

# **Patents & Technology Transfer**



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# 1

**Patent Number: 292958**

**Patent type: Indian**

## **Transparent Conducting Hole -Injecting (Hil) Polymer-Elastomer Composite Material For Organic Electronic Applications**

P. Pradeep, Aneesha Mary Mathew, Faseena N. M., Jayan Manuel, Shahul Hameed T. A.

A process for synthesizing transparent conducting hole injecting electrode material in thin film form on substrates using a conductive elastomeric *I* conducting polymeric composite material is described. The transparent and highly conducting polymer composite material with high work function is formed by blending a conjugated polymer with an appropriate amount of non-conjugated elastomer doped with suitable dopants. The composite film when coated on a transparent substrate at nanometres thickness is found to have transparency in the visible range (more than 85%) and surface resistivity of the order of 20 to 50  $\Omega$ /sq and work function of the order of 5.2 eV. When applied as an electrode it is found to be very effective in collecting and injecting holes and therefore it has wide application potential in various organic electronic devices like OLEO, OPV, OFET, OLETs, Organic memories etc, especially for large area printable devices.

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# 2

**Patent Number: 299754**

**Patent type: Indian**

## **Organic Light Emitting Structure Using A Novel Elastomer Composite Transparent Conducting Anode Replacing Transparent Conducting Oxides (TCOs)**

P. Pradeep

An organic light emitting structure with a transparent fully elastomeric conducting polymer composite material as hole injecting anode layer on the top of which a photo emissive organic layer and a top electron injecting layer of a low work function metal on the top of it by simple sticking process. Light with a predominantly pale green colour is observed to emit from the device when a bias voltage of 4-8 Vis applied between the electrodes. The present invention relates to a process of fabricating light emitting structures in which a fully organic flexible transparent conducting hole injecting electrode, instead of the conventionally

used brittle TCO (transparent conducting oxides), with high work function using a conductive elastomeric composite as the transparent anode with a luminescent polymer on it and a cathode of low work function metal applied on the top of it by an unconventional method of fixing an elastomer patterned with the metal coating.

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## 3

**Patent Number: 340750**

**Patent type: Indian**

### **Flexible And Printable Elastomeric Memory Nano Device Structure From Elastomer Fullrene Derivative Formed Through A Reagent Free Physical Method**

P. Pradeep, Jayan Manuel

A flexible, and printable elastomeric memory device structure formed by grafting fullerenes through a fully reagent free, nonchemical route is described. The device is a multilayered one with the elastomeric fullerene derivative of nanometer thickness that can be deposited by various coating techniques, acts as the charge trapping active medium. Charge collections are accomplished by nano and or micro patterned metal electrodes. The device is capable of nanosecond operating cycles, ultrafast switching and long shelf life.

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## 4

**Patent Number: 349176**

**Patent type: Indian**

### **New Organic Fullerene Derivatives From Elastomers**

P. Pradeep, , Jayan Manuel

A method for preparing Elastomer fullerene derivative without chemical additives and only through Electromagnetic wave irradiation is disclosed. The product has unique characteristics compared to currently available fullerene derivatives like multimode film processability for application in organic and hybrid electronic device fabrication. The method includes simple techniques to extract monosubstituted fullerene derivative from unreacted elastomer and fullerene components. The product offers to be an efficient and cost effective acceptor for organic and hybrid solar cells, and for Organic memories, Organic Field effect transistors, Organic Schottky diodes etc.

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## 5

**Patent Number: 312609**

**Patent type: Indian**

### **A Novel Method For The Preparation Of Chitin/PVA/PEG Crosslinked Hydrogel For Biomedical Applications**

Lisa Sreejith, Sudheesh P

The present invention generally relates to preparation of hydrogel. Particularly the present invention relates to a method of hydrogel preparation, wherein hydrogel is prepared by mixing natural and synthetic polymers that are suitable for biomedical applications. The present invention describes a method of hydrogel preparation for biomedical applications comprising steps of isolating and purifying at least one natural polymer; preparing an aqueous solution of at least one synthetic polymer; heating at least one natural polymer with at least one synthetic polymer at a temperature above the room temperature; stirring the mixture containing at least one natural polymer with at least one synthetic polymer to form a hot natural-synthetic polymer suspension; treating the hot natural-synthetic polymer suspension with a cross linking agent to form an matrix; maintaining the formed matrix above the room temperature; pouring the high viscous matrix solution into a mould (optionally pre-heated) followed by cooling down to room temperature, thereby allowing formation of the hydrogel; cooling the hydrogel at freezing temperature and thawing the hydrogel.

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## 6

**Patent Number: 313842**

**Patent type: Indian**

### **An Ecofriendly Method For Total Conversion Of Plastic Waste To Power Generation**

Lisa Sreejith

The present disclosure relates generally to plastic waste management. More particularly, it relates to an eco-friendly method for total conversion of all codes of plastic waste to thermal/electrical energy. The present invention relates to an eco-friendly method for total conversion of all types of plastics (code 1-7) excluding PVC to thermal/electrical energy using pyrolysis process. The PVC is processed separately in the same reactor since it can contaminate the products and byproducts because of the rejection of carbon soot. The present invention is simple, cost effective and eco-friendly.

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# 7

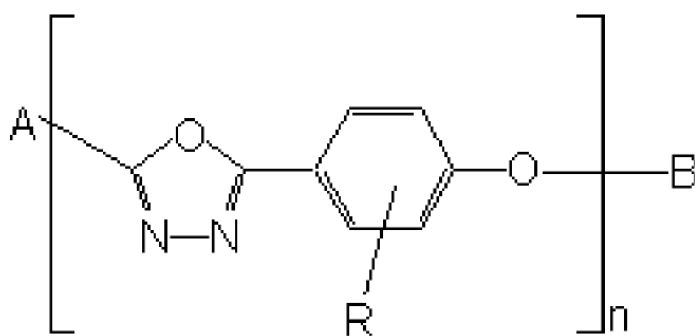
**Patent Number: 327484**

**Patent type: Indian**

## **Polymer Conjugate And A Process For Preparing The Same**

G. Unnikrishnan, Nimisha K

**T**he present invention relates to polymer conjugates of Formula I for use as an emission layer.



Formula I

The invention relates to polymer conjugates as emissive layers and process for preparing the same.

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# 8

**Patent Number: WO2012156980A1**

**Patent type: World**

## **A process for determining lubricant composition in a vapor compression refrigeration system to enhance the co-efficient of performance**

Krishna Sabareesh R, Sumitesh Das, Gobinath N, Sajith V, Shijo Thomas, Sobhan C B,

Hanas T

**T**he invention relates to a process for determining lubricant composition in a vapor compression refrigeration system to enhance the co-efficient of performance, the system comprising a hermitically sealed compressor, a condenser, a capillary tube including an evaporator cabin for cooling of water, a plurality of thermocouples, at least four

pressure gauges, and a digital energy meter, the system being operable with different varieties of refrigerants and a mineral oil as the lubricant, the process comprising the steps of preparing a nano-fluid sample in an ultrasonic agitator by dispersing TiO<sub>2</sub> nanoparticles having average particle size of 40 nm in a mineral oil; preparing a plurality of volume fractions of nano-fluid by varying the volume fraction of the nanoparticles and maintaining the volume of the mineral oil as the base fluid as constant; determining the kinematic viscosity of the base fluid and the nanoparticles in a viscometer including the variation of the kinematic viscosity of the different volume fractions of the nanofluid samples; identifying an optimum volume fraction of nanoparticles mineral oil mixture based on a minimum friction co-efficient value in a pin-on desk tester having a digital meter; and validating the identified optimum volume fraction of the nanofluid capable of enhancing co-efficient of performance of the refrigeration system when used as the lubricant, the validation being carried-out in a speckle interferometer which determined optical roughness index (ORI) value representing the effect of volume fraction of nanoparticles in the mineral oil.

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## 9

**Patent Number: BR 112012027927BI**  
**Patent type: Brazilian**

### **Process for Determining Lubricant Composition in a Cooling System by Vapor Compression**

Krishna Sabareesh R, Sumitesh Das, Gobinath N, Sajith V, Shijo Thomas, Sobhan C B,  
Hanas T

**A** process is described for determining lubricant composition in a cooling system by vapor compression to improve the coefficient of performance, the system comprising a hermetically sealed compressor sealed, a condenser, a capillary tube including an evaporator cabinet for cooling water, a plurality of thermocouples, at least four pressure gauges and a digital power meter, the system being operated with different varieties of coolers and a mineral oil as a lubricant, the process comprising the steps of preparing a nanofluid sample in an ultrasonic stirrer dispensing TiO<sub>2</sub> nanoparticles having an average particle size of 40 nm into an oil mineral.

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# 11

**Patent Number: 2021106017**

**Patent type: Australian**

## **A system and a method for trust-based intrusion Detection in a distributed IOT system**

K. N., Ambili, Jose, Jimmy

**T**he present invention relates to intrusion detection systems. In particular, the present invention relates to a system and a method for trust-based intrusion detection in a distributed IOT system. The present disclosure seeks to provide a system and a method for trust based intrusion detection in a distributed IOT system. The focus of this system is to prevent insider attacks like black hole attack, sinkhole attack and wormhole attack. Generally, IoT system uses RPL, Co RPL and CARP protocols for routing packets in the network. The system employs a novel approach of computing a trust score for each node of the network. The computation and evaluation of these trust scores are managed by distributed immutable ledger similar to a block chain for. This makes the IDS robust as history from block chain is used to validation of the trust scores. A transaction with manipulated trust score is not acceptable. Also, analytics on the trust details of a node, as saved in the block chain, give good insights into trustworthiness of a node through block chain analytics.

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# 12

**Patent Number: 375918**

**Patent type: Indian**

## **An Air Actuated Radial Robotic Gripper Attachable To A Robot Manipulator Arm**

Sudheer A. P., Jibin Rajan Varghese,

**T**he present invention provides for an air actuated radial robotic gripper attachable to a robot manipulator arm. The robotic gripper includes two symmetric baseplates (1) coupled together towards proximal end, wherein each of the base plates having two pairs of complementary slots (9) providing for a pin (7) to pass through each of the pair of complementary slots (9); a pair of complementary gripping jaw members (20) having two pairs of complementary slots (9), which correspond to the pair of slots (9) of the baseplates, are

mounted in between the two symmetric baseplates (1) by the pins (7) threaded via one or more bearings (8) fitted in each of the two pairs of complementary slots (9) allowing easy rotation of the jaw members about the pin (7); and a spring loaded lever piston mechanism. The unique design allows the gripper to operate more efficiently and with appropriate fail-safe mechanisms, while consuming lesser power, during the work cycles.

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## 13

**Patent Number: 376024**

**Patent type: Indian**

### **Novel BODIPY Based Reusable Test Paper Strip And Method Of Colorimetric Detection Of Fluoride Ion**

Diana Mathew, , Sujatha Subramaniam, Pattiyil Parameswaran

The present invention relates to a novel BODIPY molecule and reusable test paper strip based thereon. The invention also relates to a method of colorimetric and selective detection of fluoride ion. Particularly, the present invention relates to a method of colorimetric detection of fluoride ion in polar aprotic organic solvents like DMSO, DMF with the test strip containing novel 4,4-Difluoro-8-(2,4,6-trihydroxyphenyl)-4-bora-3a,4a-diaza-s-indacene.

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## 14

**Patent Number: 380432**

**Patent type: Indian**

### **Multipurpose Waste Picker**

Vinay Panicker V, Francis E. J., Manoj G. K.

The present invention relates to a portable tool for picking up waste objects of different shapes and for transferring these objects from one place to another without the need for forward-bending and stooping to the ground by the operator. The primary object of the present invention is to provide a simple and easy to manufacture, portable pickup tool that ensures multiple modes for picking up wastes of different shapes thereby eliminating the need for various pickup tools. Another object of the present invention is to provide a portable pickup

tool that ensures picking up waste objects of different shapes and transferring these objects from one place to another, without the need for the operator to bend the back and stoop to the ground. Another object of the present invention is to provide a portable pickup tool for picking up waste objects of varying shapes, which ensures easy switching over between the multiple means of waste picking thereby reducing 5 the setup time.

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## 15

**Patent Number: 394801**

**Patent type: Indian**

### **Novel 4-Diphenylamino 3-Iodo Coumarin And A Method For Its Isolation**

Sareena C, T V, Suchithra

The present invention in general relates to a novel aminocoumarin, 4- diphenylamino 3-iodo coumarin isolated from *Nigella sativa*. The compound has the capacity of inhibiting DNA gyrase B of *Staphylococcus aureus* (hereinafter referred to as *S. aureus*). More particularly, the present invention relates to 4-diphenylamino 3-iodo coumarin as a potent drug candidate against drug resistant *S.aureus* strains, the compound being isolated from the seeds of *Nigella sativa*. The compound can greatly inhibit the DNA gyrase activity of both drug sensitive and resistant *S.aureus* strains.

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## 16

**Patent Number: 391511**

**Patent type: Indian**

### **Method For Selective And Sensitive Quantification Of Hydrogen Sulfide**

M. Muraleedharank, Lakshmi. C, Ramshad. K, Divya. T. T

Embodiments are generally related to the field of analytical chemistry. Embodiments are further related to methods for selective detection and quantification of hydrogen sulfide (H<sub>2</sub>S) in biological samples or samples of environmental/industrial origin using triarylmethane dyes. Embodiments are furthermore related to detection and management of clinical conditions, including, but not limited to, sepsis and quantification of hydrogen sulfide in other

environmental or industrial samples. Embodiments are more particularly related to methods for selective and sensitive quantification of hydrogen sulfide (H<sub>2</sub>S) using new triaryl methane dyes.

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# 17

**Patent Number: 2022/06791**

**Patent type: South African**

## **MUDRA PRABHA**

G Varaprasad, Alok kumara samanta

The present invention relates to the technical field of devices for reading/authenticating banknotes, and in specific relates to a portable currency identification device (mudra prabha) that aids visually challenged people to identify various denominations of currency including paper notes and coins based on dimensions using tactile indications. The portable currency identification device comprises a flat base, at least two vertical projections, plurality of tactile indications, and at least two rectangular slots. The portable currency identification device is made of either plastic or Polylactic acid or other similar lightweight materials thereof for easy portability. The flat base is of predetermined dimensions. In specific, the flat base is further configured with at least one slot along the length that enables the visually impaired user to distinguish the at least one currency note based on width for accurate identification. The predetermined dimensions of the flat base are designed based on the currency note dimensions such that the visually impaired user is able to identify the currency notes based on whether the width of the note is either exceeding or is equal to or is less than the width of the flat base.

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# 19

**Patent Number: 399106**

**Patent type: Indian**

## **Deployable/Retractable Prefabricated Building Structure**

A.P. Sudheer, Ajin Baby, Hariram Shankar, M. Murali, Gopal, Thomas Joseph

**T**he present invention relates to a low cost deployable/retractable prefabricated building structure preferably 'Z' in shape and can be retracted up to one fourth of its volume, said deployable/retractable prefabricated building structure comprising framework housing one or more flooring panels; one or more roofing panels; one or more wall panels; one or more window panels; and one or more door panels. The wall panel further comprising one or more foldable wall panels and one or more sliding wall panels, corresponding edges of the flooring panels are pivoted to corresponding edges of said wall panels and to the framework. Corresponding edges of the roofing panels are pivoted to corresponding edges of the wall panels and to the framework, and edges of one of the wall panels are pivoted to the other wall panels and further pivoted to corresponding edges of the roofing panels, flooring panels and the framework.

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# 20

**Patent Number: 411035**

**Patent type: Indian**

## **A Device And Method For Power Management In A DC Nanogrid Power Distribution System**

Sigi C Joseph, Mohammed Ajlif A, Ashok S

**A** device for power management in a Direct Current (DC) nanogrid power distribution system, the device comprising: at least one nanosocket (111) device positioned between a power distribution unit (101) and a power appliance unit for controlling and monitoring power appliances used in a 48V DC nanogrid power distribution system; at least one Nanogrid System Controller (NSC) (103) configured to supervise power control in the 48V DC nanogrid power distribution system; a Control Area Network (CAN) communication interface used to communicate with the at least one NSC for transmitting real-

time status information of the power appliances, wherein the NSC is further configured to run a power management algorithm and manage the nanosocket (111) device using the CAN (113) communication interface, wherein the power management algorithm is based on priority-based scheduling of power load through the NSC (103); an automatic network address setting module configured to assign a unique network address to each nanosocket (111) device; and at least one power load controller configured to manage power load connected to the 48V DC nanogrid power distribution system.

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## 21

**Patent Number: 424149**

**Patent type: Indian**

### **Non-Enzymatic Electrochemical Sensor for Real-Time Detection of Glutamic Acid and Method Thereof**

Mini Mol Menampambath, Rasha Rahman Poolakkandy , Neelakandan Annamalai Ramalakshmi, Krishna Aravind Padmalayam, Rajanikant Golgodu Krishnamurthy

**T**he present invention generally relates to electrochemical sensors and in specific relates to a non-enzymatic electrochemical sensor for real-time detection of glutamic acid concentration in a human body. Another objective of the invention is to provide a model for real-time detection of glutamic acid using oxygen-glucose deprivation in neuronal cells for studying the detection of glutamate in stroke-induced patients. The other objective of the invention is to provide a synthesized metal hydroxide composite with a relatively small amount of multi-walled carbon nanotubes (MWCNT), which is inexpensive, simple to make and useful for the detection of glutamic acid.

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## 22

**Patent Number: 429867**

**Patent type: Indian**

### **A Low-Cost Portable Electrochemical Biosensor for Rapid Detection of Endotoxin and Method Thereof**

N. Sandhyarani, Tushar Pathak, Haritha K, Arun R., M. K. Ravi Varma

**T**he present disclosure generally relates to the technical field of electrochemical biosensors, and in specific relates to a low-cost portable electrochemical biosensor for the rapid detection of endotoxin spiked in human blood serum. Another objective of the invention is to provide an electrochemical endotoxin concentration detection device capable of accurately and easily detecting the endotoxin concentration. The other objective of the invention is to provide a modified screen-printed electrode with a novel composite of functionalized CNT -Cu<sub>2</sub>O- SH aptamer to specifically analyse various concentrations of endotoxin.

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## 23

**Patent Number: 429959**

**Patent type: Indian**

### **Multi-Mode Friction Stir Welding Tool**

Manu R., Renju Mohan, Jayadeep U, B.

**T**he present invention relates in general to tools and their parts used for friction stir welding (FSW) and in particular to a multi-mode friction stir welding tool having the capability to perform all the variants of friction stir welding such as Dual Rotation FSW, Counter Rotation FSW, Stationary Shoulder FSW, Regular FSW, Micro FSW ( $\mu$ FSW) and High Speed FSW. Another object of the invention is to provide a friction stir welding tool which can be used for both metal and thermo plastics welding. Another object of the invention is to provide a friction stir welding tool having multi-mode friction stir welding spindle which results in reduction of force developed during welding.

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## 24

**Patent Number: 433177**

**Patent type: Indian**

### **Superhydrophobic-Omniphobic Membrane for Membrane Distillation with Enhanced Scaling, wetting and fouling Resistance and Preparation Method Thereof**

Noel Jacob Kaleekkal, Vivekanandan Sangeetha

**S**uperhydrophobic-Omniphobic Membrane for Membrane Distillation with Enhanced Scaling, wetting and fouling Resistance and Preparation Method Thereof The present disclosure proposes a superhydrophobic-omniphobic membrane composition for membrane distillation. The proposed robust dual-layered superhydrophobic-omniphobic membrane exhibits high anti-fouling, anti-wetting and anti-scaling properties. The superhydrophobic-omniphobic membrane exhibits a high contact angle against water and oil, thus proving to be an omniphobic membrane. The superhydrophobic-omniphobic membrane exhibits high vapour permeability/flux and contaminant rejection nearly 100 %. The superhydrophobic-omniphobic membrane exhibits long-term stability, superior anti-fouling and anti-scaling properties. The superhydrophobic-omniphobic membrane can handle low surface tension feeds including surfactants and low surface-tension liquids such as ethanol, propylene glycol.

The present disclosure generally relates to the technical field of membrane manufacturing, and in specific relates to a method of preparing a robust superhydrophobic-omniphobic membrane using an electro-spraying-electro-spinning approach for membrane distillation applications that exhibits high anti-fouling, anti-wetting and anti-scaling properties.

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## 25

**Patent No. : 427649**

**Patent type: Indian**

**A Method for Determining Jointly the Carrier Frequency Offset (CFO) Timing Offset, and Channel Co-Efficients in an Orthogonal Frequency Division Multiple Access (Ofdma) Uplink Wireless Communication System**

Sameer S. M., Thafasal Ijyas V P

**A** method for determining jointly the carrier frequency offset (CFO) timing offset, and channel co-efficients in an orthogonal frequency division multiple access (OFDMA) uplink wireless communication system including multiple transmitters communicating with corresponding members of receivers of the system's single base station, the method comprising the steps of transmitting data through multiple antennas at the transmitter having  $N$  subcarriers in which each user being assigned with a block of  $S_m$  data symbols, and the  $m$ th user allocated with  $S_m$  subcarriers such that the resulting  $N$ -dimensional vector for said  $m$ th user has  $S_m$  symbols including  $N-S_m$  zeros; transforming the data symbols to the time domain using an  $N$ -point IDFT; adding a last  $N_g$  time domain symbol as a cyclic prefix to the transmitted symbol to generate an  $N+N_g$  length symbol and transmitting



the symbol; receiving signals transmitted by all M-active users at the receiver, the signals being superimposed transmitted signals including user-specific multipath distortion, timing offset and frequency offset; implementing decomposition of the received signal in a process of minimum residue decomposition (MRD) to separate the users' signals from the combined and noise-involved signal (r); obtaining an objective function and eliminate interference and noise from the signal, the objective function being formulated consecutively used for M one-dimensional searches; iterating the MRD process to minimize the residue of the decomposed signal of mth user in a subspace orthogonal to its own subspace, and estimating in each subsequent iteration the carrier frequency offset (CFO) values of all users one after another; determining maximum expected channel delay spread (Lmax) including extended channel vector (cm), and incorporating the estimated CFO values to said determined Lx and cm to obtain a search function {0}; continuing the search function based on CFO values to estimate timing offsets; and estimating channel responses by using the determined CFO and timing offset values.

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## 26

**Patent No. : 436763**

**Patent type: Indian**

### **System for Inscribing Patterns on Metallic Nanoparticles Layer at Liquid-Liquid Interface and Method Thereof**

Subramanyan Namboodiri Varanakkottu, Ragisha C M, Farzeena C

**S**ystem for Inscribing Patterns on Metallic Nanoparticles Layer at Liquid-Liquid Interface and Method Thereof A system (100) and method for inscribing patterns (116 and 120) on metallic nanoparticles (113) is disclosed. The system (100) comprises a liquid holding platform (102), a laser diode (104), a reflector (106), and a lens unit (108). The liquid holding platform (102) is partially filled with at least two immiscible liquids, thereby generating a liquid-liquid flat interface. The metallic nanoparticles (113) is self-assembled onto the liquid-liquid flat interface, thereby generating a self-assembled monolayer (118). The lens unit (108) is positioned with respect to the reflector (106) to receive the deflected single collimated expanded beam (105) and focus it to be irradiated onto a focal point for providing heating, thereby generating a thermocapillary flow in order to displace the metallic nanoparticles (113) for inscribing the patterns on the metallic nanoparticles (113), where the developed pattern could be polymerized and extracted from the liquid-liquid flat interface.

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## 27

**Patent No: 434837**

**Patent type: Indian**

### **Ground Granulated Blast Furnace Slag-Dolomitegeopolymer Concrete Blocks**

Saranya P., Praveen Nagarajan, Shashikala A. P.

**T**he present invention provides Geopolymer concrete blocks having ground granulated blast furnace slag also known as GGBS, and dolomite as binder and source materials and fine aggregate and coarse aggregate and alkaline solution as mix components, said GGBS and dolomite being in the proportion of 70:30 whereby polymeric reaction gives strength to the concrete. A process for preparation of the Geopolymer Concrete Blocks is also disclosed. Geopolymer concrete blocks having ground granulated blast furnace slag also known as GGBS, and dolomite as binder and source materials and fine aggregate and coarse aggregate and alkaline solution as mix components, said GGBS and dolomite being in the proportion of 70:30 whereby polymeric reaction gives strength to the concrete.

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## 28

**Patent No. : 445959**

**Patent type: Indian**

### **Steel Fibre Reinforced Rubcrete Fencing Post**

Anand Raj, Praveen Nagarajan, Shashikala, A. P.

**A** steel fibre reinforced rubcrete fencing post having high impact resistance, comprising 356.0 to 360 kg/m<sup>3</sup> cement, 561.70 to 650 kg/m<sup>3</sup> fine aggregates, 1279.20 to 1292.21 kg/m<sup>3</sup> coarse aggregates, 171.0 to 172.8 kg/m<sup>3</sup> water, 8 to 24.10 kg/m<sup>3</sup> rubber and 19.60 to 78.5 kg/m<sup>3</sup> steel fibre, whereby the fencing post has substantially high impact energy as compared to ordinary concrete fencing post.

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# 29

**Patent No. : 440975**

**Patent type: Indian**

## **Steel Fiber Reinforced Rubcrete Prestressed Concrete Railway Sleepers**

Anand Raj, Praveen Nagarajan, Shashikala, A. P.

**A** steel fiber reinforced rubcrete prestressed concrete railway sleeper having high impact resistance, comprises graded and pre-treated crumb rubber particles having a specific gravity of 0.65 and pre-treated with 2% polyvinyl alcohol solution. Crumb rubber replaces 15% by volume of fine aggregates. The prestressed sleeper also has steel fibre content constituting 0.75% by volume of said concrete. The prestressed concrete exhibits two times more impact energy in comparison to ordinary prestressed concrete sleepers. A steel fiber reinforced rubcrete prestressed concrete railway sleeper having high impact resistance, comprising graded and pre-treated crumb rubber particles having a specific gravity of 0.65 and pre-treated with 2% polyvinyl alcohol solution such that said crumb rubber replace 15% by volume of fine aggregates and said prestressed sleeper having steel fibre content constituting 0.75% by volume of said concrete, whereby two times more impact energy in comparison to ordinary prestressed concrete sleepers, is achieved.

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# 30

**Patent No. : 447616**

**Patent type: Indian**

## **Gold-Silver Alloy Embedded PEDOT-Based Non-Enzymatic Electrochemical Sensor for Histamine Detection and Method Thereof**

Dr. Mini Mol Menampambath, Sameena Kanakkayil, Nesleena Puthiyottil, Sijina Kinattingara Parambath and Dr. Rajanikant Golgodu Krishnamurthy

The present disclosure proposes a non-enzymatic electrochemical sensor for the detection of histamine released by human neural cells. The non-enzymatic electrochemical sensor comprises monomer, an organic solvent, an aqueous solution of silver-containing compounds, and an aqueous solution of gold-containing compounds. The in-situ synthesis of a polymer alloy composite at a bi-solvent interface. The metal salts and monomer precursors solely soluble in aqueous and organic phases, respectively undergo redox reactions leading to the formation of highly crystalline gold-silver alloy embedded PEDOT nanostructures. The non-enzymatic electrochemical sensor detects even at a very low limit of histamine ranging at 1.5 nM and the sensor further has the property of detecting the histamine at a very lower concentration in presence of a large number of interfering groups.

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# 31

**Patent No. : 445941**

**Patent type: Indian**

## **N-Stage OTA Buffer Amplifiers with Unity Gain and High Input Dynamic Range and Tunable Gain for Driving Large Resistance Loads**

Subramaniam P C, Jayachandran, Remya

**A**n N-stage OTA buffer amplifier with unity gain (1) for large resistance loads comprises of 'N' OTAs (2) which are connected in voltage series feedback configuration. The configuration is a unity gain amplifier that can drive large resistance load. An N-stage OTA buffer amplifier (3) with high input dynamic range and tunable gain for driving large resistance loads comprises of several feedback blocks constructed using OTAs (2) and forming three feedback stages. The gm control terminals of the OTA feedback blocks can be varied to attain equal voltage swing at the output of each stage, thereby improving the input dynamic range of the buffer amplifier.

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# **Technology Transfer**

Sl no	Item	Inventor	date	Name of the industry
1.	Solid State Transformer	Dr.Ashok.S Dr.Kumaravel .S	03.09.2019	Kerala Electrical and Allied Engineering co. ltd, Cochin
2.	Emergency Ventilator	Dr. Sajith .V	18.06.2020	Kerala State Drugs & Pharmaceuticals ltd. Kalavoor, Alleppy
3.	Reusable Aerosol Boxes for treating COVID19 patients	Dr. Subramanyan N V	02.04.2020	Kozhikode Govt. Medical College, Calicut
4.	Eclipse Watch Refracting Telescope	Dr. Subramanyan Namboodiri Varanakkottu	26.12.2019	Optind Solutions Pvt. Ltd. ,Calicut
5.	Visible band Integrating Nephelometer	Dr.M.K.Ravi Varma	17.12.2020	Optind solutions Pvt.Ltd

# 1

## **Solid state transformer**

Prof. S. Ashok, Dr. Kumaravel S

**A**Xilinx System Generator (XSG) based rapid implementation of SST has been developed. A Single Active Bridge (SAB) is used for integrating RES with the utility grid. For safe starting and mode selection with effective protection schemes of the SST, a dedicated algorithm has been developed and implemented in XSG along with the controllers. The various controllers for the stable operation of the SST are implemented in the XSG. A 3 kVA, 415 V, three-phase laboratory prototype of the SST has been fabricated and tested successfully in the laboratory environment. This technology was transferred to Kerala Electrical and Allied Limited, Kochi.

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# 2

## **Emergency Ventilator**

Dr. Sajith .V

**E**mergency ventilator, a breathing aid for the patients experiencing the difficulty in breathing basically uses an Ambu bag, which is normally operated by hand. The operation of the Ambu bag has been made automatic by means of a Wiper motor drive of automobiles in this breath aiding device. This ventilator can also be used for patients during their transportation. Another factor which is critical for a mechanical ventilator is Positive end-expiratory pressure (PEEP). In the ventilator developed by NITC , a PEEP valve is provided for setting the PEEP pressure. An emergency switch with an alarm is incorporated as a safety measure. This emergency ventilator is very essential under the corona situation. The exhaled air of corona patients using noninvasive ventilators will be infected and needs to be filtered before expelling to the atmosphere. Expensive filters are generally used for this. In the Ventilator developed by NITC, the exhaled air of the corona patient is disinfected, which is a unique feature of this product. The exhale disinfectant can be reused, reducing the operational cost of the respirator. The components used for this product are readily available in the shops.

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# 3

## **Reusable Aerosol Boxes for treating COVID19 patients**

Dr. Subramanyan N V

**D**octors and supporting staffs worldwide are at great risk while treating COVID19 infected patients. Conventionally, they wear PPE kit while intubating each patient. Healthcare community is employing a new, reusable protective device very recently, namely “Aerosol box”. This device helps anesthesiologists and other physicians while intubating patients by protecting them from aerosols and droplets containing virus. The device typically consists of a transparent box slips over the patient’s head and shoulders having dedicated openings/holes for access/airway management. These boxes are reusable and easy to sanitize.

\*\*\*\*\*

## 4

### **Eclipse Watch Refracting Telescope**

Dr. Subramanyan N V

**E**clipse watch refracting telescope is intended to capture and study major celestial events like solar eclipse, lunar eclipse, meteor shower, planets etc. The telescope is designed and developed in- house. The telescope design includes an objective lens, tube assembly, neutral density filters and a 45 O mirror assembly. Further, optional facility was provided for capturing the events using a CCD camera. Eyepiece lens was provided with varying focal length, so that that magnification can be decided based on the object size. All the mechanical parts, except the tube, are designed by the team and fabricated using 3d printing technology. The telescope operates in two modes: Projection mode and camera mode. In projection mode, the light rays from the eyepiece lens will be directed towards a screen by the 45 O mirror assembly. NIT Calicut has already demonstrated the performance of the prototype of Eclipse Watch Refracting Telescope developed and tested its working by projecting Solar Eclipse on 26 th December 2019, at NIT Calicut.

\*\*\*\*\*

## 5

### **Visible band Integrating Nephelometer**

Dr. M. K. Ravi Varma

**T**he broad spectral integrating nephelometer is for directly measuring light scattering by atmospheric aerosol. The solar energy, majority of which by visible light, gets scattered by particulate matter (aerosol) in the atmosphere and affects the energy budget into the earth system and will affect global warming/cooling. The scattering by particles depends on their optical properties, and this instrument will help to characterize different types of aerosols. Optind Solutions Pvt Ltd. was found by Dr. Satheesh Chandran, an alumnus of Physics Department and is being incubated in TBI-NITC. Optind has shown interests to commercialize the instrument and an MoU was signed for transferring the technology to Optind with the permission from the KSCSTE and NITC administration.


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# Copyrights

Sl no	Details of Copy Right	Name of the Inventor	Remarks
1	Supply chain role play game, Registration number: SW-9743/2017	Madhusudhanan Pillai A.P, MED	Soft ware
2	Supply chain role play game tutor, Registration number: SW-9745/2017	Madhusudhanan Pillai A.P, MED	Soft ware
3	Vendor managed inventory-based supply chain role play game, Registration number: SW-9744/2017	Madhusudhanan Pillai A.P, MED	Software
4	CometQ: A software for Medical Purposes particularly for DNA Damage Analysis using Comet Assay Images Application Number: 3449078, Copyright NUMBER:4945/2017, July 2017	Dr.P.S Sathidevi Dr. G. Sreelekha Prof. ECED	Software
5	FIXPLAN' Software Reg. No: SW-14005/2020	Dr. R Manu, Professor, MED Dr. Deepak Lawrence K, Asst. Professor, MED Remil George Thomas, PhD Research Scholar, MED	Software

# Trademarks

Slno	Details of Trademark	Name of the inventor
1	<p>UV SANITICE Application no:5051794</p> 	Dr.R Manu

**Student Innovation Projects  
(2022-2023)**

**42 Projects**

# 1

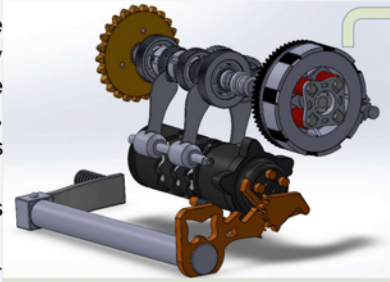
## Novel Magneto-Rheological(MR) Clutch For Two-Wheeler Application

### Novel Magneto-Rheological(MR) Clutch For Two-Wheeler Application

Contact Person: Athul S Aravind  
Contact Details : 9645282607

Our product, a novel Magneto Rheological (MR) Clutch for two-wheeler application, is a groundbreaking innovation in the field of automotive technology. This cutting-edge device employs a smart fluid technology that can variably adjust its viscosity in response to a magnetic field. The degree of viscosity can be controlled by manipulating the current, offering an impressive response time of less than 5 milliseconds, and is operational within a wide temperature range (-40°C to +130°C).

- Miniaturization of MR clutch not exceeding the space requirements of current conventional wet clutches in use.
- Readily usable and compatible integrated system to suit present-day two-wheelers.
- Commercialization of economically feasible MR clutch meeting the torque demands



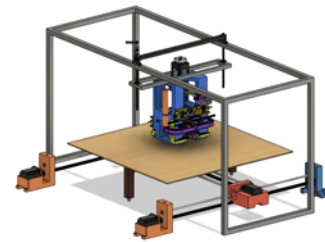
# 2

## Grafito : Automated Grafting Robot

### Grafito : Automated Grafting Robot

Contact Person: Abel C Dixon  
Contact Details :9074056134

Our automated grafting robot can increase the productivity of grafted vegetable production. The robot is designed to perform the manual and repetitive task of grafting, improving the productivity of workers and providing farmers with access to more quality vegetable saplings. It is designed to adapt to varying plant sizes and types, ensuring maximum flexibility. The robot is capable of grafting approximately 400-500 grafts/hour.



30-50%  
More Yield



2X Income



Toxic Free



Lower Production Cost

# 3

## Rutalac : Automatic Rubber Tapping Machine

### Rutalac : Automatic Rubber Tapping Machine

Inventor : Santo Jacob Koshy  
Contact Details :9497518662

Our product is an automatic tapping machine used for tapping the rubber tree. The different parts of the product are detailed below:

- Rubber Tapper : It is the most important part of our product, whose job is to tap the rubber properly at a proper orientation for maximum productivity, and no damage to the Cambium of the tree.
- This tapper is equipped with rack and pinion mechanisms for up and down as well as to and fro motion for tapping the tree.
- Mobile base with Caterpillar Track : It is the base part containing the whole machine. It is equipped with camera sensors, object sensors to move along proper track from tree to tree. The caterpillar track is used for rough terrain in the plantation.



**For more details about patents/ commercialisation/Transfer of Technology (ToT)**

**Please Contact**

**Dr. Anuj A Vargeese**

**IPR Cell Coordinator**

**Center for Innovation Entrepreneurship & Incubation (CIEI)**

**National Institute of Technology Calicut**

**Calicut 673601**

**Ph: 9700455320**

**Email: [aav@nitc.ac.in](mailto:aav@nitc.ac.in)/[iprcell@nitc.ac.in](mailto:iprcell@nitc.ac.in)**