCs) are emerging smart nanomaterials of 21st century because of their wide applications in the field of healthcare diagnostics (as drug delivery vehicles), pharmaceuticals,as sensors/charge storage material (in electronics) andpackaging material.Our team hassuccessfully developed a novel process of synthesizing CNCs at a large scale from different renewable biomass resources, especially from bamboo stems (abundantly available in Assam), waste composts of water hyacinth and waste newspaper which are generally abundantly available and are known to contribute towards environment pollution. With different preprocessing approaches we could extract the purified cellulose and successfully convert a renewable waste biomass into an emerging nanomaterial, namely CNC, which has potential futuristic applications.The fabricated CNCs have varying nanoscale dimensions (10–20nm in width and 50–600 nm in length), tunable surface area, specific strength and optical properties depending on the source of biomass.

Established several novel strategies for surface modification of CNCs with magnetic materials which leads to chemo-magnetically controlled autonomous motion of CNCs in human body-like fluid environment, making it a potential candidate for the next generation nano-machines for sensors, imaging and drug delivery applications.Further, the magnetized CNCs showed improved electro-catalytic activity and could be used as novel reinforcement material in polymeric systems whose properties could be accurately controlled through orientation of anisotropic CNCs with magnetic field.Our approach of orienting nanofillers will help in manufacturing complex structural biological composites having directionally tunable mechanical properties that are difficult to process through traditional methods.

Team - Dr. Vimal Katiyar, Shri Prodyut Dhar & Dr. Amit kumar are WINNER of National Awards 2015-16 under the Category of "INNOVATION IN POLYMER WASTE MANAGEMENT & RECYCLING TECHNOLOGY AND GREEN POLYMERIC MATERIALS & PRODUCTS"

Dr. Gourishanker Jha

M/s THE SUPREME INDUSTRIES LIMITED, PUNE

M/s Supreme Industries Ltd founded in 1942, Supreme is an acknowledged leader of India's plastics industry. Handling volumes of over 3,20,000 tonnes of polymers annually effectively makes the country's largest plastics processors. we also offer the widest and most comprehensive range of plastic products in India. Our 25 advanced plants are powered by technology from world leaders, and complement our extensive facilities for R & D and new product development. In fact, Supreme is credited with pioneering several products in India. These include Cross- Laminated Films, HMHD Films, Multilayer Films, SWR Piping Systems and more. Supreme Industries Limited is India's leading plastic processing company with seven business divisions. The company has forayed into different types of plastic processing in Injection Moulding, Rotational Moulding ,Extrusion, Compression Moulding, Blow Moulding etc.

Dr. Gourishanker Jha got his Ph.D in Chemistry from GGSIP University, Delhi in 2009, followed by post doctoral research work at Ulsan University, South Korea. He joined in The Supreme Industries Ltd. in 2014. G S Jha developed the high refractive Index Polythiourethane optical plastics for spectacle lens applications. He worked in different field in the plastics industry including, in cross link and non cross link extrusion and batch process foam, polymers and monomers synthesis, filler & additives master batch, Engineering plastics compounding and characterization. Holding 9 patents including one US patent & two PCT and has published 10 peer reviewed articles in international journals.

SUPREME® has designed In-house conversion process to convert cross linked LDPE/EVA foam in to improved thermo plastics composite. Obtaining a thermoplastic recycled material by breaking down the crosslinked structure of XLPE and reducing the molecular weight is referred to as thermoplasticizing. Thermoplasticizing process for obtaining recycled material using the XLPE waste from protecting packaging division as the raw material. Providing for innovative, value-creating plastics solutions for the XLPE foam industry and used this material in the place of virgin materials, prevent the depletion of hydrocarbon along with reduce the Environmental pollution with respect to solid waste and air pollution. This is an environmental friendly technology. This product is suitable for cushioning, civil & misc. applications.

SIGNIFICANCE:

Providing an innovative, value-creating plastic solutions for the XLPE foam industry.

- Using this material in the place of virgin foam, prevent the depletion of hydrocarbon.
- Reduce the Environmental pollution with respect to solid waste and air pollution.
- Reducing the cost of finished product by utilization of waste cum Eco friendly.

BENEFITS:

Thermoplastic PE material is recovered from three dimensional cross linked XLPE.

- Addition of 5-15 % recycled XLPE in our existing process with maintaining the quality of products. Clean and Environmental friendly technology process.

M/s The Supreme Industries Limited is the WINNER of National Awards 2015-16 under the Industry Category of
"INNOVATION IN POLYMER WASTE MANAGEMENT & RECYCLING TECHNOLOGY AND GREEN POLYMERIC MATERIALS & PRODUCTS"

Prof. Balasubramanian K

The Defence Institute of Advanced Technology, (DIAT) as it is known today, came into being as the Institute of Armament Studies in 1952 in the CME campus. In 1967, the Institute was renamed as "Institute of Armament Technology, (IAT)", which moved to its present location at Girinagar, Pune. From the relatively narrow scope of Armament Studies alone in the Fifties, the role of the Institute was considerably enlarged by the Defence R&D Council in 1964. On the basis of accreditation by the All India Council of Technical Education (AICTE), Pune University recognized eight courses for the award of ME degree in 1980. In the year 2000, the Institute acquired the status of a Deemed University.

Prof. Balasubramanian K is Dean, Professor & Head of Materials Engineering Department at Defence Institute of Advance Technology (DU), Pune since 2010. Prior to the Professorship, he had worked as Research Manager (Materials Technology) with UK Materials Research Institute (UK MatRI), Pera Innovation Park, Melton Mowbray, UK for a period of 12 years. 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 03 PhD Students (08 students on going) and more than 50 M Tech/B Tech-intern students of IITs during the last five years at DIAT (DU). He has authored more than 200 International research papers, 06 book chapters and 14 patents. His areas of expertise are Polymer Nano composites for Automobiles, Aero space and Defence, Ablative Composites, Super Hydrophobic and Bio Mimic Coatings, Energy Harvesting and Intelligent Textiles, Carbon and Graphene Technology, Camouflage and Stealth Technology.

"Effective Utilization and Management of Waste Rubber for Superior road Construction"

Defence Institute of Advanced Technology, Pune

Scrap rubber tyres and tubes form the largest and most problematic sources of rubber waste. The properties of rubber such as non biodegradability and effective utilization are of serious concern. Instead of considering this waste as a problem, a remarkable solution for its management, which also leads to highly improved and superior infrastructure, is possible. Waste rubbers are available at low cost, and its effective use in road formulations improves the durability of roads by enhancing the properties towards temperature variations and other properties of road structure like wear, abrasion, water resistance, ultra-violet radiation protection, flame resistance and noise reduction, thereby giving overall better performance. This technology makes utilization of waste rubber tires, tubes and any type of industrial waste rubber product. The use of waste rubber with cheaper additives like sawdust and graphite powder yields a high end road structure that brings down the cost of the road drastically. This is a cost effective method of utilization of tonnes of waste rubber from military and civil industries, consequently leading to an effective waste rubber management and developing advanced physical infrastructure within the country. Since this structure can be easily processed, the technology can be extended both for patching of the road as well as a continuous road structure. This technology can be further extended for the development of 40 to 50 % village roads in India. Such roads made from shredded tyres can be useful for recycling industrial waste rubber in a cost effective and an Eco friendly manner compared to the existing technology that uses cryogenically pulverized rubbers and latex.

Defence Institute of Advanced Technology, Pune is the WINNER of National Awards 2015-16 under the Academics and R & D Institution Category of "INNOVATION IN POLYMER WASTE MANAGEMENT & RECYCLING TECHNOLOGY AND GREEN POLYMERIC MATERIALS & PRODUCTS"


Shri E. Tholkappiyan


Shri G. Karuppusamy


Ms. S. Sheeba

Shri E. Tholkappiyan obtained his Masters Degree in Textile Technology from Anna University Chennai, India in 2008 and submitted PhD thesis in Development of Acoustical Absorptive Bio-Composites and their Characteristics to Anna University Chennai in November 2015. He started his career in an industrial research association serving the textiles and clothing industry. He has more than 8 years of experience in teaching, research and industry. He is a life time member for Indian Society for Technical Education. He has guided more than 15 B.Tech students, authored more than 15 publications in national and international journals and conferences.

Shri G. Karuppusamy obtained his diploma in chemical processing from Erode Institute of Technology, India in 2008 and B.Tech in Textile Technology from Anna University Chennai, India in 2015. He secured 1st prize in two different national level technical quizzes and published 2 papers in national level symposia and conferences. His recent research area was in optimizing the various chemical and biological treatments on improving the banana fibre fineness. He has 4 years of experience in the field of textile chemical processing and is presently working with Madura Garments Pvt. Ltd. Bangalore, India.

Ms. S. Sheeba obtained her Diploma in Textile Technology from Nachimuthu Polytechnic College, India in 2010 and B.Tech in Textile Technology from Bannari Amman Institute of Technology, Sathyamangalam, India in 2015. During this period, she has published 2 papers in national level symposiums and conferences. She was also involved in optimizing the various chemical and biological treatments on improving banana fibre fineness. She has two years experience in the field of knitted garment manufacturing and is currently working with CTS Pvt. Ltd., Mumbai, India.

"Development of Novel Fabrics Using Wasted Banana Stems"

Shri Tholkappiyan E, Shri G Karuppusamy & Ms. S. Sheeba

This innovation entitled "Development of Novel Fabrics Using Wasted Banana Stems" deals with the development and successful use of bio-softening process in the production of banana fibre based textile materials for apparel and industrial applications like paper manufacture. Banana stems which are normally wasted, have great potential for being developed as textile materials for apparel and industrial applications. Once the proposed value chain on utilization of banana stem is established, substantial benefits are expected to accrue to farmers, textile and paper industries. This apart from qualifying as an alternative natural raw material for textile and paper industries, also ensures an environmentally safe method of disposal of wasted banana stems.

As part of the value chain, Cotton fibre was blended with the banana fibres in two different blend ratios and converted to spun yarn using rotor spinning technique. Two different spun yarns (50:50 and 70:30 banana fiber: cotton) were produced and used as weft yarn to produce fabrics on a conventional shuttle loom. These fabrics were tested for physical and mechanical properties as per standard norms for apparel use. There is scope for further research to completely characterize these banana fibers and facilitate proper applications in apparel, technical textiles and paper industries.

Team - Shri Tholkappiyan E, Ms. S. Sheeba & Shri G Karuppusamy are RUNNER-UP of National Awards 2015-16 under the Category of "INNOVATION IN POLYMER WASTE MANAGEMENT & RECYCLING TECHNOLOGY AND GREEN POLYMERIC MATERIALS & PRODUCTS"


Shri J. Chandrasekaran


Shri P. N. Subramanian

M/s Watsan Envirotech Private Limited was started with a vision of providing affordable, electricity free, and maintenance free water filters and ready to fit toilets to the rural India, and then to the needy world, most of it which has neither of these two basic necessities.

Founder - CEO - **Technical Head - Shri J. Chandrasekaran** has 25 years of manufacturing experience and undergone training after obtaining license from IMMT (CSIR), Bhubaneswar, to manufacture Terafil water filters. Holds 3 patents to his credit National Award winner from G.O.I for Innovation in Health Care 2012.

Director - **P. N. Subramanian**

Shri P. N. Subramanian, a TiE Charter Member is a Management expert has joined as a stake holder and director in WATSAN Envirotech Private Limited. He is a Mechanical engineer with MBA from XLRI and has 35 years of experience in formation of companies, strategic planning, HR etc.

- RCC or any other known toilets consume lots of time to construct. The other FRP toilets available in neither the market nor the Rotational moulded cubicles made in HDPE address the problem of greenhouse effect, as they have single walled structure.

- Creates Self-employment within the villages around the Wind Mill Manufacturer's factory and imposes confidence in the mind that the Manufacturer has Corporate Social responsibility put in act and also saves huge land fill. The manufacturing set up to be set in a village does not need huge capital investment like Machinery, or need high energy requirements! The whole toilet gets cured in natural sun light and would be ready for installation! Complete Green energy process, and converting waste to beneficial product and the most needed product.

- The time for completion of one toilet is just 2 days as compared to the conventional toilet in RCC for at least 15 days. Cost effective than conventional RCC. Non - corrosive yet lighter in weight. Cannot be robbed and sold for the benefit of scrap selling, as FRP does not have scrap value. The design has minimal joints so that the structure looks neat, elegant and monolithic. A complete knock down (CKD) toilet are designed to be made for unreachable places like tribal areas,hilly terrains, borders, so that it can be removed and installed fast.

M/s Watsan Envirotech Pvt Limited is the RUNNER-UP of National Awards 2015-16 under the Industry Category of "INNOVATION IN POLYMER WASTE MANAGEMENT & RECYCLING TECHNOLOGY AND GREEN POLYMERIC MATERIALS & PRODUCTS"

Dr. Vimal Katiyar

Ms. Neelima Tripathi

Indian Institute of Technology, Guwahati, the sixth member of the IIT fraternity, was established in 1994. The academic programme of IIT Guwahati commenced in 1995.At present the Institute has eleven departments and three inter-disciplinary academic centres covering all the major engineering, science and humanities disciplines. Within a short period of time, IIT Guwahati has been able to build up world class infrastructure for carrying out advanced research and has been equipped with state-of-the-art scientific and engineering instruments.

Dr. Vimal Katiyar is Associate Professor in the Department of Chemical Engineering at Indian Institute of Technology Guwahati. He has obtain Ph.D in Chemical Engineering from IIT Bombay. His area of research includes development of biodegradable polymers, bio-inspired nanomaterials, clean energy, etc. He jointly owns several granted patents including few have been granted in various countries. He is coauthor of 35 articles in international journals and 6 book chapters in the area of biodegradable polymers.

Ms. Neelima Tripathi obtained her B.Tech. in Chemical Engineering from A.I.T.H. Kanpur in 2009. She has completed M.Tech. in Chemical Engineering from MNIT Jaipur in 2011. She is currently pursuing PhD in Chemical Engineering at IIT Guwahati. She isa co-inventor of two Indian patent applications.

Present invention describes the synthesis of biobased, non-toxic and ecofriendly adhesive for structural applications.The adhesive is prepared by simple, elegant and industrially viable process. Theinvented formulation and process are environment-friendly as ingredients of these adhesive are derived fromrenewable feedstock. The adhesive was prepared by in situpolycondensation ofhydroxycarboxylic acid/oligomers and its conjugates with polysaccharide/protein under microwaves.The invention also relates to the modification of hydrophilic-hydrophobic characteristics of conjugates/blends and the process ofsuch preparation.Invented conjugate/blend system can be used as adhesive byapplying it on the full surface or partial surfaces of the substrate of any shape and size at elevated temperature, andsubsequently by compressing adhesive coated surfaces leading to the integration ofsubstrates. The prepared adhesive can be appliedbetween the two surfaces can also show adhesion properties in the perpendicular direction of the surfaceswith or without the compression force applied on the surfaces. The synthesized 'green' adhesive showed excellent shear strength and showedmatchless adhesive properties with respect to the present bio-based adhesives so far. The prepared adhesive has an excellent ability tobind glass and granite substrates.Thus, it has the capability to replace the present market products. The elegant process of preparation of this adhesive formulation makes its industrially viable and therefor can be commercialize without high capital investment.

Indian Institute Technology-Guwahati is the RUNNER-UP of National Awards 2015-16 under the Academics and R &D Institution Category of "INNOVATION IN POLYMER WASTE MANAGEMENT & RECYCLING TECHNOLOGY AND GREEN POLYME MATERIALS & PRODUCTS"

Shri S. Dinesh Kumar

Shri M. J. Giridharan

M/s WELD EEZY,
KODAMBAKKAM, CHENNAI

Shri M. J. Giridharan is an Engineering Graduate with Masters in Business Administration having about 25years of expertise in HDPE Pipeline Manufacturing and Moulding Industry in various departments. He was the recipient of the 3rd National Award for Technology Innovation in the Field of Petrochemicals and Downstream Plastic Processing Industry .

Shri S. Dinesh Kumar has Masters in Business Administration and have an experience of about 17years in HDPE manufacturing Industry and various pipeline Project execution.

M. J. Giridharan and S. Dinesh Kumar had joined hands to start the Organisation M/s WELD EEZY and are into manufacturing of HDPE Pipeline and HDPE Fittings. The company is catering to Various Water and Infrastructure Industry Requirements with their HDPE Products and also with Several Products developed for specific customer requirements. Our constant development and redesigning of the product had enhanced our company to deal with new product development challenges that are thrown to us. This led to the making of several customer specific products.

Aquaculture and Fish Farming Sector are highly supported by the Union Government and certain State Governments with the help of various NABARD schemes and organisation like RGCA,CMFRI etc. There is a great export demand for the Tilapia, Asian Seabass, Cobia steak, Tiger Prawns and other variety of Shrimps. HDPE Floating Brackets are used in the Aquaculture and Fish Farming Sector to enable the fishes to grow in natural conditions like Sea or River for higher Yield.

Having approached by M/s RGCA, we had meticulously developed a better Working Floating Model Fish Cage with our HDPE BRACKETS and are now being made INDIGENOUSLY at our Plant near Chennai. Our Floating HDPE Brackets are operation friendly, Saving on Foreign Currency , Light Weight, Easy to Install & Remove, Non corrosive, Suitable for connection to various floating pipelines , Can be used for any kind of marine farming, Can be used both at Sea and at River but all these are now made available to Our Indian Farmers at an affordable price locally. All the pains that we had taken in designing the product were over thrown by seeing the Happiness in the face of our Farmers when they were benefitting from our product.

Team - Shri S. Dinesh Kumar & Shri M. J Giridharan is the WINNER of National Awards 2015-16 under the Category of "POLYMERS IN AGRICULTURE AND WATER CONSERVATION"


Dr. S. Sridhar


Shri N. S. Prasad


Shri Y.V.L. Ravikumar


Ms. Harsha Nagar


Ms. M. Madhumala

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 drugs & pharmaceuticals, agrochemicals, lipids, catalysis, polymers and functional materials, environmental, analytical, biological and engineering sciences.

Dr. S. Sridhar is a chemical engineer working as a Scientist for the past seventeen years at the Indian Institute of Chemical Technology (IICT), Hyderabad where he heads the Membrane Separations Group..

Shri Shiva Prasad is working as a project fellow in Membrane Separations Laboratory, Chemical Engineering Division at CSIR-IICT. He completed his graduation in chemical engineering from CVSR College of engineering affiliated to JNTU, Hyderabad. After his graduation he joined IICT in 2013 to work on challenging projects and has recently registered for a PhD program in Academy of Scientific and Innovative Research (AcSIR) under the guidance of Dr. S. Sridhar. He has exhibited significant potential with strong determination towards design and development of innovative products in membrane technology.

Shri Y.V.L Ravi kumar is working as a Principal Technical Officer in Membrane Separation Laboratory, Chemical Engineering Division at CSIR-IICT, Hyderabad. His main areas of research include drinking water purification, processing of industrial effluents using membrane separation techniques such as nanofiltration, reverse osmosis, electrodialysis and membrane bioreactors to enable water reclamation and recovery of valuable organic solvents. Dr. S. Sridhar at JNTU, Kakinada. He is an author of 43 research papers, 1 book chapter and 2 patents besides a recipient of six prestigious awards including Gandhian Young Technological Innovation (GYTI) National Award in 2015.

Shri Harsha Nagar is working as a Senior Research Fellow under the guidance of Dr. S. Sridhar in Membrane Separations Laboratory, Chemical Engineering Division, CSIR-IICT. She completed her Bachelor of Technology from Ujjain Engineering College, Ujjain and Master of Science in chemical engineering field from University College of Technology, Osmania University, Hyderabad. Her main research areas include synthesis of proton conducting polymeric membranes for fuel cell application and design and assembling of compact defluoridation units which are subsequently installed in villages, schools and hostels

Ms. M. Madhumala is a chemical engineer pursuing her PhD under Dr. S. Sridhar in Membrane Separation Laboratory, Chemical Engineering Division, CSIR-IICT. She completed her B.Tech and MS in chemical engineering from University College of Technology, Osmania University, Hyderabad. She is recipient of two prestigious awards “Gandhian Young Technological Innovation (GYTI) Team Award-2015” and “Dr. K V Rao Young Scientist Award-2015” besides the “Best oral presentation award” in a national conference organized by BITS Pilani, Hyderabad. She has published 7 papers in reputed international journals and 2 generic articles in popular magazines.

Contamination of drinking water and disposal of untreated industrial wastewater have caused several health hazards in India and the rest of the world. The present innovations made by Membrane Separations Group of IICT are based on novel membranes made from polyamide, polyvinyl alcohol and polyethersulfone polymers to provide cost effective and flexible solutions compared to energy intensive conventional methods employed in water purification. Pilot plants based on nanofiltration and reverse osmosis have been installed at several fluorosis affected regions in Telangana, Andhra Pradesh and Tamil Nadu to provide safe drinking water to a population of more than 1 lakh. A more recent innovation is the design of a highly compact membrane system that costs only Rs 30,000/- but is highly efficient in removal of contaminants including fluoride, heavy metal ions, turbidity, hardness and pathogens from polluted drinking water at a rate of 100150 Lit/hr and low price of 35 paisa per liter making them highly suitable for schools, hostels and hospitals.

Novel hybrid processes based nanofiltration, electrodialysis, and aerobic/anaerobic membrane bioreactor have enabled recovery of dimethyl sulfoxide solvent from pharmaceutical effluent, extraction of sodium thiocyanate solvent in acrylic fiber industry and water reclamation from domestic, food and textile industry wastewaters containing high TDS and COD levels. A double stage cascaded membrane system has been developed for production of ultrapure water containing zero ppm dissolved solids for Bioprocess applications at a capital investment much lower than imported membrane systems supplied by multinational companies or energy intensive evaporation or distillation units.

Team - Dr. S. Sridhar, Shri N. S. Prasad, Shri Y.V.L. Ravikumar, Ms. Harsha Nagar & Ms. M. Madhumala of IICT-Hyderabad are JOINT WINNER Of National Awards 2015-16 under the Category of "POLYMERS IN PUBLIC HEALTH CARE"

Shri Vilas Laxman More

YASHWANT NAGAR, NEAR NAVLE MAHARAJ
MATH, PAITHAN. TQ. PAITHAN DIST. AURANGABAD
PIN CODE: 431107

Shri Vilas Laxman More is resident of Paithan, Dist Aurangabad (Maharashtra) and a barber by Profession. Being in this Profession for last few decades, in the Vicinity, he found loopholes in the current design of the razor equipment, which used as conventional shaving razor and one of the mostly used device in saloon which carried a lot of infectious disease due to its frequently used and most closely to human skin and it having possibility of transferring germs and bacteria from one individual to another. So he came up with described product by eliminating all loopholes in it. His vision is to serve the nation by his revolutionary product called shaving razor and making the world a much safer place to live

In different men's saloon ,same traditional razor are used twice or thrice before disposed, there is possibility that some bacteria remains in that razor which cause for infectious disease, but new Shaving razor contains front part with blade that was completely disposable . so disease like HIV, Hepatitis etc. will not spread through shaving.

Shri Vilas Laxman More is the JOINT WINNER Of National Awards 2015-16 under the Individual Category of "POLYMERS IN PUBLIC HEALTH CARE"

Ms. Chhaya Engineer

M/s Sahajanand Medical Technologies Pvt. Ltd - Surat (SMT) is a leading medical device company with the motto of "Pledge to save millions". The company has proved itself by being the first company in Asia to manufacture coronary stent and only of its third kind in entire world. Today 's "Make in India" concept was visualized by SMT since 2001 and India's complete import dependency for implantable coronary stents was addressed by SMT for creating an affordable yet efficient Indian stents. With this path breaking technology SMT products are used worldwide and trusted by clinicians in more than 40 countries.

Ms. Chhaya Engineer - Sr. Manager, (R&D) M.Tech (Research) in Chemical Engineering from National Institute of Technology, Surat. She is having a total 15 years of experience of research and development of coronary stent. Her research work is mainly focused on the controlled drug delivery from medical devices including cardiovascular/peripheral stents and balloon catheters and also on various degradable and non-degradable biomaterials, conjugation of drug with polymer to improve biocompatibility of polymers, drug polymer nanoparticles and bio-absorbable scaffolds. She played a key role in development, technology transfer and regulatory approval of 6 drug eluting stents with different drug-polymer formulations designed to deliver Paclitaxel, Sirolimus and Everolimus drug. She has authored more than 15 research papers in international journals and is an inventor of 2 patents application.

SMT is the global pioneer to utilize biodegradable polymers in drug eluting stents. When SMT has started the research work for development of drug eluting stents, very few drug eluting stents were developed and commercialized. When all these stents were utilizing non - biodegradable polymers for the drug delivery from stents; SMT has started a new trend while selecting biodegradable polymers for controlled drug delivery for drug eluting stents. SMT has identified the potential of biodegradable polymers and had initiated the development of drug eluting stent using them. Due to efforts of R&D team, SMT became the first stent manufacturing company to receive CE approval for Paclitaxel eluting coronary stent with biodegradable polymers in the world. Safety of biodegradable polymers are well-studied and well accepted by the stent industry now and other companies' research is also focused on biodegradable polymer based DESs as they "do their job and then disappear".

This biodegradable technology has not only benefited patients clinically but also has helped to reduce the cost of treatment. SMT is committed towards developing such innovative and cost effective treatment options that is beneficial to mankind.

M/s Sahajananad Medical Technologies Pvt. Limited is the WINNER of National Awards 2015-16 under the Industry Category of "POLYMERS IN PUBLIC HEALTH CARE"

Mrs. Lakshmi Unnikrishnan

Dr. Smita Mohanty

Dr. S. K. Nayak

Laboratory for Advanced Research in Polymeric Materials (LARPM) is an exclusive R&D wing of Central Institute of Plastics Engineering & Technology (CIPET) set-up in 2008-09 with an objective of developing high-end polymeric materials in the area of Polymer Blends and Alloys, Composites and Nanocomposites, Polymer Synthesis, Fuel Cells, E-waste Recycling and Biodegradable Polymers. Over the years, LARPM has established its recognition in terms of high global citations through International Publications in Peer-Reviewed Journals, Patented Technologies, Textbooks, Industry-Academic Tie-Ups and Collaborative Research with Universities in India and abroad.

Mrs. Lakshmi Unnikrishnan is working as Junior Scientist in LARPM, CIPET Bhubaneswar. She has 7.5 years of Teaching and Research experience in the area of Polymeric Membranes, Polymer Electrolytes and Nanocomposites and has guided many M.Tech students in the area of Renewable Energy, Nanocomposites and Piezoelectric Sensors. She has published 14 nos. of articles in various peer-reviewed International Journals.

Dr. Smita Mohanty is Senior Scientist and In-charge of LARPM with more than 12 years of Research and Teaching experience. She has completed her Ph.D and D.Sc degree in the year 2004 & 2013 respectively. She has published more than 150 papers in major International Journals and has 05 Indian Patents to her credit. She has also initiated several advanced research at LARPM, which includes E-waste Recycling, Biopolymers from Natural Resources, Polymer Electrolytes etc. She has so far guided 10 Ph.D students. She has successfully completed several sponsored projects and has authored 10 textbooks / chapters, published under renowned international publishers.

Dr. S. K. Nayak holds the position of Prof. & Chair of R&D wings of CIPET with 30 years of experience in Teaching and Research. He is an active researcher in the field of Polymer Science & Technology with several publications in peer-reviewed International Journals and Patented Technologies in the area of Advanced Polymeric Materials & Characterization.

Precise and rapid quantification of specific biomarkers in the blood enables timely diagnosis and treatment of various disorders. It is apparent that prevalence of cardiovascular diseases and related mortality in the modern society symbolizes the necessity of biosensors for cholesterol and other related biomarkers. Since, majority of the population still depend on analytical techniques for detecting these risk factors, it has become impeccable to develop a technology for easy and fast detection of lipid metabolites, i.e., lipoproteins, cholesterol and triglycerides as well. Moreover, all major key players in biosensors work on Glucose Sensors, implementing novel technologies and improvising the existing. Thus, the market lacks a handy and portable biosensor for detecting some of the important biomarkers mentioned above.

The 'Polymer Biosensing Platform for Lipid Metabolite Detection' developed shall be an effective tool for easy detection of lipid metabolites, the crucial factors directly linked to the health of our heart. The biocompatible conducting polymer base reinforced with non-toxic metal oxide nanohybrids would act as enzyme immobilized substrate and a transducer simultaneously. This leads to a stable and durable sensing system with high selectivity and specificity towards desirable analytes. Moreover, the technology proposed can easily be integrated into an existing sensor design with minimal complexity and improved precision.

Team - Mrs. Lakshmi Unnikrishnan, Dr. Smita Mohanty & Dr. S. K. Nayak are JOINT RUNNER-UP Of National Awards 2015-16 under the Category of "POLYMERS IN PUBLIC HEALTH CARE"

Shri Rishi Baid

M/s POLY MEDICURE LIMITED,
FARIDABAD

M/s Poly Medicure Limited (POLYMED) is one of the leading manufacturer of Medical Devices and among top manufacturer of IV Catheter in World. Currently producing over 550 million pieces of various Medical Disposable products annually. Which comprises various products under category of Infusion Therapy, Central Venous Access Catheters, Anesthesia, Urology, Gastroenterology, Blood Management & Blood Collection Systems, Surgery & Wound Drainage, Dialysis and many more.

Shri Rishi Baid Executive Director of the Company, M.S.M.E. (Mechanical) from West Virginia University, U.S.A. He has been associated with the Company from its incorporation. As an Executive Director, direct all operations and personnel for 06 plants worldwide including China and Egypt. The Company manufactures and exports Medical Devices, and is currently producing more than 300 million pieces of various Medical Disposable products per year like I.V. Catheters, Three Way Stop Cocks, Urine Collection Bags, Close Wound Suction Unit, Infusion and Transfusion Sets, Nelaton Catheters, Central Venous Catheters. Formulated and implemented New Human Resource Policies, including compensation & training for employees. To keep pace with the ever changing requirements of the market, Polymed has a fully staffed and highly equipped R&D section approved by Ministry of Science & Technology, Government of India, to design and develop new and innovative products. Using the latest CAD/CAM technology, the new product development is fast and improvements, based on market response and customer feedback, are made with ease. The Company has on its rolls around 30 Engineers in R&D Deptt. Having good knowledge of Intellectual Property laws in India and EU.

This invention offers the advantage over the available alternatives, such as

1. The paramedic has to be fully engrossed in operation of the alternatives side port cap while opening, closing and feeding of the medical fluids in to the IV catheter, whereas in this invention paramedic has to open with slight flick of finger and then the port cap is in its place w/o being displaced or hanging loose and obstructing in the way of paramedic to maneuver the process of medication dosing in to the vein, through IV catheter side port.

2. In this invention the paramedic does not have to apply a pressure on the port cap in order to close it by pressing, since this has a snap fit with and automatic hinge, the paramedic has to only apply a little flick of finger and the devise i.e. port cap will close by automatic action and does not need an additional vertical pressure to close the cap which causes the discomfort to the patient.

3. In this invention there are no chances that the port cap will remain open or will get open on its own, since this cap has an automatic mechanism for closing the cap by applying slight pressure, this mechanism also prevents the cap from opening accidently since the mechanism has an inbuilt locking pressure on the cap, which keeps the cap closed unless it is intended to open the cap and an action is carried out to open the cap

4. Since the port cap closure is ensured there are no chances of bio-contamination in the process of medication and afterwards

Shri Rishi Baid is the JOINT RUNNER-UP Of National Awards 2015-16 under the Individual Category of "POLYMERS IN PUBLIC HEALTH CARE"


Shri K. Prabakaran


Dr. A. K. Palai


Dr. Smita Mohanty


Dr. S. K. Nayak

Laboratory for Advanced Research in Polymeric Materials (LARPM) is an exclusive R&D wing of Central Institute of Plastics Engineering & Technology (CIPET) set-up in 2008-09 with an objective of developing high-end polymeric materials in the area of Polymer Blends and Alloys, Composites and Nanocomposites, Polymer Synthesis, Fuel Cells, E-waste Recycling and Biodegradable Polymers. Over the years, LARPM has established its recognition in terms of high global citations through International Publications in Peer-Reviewed Journals, Patented Technologies, Textbooks, Industry-Academic Tie-Ups and Collaborative Research with Universities in India and abroad.

Shri K. Prabakaran obtained his master & M.Phil in Physics from School of Physics, Bharathidasan University, Tiruchirappalli & from Madurai Kamaraj University, Madurai respectively. Recently, Shri K. Prabakaran submitted his Ph.D thesis under the supervision of Dr. S. Mohanty, Laboratory for Advanced Research in Polymeric Materials, Central Institute of Plastics Engineering and Technology, Bhubaneswar. His research area of interest is polymer electrolytes for solid state electrochemical device applications.

Dr. A. K. Palai obtained his PhD on "Design, synthesis and characterization of linear and hyperbranched light emitting polymers" from University of Mumbai (Naval Materials Research Laboratory, Defence Research and Development Organisation) in 2010. He was a postdoctoral fellow (visiting fellow) during 2010 to 2011 in Tata Institute of Fundamental Research (TIFR), Mumbai. Subsequently, he worked as a Brain Pool Researcher/Assistant Professor at Konkuk University, South Korea for more than 3 years. Currently, he is working as a Pool Scientist in LARPM, Bhubaneswar. He has guided 01 M.Tech student, authored 30 peer-reviewed journals and presented 14 national/international conference papers. His research interest is in the area of organic electronics, synthetic organic chemistry, polymer nanocomposite and, materials for energy conversion and storage.

Dr. Smita Mohanty is Senior Scientist and In-charge of LARPM with more than 12 years of Research and Teaching experience. She has completed her Ph.D and D.Sc degree in the year 2004 & 2013 respectively. She has published more than 150 papers in major International Journals and has 05 Indian Patents to her credit. She has also initiated several advanced research at LARPM, which includes E-waste Recycling, Biopolymers from Natural Resources, Polymer Electrolytes etc. She has so far guided 10 Ph.D students. She has successfully completed several sponsored projects and has authored 10 textbooks / chapters, published under renowned international publishers.

Dr. S. K. Nayak holds the position of Prof. & Chair of R&D wings of CIPET with 30 years of experience in Teaching and Research. He is an active researcher in the field of Polymer Science & Technology with several publications in peer-reviewed International Journals and Patented Technologies in the area of Advanced Polymeric Materials & Characterization.

In the recent years, energy is one of the most important issues faced in our country with regards to the pollution and shortage of sustainable, safe and environmental friendly energy resources. The best approach to tackle this is to utilize renewable energy resources. Renewable energy sources that gain their energy conversion from the sun, such as dye sensitized solar cells (DSSCs), are expected to be capable of supplying the endless energy for mankind. In this regard, our research on dye sensitized solar cell based on solid-state polymer electrolyte will not only help to thrive the green and clean energy but also protect our environment as well. In addition, developed polymer electrolyte system will enhance the photo-conversion efficiency by utilising simpler techniques. In compared to liquid electrolyte system, our polymer nanocomposite system is safe in term of electrolyte leakage and stability.

This research and innovation in the field of polymer science & technology entitled "Aligned carbon nanotube/polymer hybrid electrolyte membranes for high performance dye sensitized solar cells" deals with the development and successful use of novel polymer nanocomposite electrolyte system in the fabrication of efficient solid state DSSC. The key feature of this nanocomposite system is the presence of aligned carbon nanotube within the polymer matrix that enhances the ionic conductivity, ionic mobility, diffusion coefficient, number of charge carriers and hence overall photo-conversion efficiency. The scope of our research on solid-state polymer electrolyte system could also be expanded to fabricate flexible devices such as batteries and supercapacitors for energy storage applications.

Team - Shri K.Prabakaran, Dr. A. K. Palai, Dr. Smita Mohanty & Dr. S. K. Nayak is the WINNER Of National Awards 2015-16 under the Category of "RESEARCH IN THE FIELD OF POLYMER SCIENCE & TECHNOLOGY"

Dr. V. K. Gupta

Shri U. Makwana

M/S RELIANCE RESEARCH & DEVELOPMENT CENTRE,
NAVI MUMBAI

Reliance Industries Ltd (RIL) is 6th largest polypropylene (PP) producers at global level with manufacturing capacity of 2.7 million ton/annum. Reliance holds 1st position in Indian market for PP with total 69% market shares and maximum shares in raffia / injection molding / TQ/ fiber grades.

Dr. Virendra Kumar Gupta is currently head research and development (Polymer), Reliance Industries Limited, Navi Mumbai. He obtained his PhD from Banaras Hindu University in 1984. He has worked for last 30 years in the area of polymer science and technology and inorganic materials at university of Alabama at Birmingham, USA, R&D Centre IPCL, Gharda Chemicals Limited and Reliance Industries Limited. He has 130 patents and 70 internal publications to his credit. He has been nationally and internationally recognised for his technology development in the area of polyolefins and engineering thermoplastics through more than 15 awards.

Shri Umesh Makwana obtained his master degree in chemistry and M. Phil. from South Gujarat University. He has 22 year experience in Reliance Industries limited. He has 10 patents and 13 publications in his credit.

RIL developed single step process for making commercially useful Morphological Magnesium Alkoxide type precursors which is used to make proprietary advance generation morphological Ziegler-Natta catalysts for polyolefin. RIL in-house technology development is demonstrated example of INVENT & MAKE IN INDIA and Pride of Nation for faster growth of polypropylene based products for different niche as well as general applications catering the need of infrastructure, agriculture, automotive, retail and other sectors. This has benefitted also downstream processing industries also in India.

M/s. Reliance Industries limited is the WINNER of National Awards 2015-16 under the Industry Category of "RESEARCH IN THE FIELD OF POLYMER SCIENCE & TECHNOLOGY"

Dr. G. S. Kapur

Indian Oil Corporation Limited-Faridabad is India's largest commercial enterprise, with a sales turnover of Rs 4,50,756 crore (US$ 73.7 billion) and profits of Rs 5,273 crore for the year 2014-15. It is also the leading Indian corporate in Fortune's prestigious 'Global 500' listing of the world's largest corporate, ranked at the 119th position currently. IndianOil has a sprawling world-class R&D Centre that is perhaps Asia's finest. This Centre is India's foremost commercial centre of research excellence in the areas of lubricants, refinery processes, pipeline transportation, alternative fuels fuel additives, engine testing, materials sciences, environmental sciences, petrochemicals & polymers. The Centre holds 438 active patents, including 257 international patents.

Dr. G. S. Kapur is Dy. General Manager at Indian Oil-R&D Centre. He is recipient of prestigious international fellowships like Humbolt & UNESCO. Presently he is heading the Petrochemical & Polymer R&D activities of Indian Oil Corporation.

Indian Oil-R&D is the First Indian Organization to have developed Drag Reducing Additive, a formulation that can be used in turbulence free transportation of crude and product in pipelines.

The additive which is the combination of ultrahigh molecular weight higher polyalphaolefins along with organic compounds – a complete package has been developed INHOUSE. The catalyst for the production of ultrahigh molecular weight polyolefin was developed indigenously. The process for producing ultrahigh molecular weight polymer was optimized successfully.

The synthesis of ultrahigh molecular weight higher polyalphaolefins which itself was a challenge was, very carefully and expertly translated from lower scale to 2kg scale. Reproducibility and repeatability was ensured at each step.

The total process of turning the solid polymer into powder form and finally into the slurry form – presently usable form was developed INHOUSE. The performance of the indigenously developed DRA vis-à-vis commercial DRA samples was evaluated in indigenous Pilot Plant Test Loop (PPTL) which is 250 meter long 8" diameter closed circuit pipe loop jacketed by 10' pipe and through Third Party on Turbulence Rheometer which showed the percentage reduction in pressure is same for both the samples hence indicating the at par performance of inhouse DRA. This fulfills the "Make in India" thought process. This development also falls in the line of corporate vision of developing specialty products fetching much higher returns.
This way also ensures that IOCL as representation of India is active in not only technology buying but also is seen on technology development platform.

Indian Oil Corporation Limited-Faridabad is the WINNER of National Awards 2015-16 under the Academics and R & D Institution Category of "RESEARCH IN THE FIELD OF POLYMER SCIENCE & TECHNOLOGY"


Dr. R. S. Dongre


Dr. D. S. Ramteke

R.T.M. NAGPUR UNIVERSITY, NAGPUR

NEERI, NAGPUR

Dr. Rajendra S. Dongre is working as Assistant Professor (Sr. Grade)/Reader in Department of Chemistry; RTM Nagpur University Nagpur, since 2003. He has acquired Ph.D degree in 2010 on environmental research in water treatment techniques entitled "Development of eco-friendly defluoridation technique for drinking water". Research background of synthetic organic chemistry, especially metal chelates catalyzed aerobic oxidations & Water Pollution research e.g., Defluoridation, Cr (IV), Lead (II) removal from water. Overall, R&D experience of 20 years with 30 research papers in peer reviewed journals. At present he is guiding 5 research students for Ph.D degree.

Dr. D. S. Ramteke is a Project Advisor at ANACON Lab., Nagpur. He retired as Director Grade Scientist from National Environmental Engineering Research Institute, (NEERI) in 2014. He has guided ten students for PhD and published 100 research papers in reviewed journals. He has completed 12 research projects of funded by UGC, CSIR, ONGC other such organizations

Chitosan doped biocomposite found superior and showed viable fluoride uptake capacity with four cycle utility. Chitosan's feeble chemical properties has overcome in biocomposite by surface modification/chemical treatments on its – NH2/–OH functionality responsible for fluoride sorption/diffusion. Thus, ZrOCl2, MnO2 and carbon's allotropes (graphite) were doped by inter-wined with bendable chitosan layers resulting binary composite which provide at about neutral pH the stronger, stiffer reinforced fluoride binding sites matrix superior to either constituent alone due to combining advantages dopant. Besides, problems associated with mere inorganic and chitosan utility imparts limitations like; intrinsic brittleness, poor formability and low mechanical strength get circumvented by the doping for to achieve efficient fluoride biosorption. Chitosan's drawback like low mechanical resistance and high solubility in acids have overcome using inorganic doping, as it imparts chemical/mechanical stability in biocomposites by altering solubility and brittleness. Herein, a novel and eco-friendly biocomposites achieved stringent limit of 1.5 ppm fluoride concentration in drinking without affecting quality of treated water.

Proposed study to combat epidemic of fluorosis that influence health. The direct usage of alumina/silica may leak aluminium/silica further in treated water which is bypass using biocomposites. Besides, regeneration requires very little skill/knowledge, so user replace/handle adsorbent media easily than commercial coagulants/flocculants.

Team - Dr. R. S. Dongre & Dr. D. S. Ramteke are RUNNER-UP of National Awards 2015-16 under the Category of "RESEARCH IN THE FIELD OF POLYMER SCIENCE & TECHNOLOGY"

Dr. Gourishanker Jha

M/s THE SUPREME INDUSTRIES LIMITED, PUNE

M/s Supreme Industries Ltd founded in 1942, Supreme is an acknowledged leader of India's plastics industry. Handling volumes of over 3,20,000 tonnes of polymers annually effectively makes the country's largest plastics processors. we also offer the widest and most comprehensive range of plastic products in India. Our 25 advanced plants are powered by technology from world leaders, and complement our extensive facilities for R & D and new product development. In fact, Supreme is credited with pioneering several products in India. These include Cross- Laminated Films, HMHD Films, Multilayer Films, SWR Piping Systems and more. Supreme Industries Limited is India's leading plastic processing company with seven business divisions. The company has forayed into different types of plastic processing in Injection Moulding, Rotational Moulding ,Extrusion, Compression Moulding, Blow Moulding etc.

Dr. Gourishanker Jha got his Ph.D in Chemistry from GGSIP University, Delhi in 2009, followed by post doctoral research work at Ulsan University, South Korea. He joined in The Supreme Industries Ltd. in 2014. G S Jha developed the high refractive Index Polythiourethane optical plastics for spectacle lens applications. He worked in different field in the plastics industry including, in cross link and non cross link extrusion and batch process foam, polymers and monomers synthesis, filler & additives master batch, Engineering plastics compounding and characterization. Holding 9 patents including one US patent & two PCT and has published 10 peer reviewed articles in international journals.

Floor protector multilayer composite mats enable keeping job site floors safe from external damage during civil work. Processed by the application of pressing & heating and hot air flow on specially designed lamination machine with cross laminated polyethylene film or woven sacks mat, HD film and uncross-linked low density expanded polyethylene foam. Expanded polyethylene foam sheet with the lower density provides a new generation cost effective cushioning privilege & cross linked PE film or woven sacks mat provides the minimized wear and puncture resistance as HD film provides absolutely flat surface for floor surface contact. It has been found that expanded polyethylene foam mats laminated with polyethylene film on bottom side and upper side is laminated with cross laminated polyethylene film or woven mats which improving the anti skid property after the special embossed treatment on surface provide safe civil working condition

SIGNIFICANCE:

- User-friendly products as compare to conventional products available in market.
- Recycled & re usable in nature and possesses improved cushioning property.
- Providing anti skid property after embossed treatment on top surface.
- Bottom layer provides absolutely flat surface for floor surface contact.

BENEFITS:

- Recycled and re-usable composite multilayer mats for protect the floor during civil work.
- Provide for a light weight floor mat with low density expanded polyethylene foam.
- Easy handling

M/s The Supreme Industries Ltd is the RUNNER-UP of National Awards 2015-16 under the Category of "INNOVATION IN POLYMER APPLICATION"

6th National Awards for Technology Innovation in Petrochemicals and Downstream Plastics Processing Industry (2015-16)

Prof. (Dr.) S.K. Nayak
Director General - CIPET &
Chairman - 6th National Awards Expert Committee

Petrochemicals are a set of very specific chemical compounds majorly made from oil, natural gas, coal or other sources, having multifaceted applications. They form the building blocks of versatile and scientifically important materials, the POLYMERS. These economic materials are quintessential part of a wide application arena down the value chain catering to the needs of textiles and clothing, agriculture, packaging, infrastructure, healthcare, furniture, automobiles, information technology, power, electronics, telecommunications etc.

Considering the importance and benefits of petrochemical products, Government of India announced the National Policy on Petrochemicals in April 2007. The policy envisioned the following:

- Development of value added, quality petrochemical products at globally competitive prices using eco-friendly processes and technologies.
- Innovation of newer application and products with focus on sustainable development.

This vision can only be accomplished through promotion of Research & Developmental activities bridging the gap between academia and industries as well as generating potential Human Resource. To incentivize meritorious innovations and inventions in the field of polymeric materials, products, processes and other areas of national and social importance, the Department of Chemicals & Petrochemicals, Government of India, decided to set up an Award Scheme.

In order to strengthen the research prospects and encourage the research initiatives in this area, the policy envisaged institutionalization of National Awards for Technology Innovation in various fields of Petrochemicals and Downstream Plastic Processing Industry.

Despite the penetration of polymeric products into almost every walks of life, there are public apprehensions about the adverse impact of plastics on environment and health, technology development & enhancement. This initiative has been motivating researchers and industries to take up challenges for developing sustainable solutions and eco-friendly processes and create awareness about the prevailing myths and truths about plastics. Also, this initiative emphasizes innovations that conserve natural resources, while retaining energy efficiency.

Central Institute of Plastics Engineering & Technology (CIPET) - an autonomous institute under the administrative control of the Department of Chemicals & Petrochemicals, Govt. of India has been entrusted with the task of implementing the award scheme and happy to inform that the sixth in the series is now completed successfully.

The categories of the Award Scheme are given below:

1. Innovation in Polymeric Materials:
New Polymers, Blends & Alloys, filled materials, Fibers, Polymer, Composites and Nano composites, Smart Materials etc,

2. Innovation in Polymeric Products:
New/creative product design, Non-conventional application/Replacement of conventional materials (eg. Metals, Ceramics etc.), Modification of product design for performance improvements.

3. Innovation of Polymer Processing Machinery & Equipments:
Development of new processing techniques, Modification of machinery for higher efficiency/productivity/Automation, Energy conservation, product quality improvement, Improvement in Moulds, Dies and Auxillary equipments.

4. Innovation in Polymer Waste Management & Recycling Technology and Green Polymeric Materials & Products:
Newer technology in plastic waste utilization into products/energy recovery, Recycling Technology, Plastic waste collection, Segregation techniques, Product design for improved recyclability, Biopolymers, Biodegradable/Compostable Polymers, Time controlled degradation, Green material filled polymers, Biodegradability evaluation techniques.

5. Polymers in Agriculture and Water Conservation:
Water transportation, mulching, canal lining, Drip irrigation, Sprinkler system, Low Tunnels, Poly house etc., Controlled release system for fertilizer, pesticides, micro nutrients etc., Innovative packaging for agriculture, floriculture and horticultural produce, Controlled permeability films &packaging for improved shelf life, Novel Usage of plastics for food security.

6. Polymers in Public Health Care:
Affordable/cost effective implants, implements and devices, New innovative products for medical application, Polymer based new drugs delivery system, Polymer body implants, Drinking water storage & transportation, Polymer membrane for water purification/Desalination, Devices for waste water, drainage, sewage treatment system.

7. Research in the field of Polymer Science & Technology (for Researchers working in Academic Institute /Research lab.):
Individual/Team of researchers in R&D Institutions & Laboratories, Original research work in polymeric materials processing etc. leading to prototype development & future industrial applications.

8. Innovation in Polymer Application:
Sub-categories are: (i) Cottage/Micro Industry; (ii) Small Scale Industry and (iii) Medium Scale Industry
Newer polymer applications in any field to enhance the working environment, life cycle, energy efficiency, re-cyclability etc.

IMPLEMENTATION FRAMEWORK & OPERATIONAL MODALITIES:

264 numbers of application/nominations received for awards were scrutinized and valuated by the nominated field experts headed by the Director General, CIPET & Chairman of 6th National Awards with the representatives from Administrative Ministry/Government Institutions/Research Laboratories/Academics Institutions, National Level Industry Associations associated with petrochemical products and other representatives from Government of India. The recommendation of the Expert Committee was deliberated at the Prize Award Committee headed by the Joint Secretary of the Department of Chemicals & Petrochemicals. 17 nominations were finally selected and rewarded as WINNER, 14 nominations were rewarded as RUNNER-UP.

The 6th National Award Function to encourage and to promote Technology Innovation in Petrochemicals and Downstream Plastics Processing Industry (2015-16) is being organized on January 20, 2016 at FICCI, New Delhi. Hon'ble Minister for Chemicals & Fertilizers – Shri Ananth Kumar ji will present the 6th National Awards to the awardees in the presence of Hon'ble Minister of State for Chemicals & Fertilizers – Shri Hansraj Gangaram Ahir ji.

सेन्ट्रल इंस्टिट्यूट ऑफ प्लास्टिक्स इंजीनियरिंग एण्ड टेक्नोलॉजी (सिपेट)
CENTRAL INSTITUTE OF PLASTICS ENGINEERING & TECHNOLOGY (CIPET)
(Department of Chemicals & Petrochemicals, Ministry of Chemicals & Fertilizers, Govt. of India)
Head Office: Guindy, Chennai - 600 032, Tel: 044-22254780 Fax: 044-22254787 Email: pds.gurgaon@pds.gov.in

Central Institute of Plastics Engineering & Technology (CIPET) is a premier National Institution devoted to Academic, Technology Support & Research (ATR) for the Plastics & allied industries in India. CIPET operates at 28 locations spread across the length & breadth of the country, which includes 5-High Learning Centers, 12-Other Learning Centers, 2-R&D wings, 3-Specialized Centres, 5-Vocational Training Centres and 1-PDS. All the CIPET centres have uniform infrastructural facilities in the areas of Design, CAD/CAM/CAE, Tooling, Plastics 'Processing, Testing & Quality Control to cater to the needs of plastics and allied industries in the country.

CIPET offers 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 recourse to plastics & allied industries. The Technology Support Service (TSS) to the industries and ingenious research are the important product portfolios of CIPET.

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 agency 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 global R&D hub, CIPET has established two exclusive R&D centres, viz., Advanced Research School for Technology & Product Simulation (ARSTPS) at Chennai and Laboratory for Advanced Research in Polymeric Materials (LARPM) at Bhubaneswar. These laboratories work towards developing novel indigenous technologies to cater the current requirements in the areas of Polymer Composites, Nanocomposites, 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 expertise.

CIPET has signed various Memorandum of Understanding (MoUs) for collaborative projects, faculty & student exchange, exchange of academic materials etc., with leading international Universities/ Organizations at USA, Canada, Australia, Germany, France, Korea, Poland, Mexico, China, South Africa, Russia & Brazil.

With strong Alumni base of about 45,000 professionals, CIPET has emerged as an apex plastics technology institution, not only in India but a unique institution of its kind, in Asia.

7th NATIONAL AWARDS FOR TECHNOLOGY INNOVATION

In Petrochemicals & Downstream Plastics Processing Industry

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

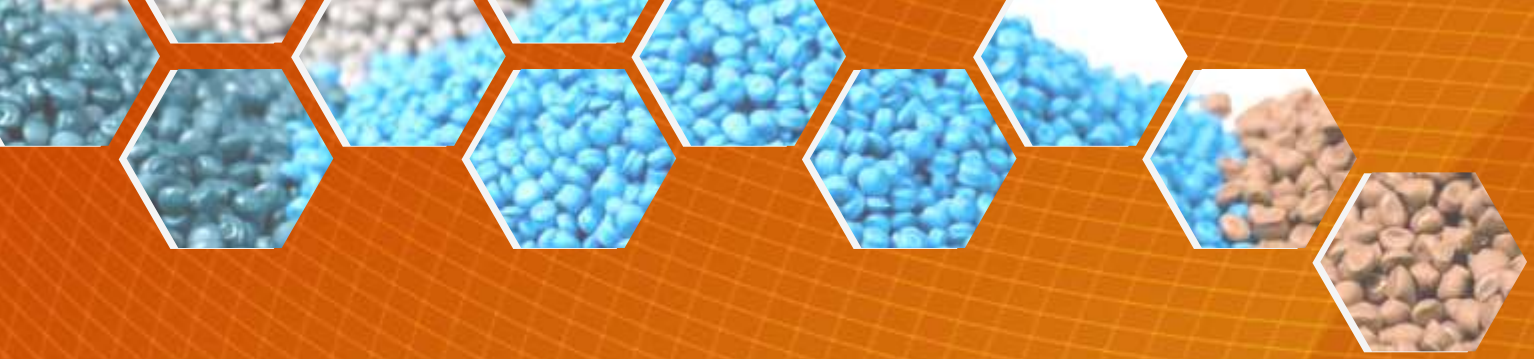
INVITES

Nomination from Individual / Team,
Small / Medium / Large scale Industry, Academic / R&D Institution

Organised by:

CENTRAL INSTITUTE OF PLASTICS ENGINEERING & TECHNOLOGY (CIPET)
(Department of Chemicals & Petrochemicals, Ministry of Chemicals & Fertilizers, Government of India)

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



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सेन्ट्रल इंस्टिट्यूट ऑफ प्लास्टिक्स इंजीनियरिंग एण्ड टेक्नोलॉजी (सिपेट)

CENTRAL INSTITUTE OF PLASTICS ENGINEERING & TECHNOLOGY (CIPET)

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

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