

# List of CSIR Knowledgebase



**Planning and Performance Division (PPD)  
Council of Scientific & Industrial Research  
New Delhi**

**July 2014**

## CSIR Knowledgebase

Sr. No.	Lab	Number of Technology / Product / Process / Knowhow
1	CSIR-AMPRI, Bhopal	7
2	CSIR-CBRI, Roorkee	18
3	CSIR-CCMB, Hyderabad	5
4	CSIR-CDRI, Lucknow	1
5	CSIR-CECRI, Karaikudi	17
6	CSIR-CEERI, Pilani	8
7	CSIR-CFTRI, Mysore	24
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9	CSIR-CIMAP, Lucknow	30
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Total Knowledgebase: **642**

<b>Title</b>	<b>Technology / Product / Process / Knowhow</b>	<b>Technology Area</b>	<b>Industry Sector</b>	<b>Is patent part of licensing?</b>
X-Ray Radiation Shield	Novel process and material for making advanced X-Ray radiation shielding material for diagnostic and industrial application.	Chemical sciences & engineering	Defense, Aerospace, Atomic Energy (Strategic)	Yes
Cost effective fast settling alternative to cement	Prefabricated housing industry, basic public infrastructure like drainage system etc.	Physical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	No
A cost effective process for stabilization of solid wastes and sewage sludge generated from galvanizing and metal finishing industry	A process for stabilization and solidification of industrial hazardous wastes by transforming it into glass like solid structure for use in concrete construction	Physical sciences & engineering	Natural Resources, Water, Environment, Sustainability	No
An eco-friendly acid and corrosion resistant coating composition for concrete and metals	A coating composition to protect concrete, metal from acidic or chemicals vapours/environment against corrosion	Chemical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	Yes
Cost-effective process to produce nano-sized Titanium Carbide particles	Knowhow to manufacture a product for high performance machining, tribology applications	Physical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	Yes
Decorative and protective semi-gloss enamels coatings made from fly-ash utilization	Corrosion protection of metallic structures, aesthetic improvements of buildings and	Chemical sciences & engineering	Chromophoric Materials, Dyes, Pigments, Colorants	Yes

	concrete structures			
Very efficient utilization of industrial by-products in composites which can replace conventional building materials	To process fly-ash and use it to make composite materials	Physical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	No

<b>Title</b>	<b>Technology / Product / Process / Knowhow</b>	<b>Technology Area</b>	<b>Industry Sector</b>	<b>Is patent part of licensing?</b>
Thermal Insulated Tiles from Vermiculite	Vermiculite cement tiles with low water absorption, better strength properties and low thermal conductivity compared to the conventional clay tiles used for thermal insulation purpose.	Chemical sciences & engineering	Polymers, Plastics, Elastomers, Fibers, Adhesives, Paints, Specialty Polymers, Natural Polymers, Fibers and Leather	Yes
Fire resistant smoke suppressant coating for wood and cellulose based housing and furniture	Knowhow for a fire resistant coating for wood and furniture industry	Chemical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	No
Fire Resistant Door	Knowhow to manufacture metallic composite based fire resistant door	Chemical sciences & engineering	Polymers, Plastics, Elastomers, Fibers, Adhesives, Paints, Specialty Polymers, Natural Polymers, Fibers and Leather	No
Light-weight sandwich panels by using paper industry cellulosic waste	Knowhow to manufacture light-weight sandwich panels	Chemical sciences & engineering	Natural Resources, Water, Environment, Sustainability	No
Pine Needle Panel Board	Knowhow to manufacture	Others	Inorganic and Hybrid	Yes

	pine needle panel board which has 90 percent more strength and better screw withdrawal load and biological resistance than the untreated needle boards		materials, Inorganic materials	
Flooring Tiles from Waste Gypsum	Process know-how for manufacturing waste-gypsum based floor tiles as a replacement to ceramic and cement tiles	Chemical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	Yes
Rice Husk Plastic Composite	Rice husk plastic wood through melt blend processing providing superior heat stability used for building applications.	Others	Inorganic and Hybrid materials, Inorganic materials	Yes
Liquid fire extinguisher	Novel and affordable fire extinguisher suitable to combat Class A and Class B fires	Chemical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	Yes
Direct Foam Injection (DFI) - technology for petroleum oil tank fire safety	A technology for oil tank fire safety in the oil and petroleum industry or allied chemical and petro-chemical industries	Others	Petrochemicals and Petroleum	Yes
High strength plaster from fluorogypsum	An energy efficient low cost high strength plaster	Chemical sciences & engineering	Polymers, Plastics, Elastomers, Fibers,	No

			Adhesives, Paints, Specialty Polymers, Natural Polymers, Fibers and Leather	
Geopolymer based building materials	Solid and hollow blocks, bricks and concrete cured at room temperature.	Chemical sciences & engineering	Polymers, Plastics, Elastomers, Fibers, Adhesives, Paints, Specialty Polymers, Natural Polymers, Fibers and Leather	No
Building Bricks from Inferior Soils/Industrial Waste	Knowhow to manufacture bricks from inferior soils	Chemical sciences & engineering	Polymers, Plastics, Elastomers, Fibers, Adhesives, Paints, Specialty Polymers, Natural Polymers, Fibers and Leather	No
Brick Kilns In-Built Gravitational Settling Chamber	Pollution control in brick kilns through in-built gravitational settling chamber (GSC)	Physical sciences & engineering	Others	Yes
Natural Fibre Composite Door/Panel	Knowhow to make doors made from fibres having good reinforcement potential	Chemical sciences & engineering	Polymers, Plastics, Elastomers, Fibers, Adhesives, Paints, Specialty Polymers,	No

			Natural Polymers, Fibers and Leather	
Water Based Epoxy System for Concrete	Pigmented epoxy coating which provides a wear and water resistant finish to broad areas of concrete exposed to pedestrian and light vehicular traffic. It provides a more heavy duty finish than conventional paving paints.	Chemical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	No
Roof Cooling Device.	Saves upto 30percent energy in air conditioned building	Physical sciences & engineering	Natural Resources, Water, Environment, Sustainability	No
Energy Efficient Gypsum Calcinator	Calcination of quarry gypsum, marine gypsum, phosphogypsum into plaster of paris of various grades for use in building, pottery, ceramic and surgical applications.	Chemical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	No
Bored compaction pile for foundation of different construction structures	Design and construction package for bored compaction pile for foundations of structures	Physical sciences & engineering	Others	No



Title	Technology / Product / Process / Knowhow	Technology Area	Industry Sector	Is patent part of licensing?
Molecular diagnostic marker for male sterile in hybrid seeds.	A DNA marker that is amenable for automation, to distinguish cytoplasmic male sterile from cognate maintainer lines at hybrid seed level to assess seed purity.	Life sciences/ biosciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	Yes
Bacterial blight resistant Improved Samba Mahsuri rice variety	Seeds of bacterial blight resistant variety with yield and fine quality characteristics of Samba Mahsuri. Package of practices for growing the variety.	Life sciences/ biosciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	Yes
Protein engineered lipase enzymes for Industrial Biotechnology	Process for generation, production and selective purification of novel thermostable, organic solvent stable and pH tolerant lipases expressed from through genetically	Life sciences/ biosciences & engineering	Industrial Biotechnology	Yes

	engineered recombinant gene variants.			
Novel molecular carriers for targeted gene and drug delivery	Novel cationic (positively charged) amphiphiles in the form of liposomes or micelles which are capable of facilitating the transport of biologically active molecules into cells.	Chemical sciences & engineering	Medical Biotechnology, Biomed Products, Medical Healthcare, Diagnostics	Yes
Low temperature active enzymes	Low temperature system for protein production and other industrially relevant bioprocess	Life sciences/ biosciences & engineering	Industrial Biotechnology	No

Title	Technology / Product / Process / Knowhow	Technology Area	Industry Sector	Is patent part of licensing?
An anti-thrombotic compound to prevent platelet activation in the patients of coronary artery disease/thrombotic cerebral stroke	An anti-thrombotic compound which is specific inhibitor of collagen induced platelet adhesion and aggregation and process of synthesis of that compound	Life sciences/ biosciences & engineering	Pharmaceuticals, Bulk Drugs, Formulations	Yes

Title	Technology / Product / Process / Knowhow	Technology Area	Industry Sector	Is patent part of licensing?
High voltage Lithium ion Battery	It is a innovative lithium ion battery designed with a stand alone anode and a cathode made from lithium oxide which enables it to work at high temperature and has increase the battery life up-to 200 cycles.	Chemical sciences & engineering	Computing & Electronic Devices, Instrumentation	Yes
PEM based electrolyser	A patented device that produces a pure form of Hydrogen for captive energy consumption	Chemical sciences & engineering	Energy, Fuels	Yes
Electrolytic Defluoridation Technology	Technology for simultaneous removal of fluoride and iron from water	Chemical sciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	No
High durability and multifunctional reinforcement concrete	Nano silica for reinforcing concrete and multi-component inhibitor formulation for electro-injection process towards	Chemical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	No

	the corrosion of steel in different cements.			
Light lead acid batteries with improved performance	A low-cost, light weight, lead-acid battery with high specific-energy	Chemical sciences & engineering	Polymers, Plastics, Elastomers, Fibers, Adhesives, Paints, Specialty Polymers, Natural Polymers, Fibers and Leather	No
Electrochemical treatment processes for pollution control & waste management	Knowhow to progressively convert and substitute the classical chemical methods (toxic) by cleaner and improvised approach in the treatment of industrial effluents	Chemical sciences & engineering	Organic Chemicals, Fine Chemicals, Intermediates, Feedstocks	
Electrochemical strategy for efficient extraction, recovery of metals	An electrochemical process as an alternative to the smelting operation	Chemical sciences & engineering	Natural Resources, Water, Environment, Sustainability	
Immuno-biosensor for diagnostic kits development of MRSA bacteria	Electrochemical immunoassay based detection kits for rapid MRSA bacteria detection & diagnosis	Chemical sciences & engineering	Organic Chemicals, Fine Chemicals, Intermediates, Feedstocks	No
Electroanalytical sensor for pesticides and heavy metals	Portable amperometric instrument for sensing the presence of	Chemical sciences & engineering	Natural Resources, Water, Environment, Sustainability	

	pesticides			
Super hard coatings for biomedical application	Biocompatible, nanoscale multilayered, super hard nanocomposite coatings for biomedical applications	Life sciences/ biosciences & engineering	Medical Biotechnology, Biomed Products, Medical Healthcare, Diagnostics	No
DNA based nanomaterials for catalysts, devices and sensors	DNA as a template for nanowire synthesis and their application in conducting elements in nanodevices, catalysis and sensors	Life sciences/ biosciences & engineering	Electronics, Photonics, Magnetics	
Efficient process for production of aluminum	An eco-friendly, high yielding, electrolytic process using new type of anode for the production of aluminum	Chemical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	Yes
A new process for recovery of pure nickel sulphate from dilute solutions	Enhancing nickel recovery efficiency using novel method	Chemical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	Yes
An improved pH measurement device for chemical and electrochemical industries	Device for better pH transmission in high current applications	Chemical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	Yes
A new technology to recycle waste water from textile industry	Electrochemical oxidation of textile wastewater and its reuse	Chemical sciences & engineering	Chromophoric Materials, Dyes, Pigments, Colorants	Yes
Electro-refining of scrap lead batteries	A pollution free method to acquire pure	Chemical sciences & engineering	Electronics, Photonics, Magnetics	Yes

	Lead from scrap Lead Batteries removing almost all kinds of metallic impurities.			
Thin film metallic glass coatings by sputtering for bioimplants	Biocompatible, amorphous alloys (thin film metallic glasses), corrosion and wear resistant coatings for biomedical applications	Life sciences/ biosciences & engineering	Medical Biotechnology, Biomed Products, Medical Healthcare, Diagnostics	No

<b>Title</b>	<b>Technology / Product / Process / Knowhow</b>	<b>Technology Area</b>	<b>Industry Sector</b>	<b>Is patent part of licensing?</b>
X-ray imaging based mango sorting system	A system for non-destructively sorting mangoes	Physical sciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	No
KSHEER-SCANNER: A system for detection of adulteration in raw milk	An electronic tongue system to detect quality of milk	Physical sciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	Yes
Plastic waste sorting system for recycling of PET Materials	An automated system for sorting plastic wastes	Physical sciences & engineering	Natural Resources, Water, Environment, Sustainability	No
Industrial vision for iron ore pellets	Industrial vision system for distribution and size analysis of iron ore pellets	Physical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	
Smart Pond Management System for aquaculture	An integrated, smart system to monitor and control the health of aquaculture ponds	Physical sciences & engineering	Natural Resources, Water, Environment, Sustainability	No
Embedded smart motorized boat for water and aquaculture	A system comprising of a smart motorized	Physical sciences & engineering	Agriculture, Agro-biotech, Agro-	No



	boat for aquaculture application		products, Fertilizers, Food processing & Secondary Agriculture	
Smart camera based system for sorting of biscuits	Machine vision based inspection system for sorting of biscuits	Physical sciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	No
On-line Monitoring of Free Fatty Acid (FFA) in Edible Oil	A NIRS based system for on-line monitoring of FFA in edible oils	Physical sciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	Yes

<b>Title</b>	<b>Technology / Product / Process / Knowhow</b>	<b>Technology Area</b>	<b>Industry Sector</b>	<b>Is patent part of licensing?</b>
Multi-grain Pasta	A good source of macronutrients	Life sciences/ biosciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	No
Shelf Stable Egg Crunchy Bites	Technology to produce a protein rich snack	Life sciences/ biosciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	No
Dehydrated Shelf Stable Egg Cube	Technology to produce egg cubes which can be rehydrated at the time of use	Life sciences/ biosciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	No
Mass propagation of banana by tissue culture	Plant tissue culture protocols for banana cultivation	Life sciences/ biosciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	No
Mass propagation of vanilla by tissue culture technique	Plant tissue culture technique for vanilla cultivation	Life sciences/ biosciences & engineering	Industrial Biotechnology	Yes
Continuous chapati making machine	High capacity chapati making machine	Physical sciences & engineering	Agriculture, Agro-biotech, Agro-products,	No

			Fertilizers, Food processing & Secondary Agriculture	
Storage technology for Indian fruits such as banana for long sea voyage.	A pre harvest and post harvest protocol for export of a banana variety, Dwarf Cavendish.	Physical sciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	Yes
Technology protocol for export of Alphonso mango by ship	Sea storage technology for export of Alphonso mangoes	Life sciences/ biosciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	No
Clonal propagation of Pandanus amaryllifolius.	An ornamental plant used as Flavoring agent and aroma enhancer for food products.	Life sciences/ biosciences & engineering	Industrial Biotechnology	Yes
Totapuri mango beverage with enhanced flavor.	A process and formulation for the preparation of enhanced flavor beverage.	Life sciences/ biosciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	Yes
Phytase enzyme for use in poultry feed	Knowhow for economical synthesis of phytase enzyme for poultry feed application	Life sciences/ biosciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	Yes
Process for preparation of cholesterol lowering structured lipids	Process knowhow for preparation of cholesterol lowering structured lipids	Chemical sciences & engineering	Organic Chemicals, Fine Chemicals,	Yes

containing omega 3 polyunsaturated fatty acids	containing omega 3 polyunsaturated fatty acids		Intermediates, Feedstocks	
A process for the preparation of colorant from oleoresin	Technology for the preparation of colorant from chilli oleoresin	Chemical sciences & engineering	Organic Chemicals, Fine Chemicals, Intermediates, Feedstocks	Yes
Ready-to-eat cereal grit food product	Cereal grit food products having enhanced shelf life and high protein content	Life sciences/ biosciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	Yes
Whole-wheat pasta enriched with added micronutrients	Technology to make whole-wheat pasta enriched with added micronutrients	Life sciences/ biosciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	No
Cost effective production of natural oryzanol concentrate from rice bran oil	Simple and cost effective process for production of natural oryzanol concentrate from rice bran oil soapstock	Life sciences/ biosciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	Yes
Shelf Stable Sugarcane Beverage	A process for the preparation of ready-to-drink shelf stable sugarcane juice beverage, which is clear and has a ginger flavor	Life sciences/ biosciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	Yes
Bio-degradable Plates Casting Machine	A machine which enables not only casting but also shaping of various kinds of plates,	Chemical sciences & engineering	Others	Yes

	saucers, or cups.			
Emulsifier Composition	An emulsifier that improves the quality of cakes by providing a fine grain and texture and a more tender crumb	Others	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	Yes
Anit-Oxidant for Food Products.	Natural flavidin compound for use as an anti-oxidant for preservation of food products	Life sciences/ biosciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	Yes
Continuous Vada making machine	A machine for the production of doughnut shaped urad vada continuously and consistently in predetermined form, shape and size.	Physical sciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	No
Minimally processed and packaged vegetables	Technology for production and packaging of several popular Indian vegetables. Protocols have been standardized for modified atmosphere packaging and storage of minimally processed vegetables in ready-to-use form.	Others	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	No
Layered (South Indian) Parotta	The technology for the manufacture of South Indian Parotta on a commercial scale using appropriate equipment for optimal product recovery of right	Chemical sciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	No

	quality			
A process for the preparation of cholesterol lowering structured lipids containing omega 6 polyunsaturated fatty acids.	A process for the synthesis of structured lipids with improved melting behaviour, better triglyceride-distribution for easy digestion, that are enriched in MCFA (Medium chain fatty acids ) and omega 6 PUFA, which is nutritionally advantageous by way of being hypocholesterolemic and hypotriglyceridemic, produced in a parenterally administered formulation for critically ill patients in ICUâ€™s.	Life sciences/ biosciences & engineering	Medical Biotechnology, Biomed Products, Medical Healthcare, Diagnostics	Yes

<b>Title</b>	<b>Technology / Product / Process / Knowhow</b>	<b>Technology Area</b>	<b>Industry Sector</b>	<b>Is patent part of licensing?</b>
Orbital Eye Ball Implant	An ISO and CE certified technology for manufacturing eye ball implants	Life sciences/ biosciences & engineering	Medical Biotechnology, Biomed Products, Medical Healthcare, Diagnostics	Yes
Ceramic biomedical implants	Technology for manufacturing mechanically operated ceramic biomedical implant	Life sciences/ biosciences & engineering	Medical Biotechnology, Biomed Products, Medical Healthcare, Diagnostics	Yes
Plasma sprayed hydroxyapatite coating on biomedical implants	Hydroxyapatite coating on biomedical implants for both orthopedics and dental	Life sciences/ biosciences & engineering	Medical Biotechnology, Biomed Products, Medical Healthcare, Diagnostics	Yes
Ceramic membrane based technology for water purification.	An innovative membrane technology for removal of iron and arsenic from water.	Chemical sciences & engineering	Natural Resources, Water, Environment, Sustainability	No
Bioactive glass coating for dental application	Technology to produce bioactive glass coatings as a good alternative coating material for dental implant.	Life sciences/ biosciences & engineering	Medical Biotechnology, Biomed Products, Medical Healthcare, Diagnostics	Yes
Synthetic bone graft material	Knowhow to produce bone	Life sciences/ biosciences &	Medical Biotechnology,	Yes

	graft material-powder, granules and scaffolds	engineering	Biomed Products, Medical Healthcare, Diagnostics	
A simple and better process for Boron Nitride treatment on carbon fibers	Aerospace engine and structural components, high-tech automobiles, other high temperature extreme chemical environments,	Physical sciences & engineering	Defense, Aerospace, Atomic Energy (Strategic)	Yes
A new type of sealing material for high temperature applications	Furnace sealants, high temperature electro-chemical devices	Physical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	Yes
An improved sensor-detector for sulphur dioxide	SO <sub>2</sub> sensor for chemical industry, petrochemical industry, laboratories	Physical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	Yes
An improved sensor-detector for combustible gases like carbon monoxide	Technology to develop detectors for combustible gases	Physical sciences & engineering	Energy, Fuels	Yes
Ceramic UF membrane based water purifier	Technology for ceramic ultrafine membrane based water purifier	Chemical sciences & engineering	Natural Resources, Water, Environment, Sustainability	Yes
River water purification	Microfiltration membrane based treatment for iron contaminated brackish ground water and tidal	Chemical sciences & engineering	Natural Resources, Water, Environment, Sustainability	Yes



	river water			
Treatment of Tannery Effluent Using Ceramic Membrane	Treating tannery wastewater having high organic loads was studied using ceramic membrane based microfiltration process.	Chemical sciences & engineering	Polymers, Plastics, Elastomers, Fibers, Adhesives, Paints, Specialty Polymers, Natural Polymers, Fibers and Leather	No
Palladium membrane for selective hydrogen separation	Impervious Pd-Membrane of tunable 3 to 12 micron thickness developed over ceramic substrate	Chemical sciences & engineering	Computing & Electronic Devices, Instrumentation	No
Specialty optical fibres and guided wave photonic devices	Knowhow for fabricating specialty fibres such as fibres for amplifiers and lasers, Fibre Bragg Gratings (FBG) and Photonic Crystal Fibres (PCF)	Physical sciences & engineering	Electronics, Photonics, Magnetics	Yes
Non-invasive breath analyzer for diabetes monitoring	A composition for acetone detection in breath useful for diabetic diagnostics and a process of preparation thereof.	Chemical sciences & engineering	Medical Biotechnology, Biomed Products, Medical Healthcare, Diagnostics	Yes

<b>Title</b>	<b>Technology / Product / Process / Knowhow</b>	<b>Technology Area</b>	<b>Industry Sector</b>	<b>Is patent part of licensing?</b>
Pain Relieving Herbal formulation	Herbal formulation having essential oils and isolates as ingredients for headache, muscular pain, sprains & cold etc.	Biological Sciences & engineering	Herbal	
Natural Hair Care Shampoo	Natural, herbal based formulation prepared from extracts of Amla ( <i>Emblica officinalis</i> ) for hair care to control graying, dandruff and hair fall.	Biological Sciences & engineering	Herbal, personal care, cosmetic	
Hand and Face Wash	Natural, herbal formulation having anti-microbial activity.	Biological Sciences & engineering	Herbal, personal care	
Geranium Active, Hair care shampoo	Natural, herbal based formulation with good conditioning effect for soft & silky hair intended for control of dandruff.	Biological Sciences & engineering	Herbal, personal care, cosmetic	
Haloe Skin cream	Natural, herbal all- purpose topical formulation prepared from plant extract with wound healing and anti-fungal properties and can also be used to cure cracks in heels.	Biological Sciences & engineering	Herbal, personal care, cosmetic	
Acne face wash	Plant based formulation effective for acne and pimples	Biological Sciences & engineering	Herbal, personal care, cosmetic	
Skin Gel	Skin protection gel for relief from sun burn and removal of spots from the skin	Biological Sciences & engineering	Herbal, personal care, cosmetic	
Face Scrub	Essential oils and plant extracts based formulation to remove dead tissues from the skin	Biological Sciences & engineering	Herbal, personal care, cosmetic	
Lip Balm	Natural formulation with herbal colour and without petroleum jelly to protect the	Biological Sciences & engineering	Herbal, personal care, cosmetic	

	lips from dryness and bacterial infection			
Skinpro, Antifungal cream	Essential oil based broad-spectrum antifungal cream for cure of superficial infection of keratinized tissues of skin caused by ringworm or tinea. Completely inhibits the growth of <i>Microsporum abudouiniis</i> , <i>M. nanum</i> , <i>M. canis</i> , <i>M. gypseum</i> , <i>Trichophyton mentagrophytes</i> , var. <i>mentagrophytes</i> , <i>T. mentagrophytes</i> , var. <i>interdigidale</i> , <i>T. tonurans</i> , <i>T. violaceum</i> and <i>Epidermophyton floccosum</i> . Formulation is nonstaining, thermostable, fungicidal, ecofriendly and biodegradable. It smoothen the skin and act as moisturizer and has no preservative but have long shelf-life	Biological Sciences & engineering	Herbal, personal care, drug & pharmaceuticals	
Cracknil - Crack cream	Safe, non-toxic topical cream based on synergetic combination of turmeric extract and essential oil in bees wax to cure cracks of heel, chapped hands and dry skin.	Biological Sciences & engineering	Herbal, personal care, drug & pharmaceuticals	
Myconil, Anti-fungal Cream	Natural, herbal based antifungal formulation with no chemicals and preservative	Biological Sciences & engineering	Herbal, personal care, drug & pharmaceuticals	
Instant hand disinfectant	Natural, herbal based bio-safe hand disinfectant.	Biological Sciences & engineering	Herbal, personal care, drug & pharmaceuticals	
Medicated Sanitary Napkin	Sanitary napkin with natural microbial control minimizing the odour. Product contains natural absorbent for enhanced blood absorbency	Biological Sciences & engineering	Herbal, personal care	
Stress Relieving Oil	Aromatherapy based formulation intended for relief from tension, anxiety and stress by toning up the nerves and	Biological Sciences & engineering	Herbal, personal care, drug & pharmaceuticals	

	muscles thus providing extraordinary cooling effect			
CIM Paushak	Nutritive amla tonic, rich natural source of vitamin C and trace minerals based on combination of traditional rasayna concept and modern science	Biological Sciences & engineering	Herbal, nutraceutical	
CIMAP – PhalSe	Chewable food supplements granules with antioxidant properties. It is an Ayurvedic knowledge based formulation rich in natural source of vitamin C, trace minerals and carbohydrate. Fruits of Amla ( <i>Emblica officinalis</i> ) and Bael ( <i>Aegle marmelos</i> ) have been incorporated in sugar base	Biological Sciences & engineering	Herbal, nutraceutical	
CIMAP-CANDY	Traditional knowledge based preparation containing <i>Ocimum sanctum</i> ; shows immunopotentiating effect	Biological Sciences & engineering	Herbal, nutraceutical	
Scented mosquito repellent	Natural & herbal plant extracts and essential oil based mosquito repellent formulation in the form of spray. It is a safe, eco-friendly	Biological Sciences & engineering	Herbal, health & hygiene	
Surface Disinfectant	Natural, herbal based surface disinfectant for use on surfaces like kitchen platform, cabinets, floor, ceramic tiles, bathrooms etc.	Biological Sciences & engineering	Herbal, health & hygiene	
Mosquitoes Repellent	Natural, herbal based product having pleasant odour and which can be fitted on any mosquito device	Biological Sciences & engineering	Herbal, health & hygiene	
Mosquito repellent incense stick	Incense stick prepared using distillation waste, plant extract and essential oils, synthetic insecticides have been completely avoided. Safe, non-toxic, eco-friendly and biodegradable. Suitable for open areas such as lawns, etc.	Biological Sciences & engineering	Herbal, health & hygiene	

Mosquito repellent body	Safe, non-toxic, eco- friendly, plant based formulation for use to repel mosquitoes. It contains essential oils and herbal extract in petroleum jelly	Biological Sciences & engineering	Herbal, health & hygiene	
Mosquito repellent cream	Natural, herbal based mosquito repellent cream formulation effective against mosquitoes for outdoor	Biological Sciences & engineering	Herbal, health & hygiene	
Floor mopping disinfectant	Scented insect repellent emulsion floor mopping liquid concentrate. Disinfectant, insect repellent with pleasant aroma. Safe, non-toxic eco-friendly containing essential oil and liquid paraffin	Biological Sciences & engineering	Herbal, health & hygiene	
Wet tissues	Perfumed, wet tissue with natural essential oils having antimicrobial properties for hygiene and convenience to carry	Biological Sciences & engineering	Herbal, personal care, health & hygiene	
Technology for utilization of waste	Incense sticks from waste flowers	Biological Sciences & engineering	Herbal	
Field Distillation Units	Improved low cost directly fired type "Field Distillation Units" with superior technical features which gives higher & better oil recovery (10-15% higher than conventional local type units)for crops like mints, grasses, basil, patchouli etc. <ul style="list-style-type: none"> <li>• Lesser time for distillation</li> <li>• Fuel efficient (20-30% fuel saving)</li> <li>• Utilizes agro waste / spent bio mass as fuel</li> <li>• No smoke produced in work area</li> </ul>	Biological Sciences & engineering	Herbal, essential oils & perfumery	
Cohobation Type Units	Improved cohobation type unit for extraction of high value essential oils from rose, lavender, geranium etc. having high water solubility. The unit has packed column on top of	Biological Sciences & engineering	Herbal, essential oils & perfumery	

	<p>the column for providing mass transfer to the oil/water vapours so as to increase the concentration of the outgoing condensate to coalesce the oil droplets in the oil separator. The condenser is placed above the column so that the condensate water from the separator can be recycled back to the still by means of gravity.</p>			
CIMAP Asvika	<ul style="list-style-type: none"> <li>• Low cost portable type distillation unit for Rose water, spice oils etc.</li> <li>• Specially designed for producing high quality natural rose water. Can also be used for extraction of spice oils like coriander, cumin, etc and aromatic oils like mints, grasses, basil etc.</li> <li>• Pure stainless steel construction with long life</li> <li>• Efficiently designed with shell &amp; tube condenser for proper condensation &amp; complete oil recovery; can be operated by firewood, agro wastes, LPG / kerosene burners, no pollution at workplace due to provision of chimney</li> <li>• Modular construction for easy assembly at site</li> </ul>	Biological Sciences & engineering	Herbal, essential oils & perfumery	

<b>Title</b>	<b>Technology / Product / Process / Knowhow</b>	<b>Technology Area</b>	<b>Industry Sector</b>	<b>Is patent part of licensing?</b>
Design of coal washeries	Know-how is available for development of flow sheet for beneficiation of coal and planning of Coal Washeries	Chemical sciences & engineering	Coal, Iron & Steel, Power	
Froth Flotation - Technology for Coal Slurry Beneficiation	Coal slurry from disposal ponds of coking coal washeries, reagents can be used for production of low ash clean coal for metallurgical use. Rejects can be utilized for briquetted fuel.	Chemical sciences & engineering	Coal, Iron & Steel, Power	
Energy Efficient Environment Friendly Non-Recovery Coke Oven	Prime coking and Medium coking Coal based Non-Recovery Coke Oven	Physical sciences & engineering	Coal, Iron & Steel, Power	
Briquetted fuel from coke breeze for Industrial use	A process for converting Coke Breeze, Char etc. to Briquetted fuel	Chemical sciences & engineering	Coal, Iron & Steel, Power	
Technology for Soft Coke Production (Devolatilization Of Coal)	Technology for production of Soft Coke for Domestic Use from Non Coking Coal	Physical sciences & engineering	Coal, Iron & Steel, Power	
Synthesis of picolines from acetaldehyde and ammonia	A Lab scale process for synthesis of pyridine and picolines has	Chemical sciences	Chemical	

	<p>been developed by cyclocondensation reaction of acetaldehyde, formaldehyde and ammonia in vapour phase using 10 g catalyst in a fixed bed reactor. The maximum yield achieved at optimum reaction conditions are 57 %</p>			
<p>Ammoxidation of methyl pyridines to cyanopyridines</p>	<p>The process has been developed upto lab-scale with 10 g catalyst by ammoxidation of methyl pyridines in a fixed bed reactor and 86 % yield of cyanopyridines has been obtained under optimum reaction conditions.</p>	<p>Chemical sciences</p>	<p>Chemical</p>	
<p>Synthesis of nicotinamide from 3-Cyanopyridine</p>	<p>Process for the synthesis of nicotinamide has been developed by catalytic hydration of 3-cyanopyridine in liquid phase upto the scale of 100 g per batch and 98 % yield</p>	<p>Chemical sciences</p>	<p>Chemical</p>	



	of nicotinamide has been obtained.			
Process for diphenicacid from phenanthrene	The process has been developed for the oxidation of phenanthrene to diphenicacid on 25 g/batch. The maximum yield of 68% has been achieved with 99% purity. It is used in heat resistance resins, engineering plastics, LCD, pharmaceuticals and agrochemicals.	Chemical sciences	Chemical	
Development of non-nitrolycerine based explosive – cord system suitable for use in blasting gallery method in underground coal mines	A new emulsion explosive and cord system (commercially marketed as Powerring - Powercord system) suitable for use in blasting gallery method in underground coal mines	Chemical sciences & engineering	Mining, Engineering	
Technology for extraction design of locked-up coal by highwall mining in India	Highwall mining is a new technology which can extend the life of opencast mines without disturbing the surface dwellings, and maintaining economy and productivity. It is	Engineering	Mining	

	<p>a remotely operated coal mining technology closely related to underground mining machinery. The method comprises extraction of coal from a series of parallel entries driven in the coal seam from the face of the highwall. These entries are unmanned, unsupported and unventilated.</p>			
Road Dust Collecting and Briquetting System	<p>The system collects coal dust from road surface &amp; transforms into coal briquettes. The system comprises of various sub-systems for sweeping, sucking, filtering, collecting, mixing and briquetting. The total system is mounted on a truck chassis.</p>	Engineering	Instrumentation, Engineering	
Wireless Information and Safety System for Mines	<p>The system tracks and monitors miners and movable equipment in mines</p>	Engineering and Computing	Instrumentation, Engineering, IT	
Landslide Monitoring and Detection System Using Wireless	<p>Real-time monitoring of landslide parameters.</p>	Engineering and Computing	Instrumentation, Mining, Engineering, IT	

Sensor Network	Remote monitoring of large area using WSN. Prediction of landslide based on multivariate statistical analysis of different parameters.			
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<b>Title</b>	<b>Technology / Product / Process / Knowhow</b>	<b>Technology Area</b>	<b>Industry Sector</b>	<b>Is patent part of licensing?</b>
UASB technology with sulfur recovery for effluent treatment	UASB based effluent treatment technology for effluent treatment	Chemical sciences & engineering	Natural Resources, Water, Environment, Sustainability	No
Chemo Autotrophic Activated Carbon (CAACO) technology for waste water treatment	Effluent treatment process for tannery effluent	Chemical sciences & engineering	Natural Resources, Water, Environment, Sustainability	No
Diabetic patient footwear	A therapeutic open footwear for diabetic patients	Chemical sciences & engineering	Medical Biotechnology, Biomed Products, Medical Healthcare, Diagnostics	No
Reconstituted collagen sheet	Knowhow for manufacturing reconstituted collagen sheet	Life sciences/ biosciences & engineering	Medical Biotechnology, Biomed Products, Medical Healthcare, Diagnostics	No
Collagen sheet for wound dressing	Knowhow for producing collagen sheet for use as wound dressing	Life sciences/ biosciences & engineering	Medical Biotechnology, Biomed Products, Medical Healthcare, Diagnostics	No
Plant based Reconstituted Collagen Substratum	Technology for manufacturing plant based Reconstituted Collagen Substratum	Life sciences/ biosciences & engineering	Medical Biotechnology, Biomed Products, Medical Healthcare, Diagnostics	Yes
Reconstituted	Knowhow to	Life sciences/	Medical	No

collagen sponge	produce reconstituted collagen sponge	biosciences & engineering	Biotechnology, Biomed Products, Medical Healthcare, Diagnostics	
Sludge free liming process	Sludge free liming process for leather processing	Chemical sciences & engineering	Polymers, Plastics, Elastomers, Fibers, Adhesives, Paints, Specialty Polymers, Natural Polymers, Fibers and Leather	No
Total lime and sulfide free enzymatic dehairing process	Total lime and sulfide free enzymatic dehairing process for leather processing	Chemical sciences & engineering	Polymers, Plastics, Elastomers, Fibers, Adhesives, Paints, Specialty Polymers, Natural Polymers, Fibers and Leather	No
Lime free fibre opening	Process for lime free fibre opening for leather processing	Chemical sciences & engineering	Polymers, Plastics, Elastomers, Fibers, Adhesives, Paints, Specialty Polymers, Natural Polymers, Fibers and Leather	No
Ammonia free deliming of skins and hides	Eco-friendly process for ammonia free deliming of skins	Chemical sciences & engineering	Polymers, Plastics, Elastomers, Fibers,	No

	and hides for leather processing		Adhesives, Paints, Specialty Polymers, Natural Polymers, Fibers and Leather	
High Exhaust Chrome Tanning	A process for high exhaust chrome tanning for leather processing	Chemical sciences & engineering	Polymers, Plastics, Elastomers, Fibers, Adhesives, Paints, Specialty Polymers, Natural Polymers, Fibers and Leather	No
Aluminium based syntan (ALUTAN): a leather processing chemical	An innovative, synthetic tanning chemical for leather processing	Chemical sciences & engineering	Polymers, Plastics, Elastomers, Fibers, Adhesives, Paints, Specialty Polymers, Natural Polymers, Fibers and Leather	No
Formaldehyde free chrome syntan (Ecochrome 2000)	A leather chemical, formaldehyde free chrome syntan (Ecochrome 2000)	Chemical sciences & engineering	Polymers, Plastics, Elastomers, Fibers, Adhesives, Paints, Specialty Polymers, Natural Polymers, Fibers and Leather	Yes
Glue, gelatin from tannery wastes	Process to make glue, gelatin from	Chemical sciences &	Polymers, Plastics,	No

	tannery wastes	engineering	Elastomers, Fibers, Adhesives, Paints, Specialty Polymers, Natural Polymers, Fibers and Leather	
Fleshing Meal	Process to make fleshing meal from tannery waste	Chemical sciences & engineering	Polymers, Plastics, Elastomers, Fibers, Adhesives, Paints, Specialty Polymers, Natural Polymers, Fibers and Leather	No
Fallen Carcass Utilisation Technology (FCUT)	A technology for utilizing fallen body parts of animal to make value added products	Physical sciences & engineering	Polymers, Plastics, Elastomers, Fibers, Adhesives, Paints, Specialty Polymers, Natural Polymers, Fibers and Leather	No
CLaRI - Leather processing drum for tanning operations.	A low float tanning device (LFTD) with improved efficiency over existing alternatives for application in pre-tanning, tanning and post tanning wet operations in leather processing	Chemical sciences & engineering	Polymers, Plastics, Elastomers, Fibers, Adhesives, Paints, Specialty Polymers, Natural Polymers, Fibers and Leather	Yes

	industry			
Device for accurately measuring oxygen permeability of ophthalmic lens.	A novel device and method to measure the gas permeability of a solid permeable material . Potential applications include calculating the accurate oxygen permeability values of ophthalmic lens, measuring the gas permeability of gas masks used for mining, permeability of plastic films used in food packaging industry etc.	Physical sciences & engineering	Medical Biotechnology, Biomed Products, Medical Healthcare, Diagnostics	Yes
Novel fluidized bed reactor for waste water treatment	Novel fluidized bed reactor for treatment of waste water discharged from various processing industries as well as domestic sources	Chemical sciences & engineering	Natural Resources, Water, Environment, Sustainability	Yes
Novel adhesive for fabrication of cellulose, glass and cotton products	Preparation of adhesives through microbial methods by dimerization of fatty acids with wide application in textile, glass, footwear, leather apparel manufacturing processes	Life sciences/ biosciences & engineering	Industrial Biotechnology	Yes
Jatropha oil-acrylic co-polymer for tanning, textile processing and	Process for the preparation of jatropha oil-acrylic co-polymer by in-	Chemical sciences & engineering	Polymers, Plastics, Elastomers, Fibers,	Yes



surface coating applications.	situ polymerization and grafting method for application as a tanning cum lubricating agent.		Adhesives, Paints, Specialty Polymers, Natural Polymers, Fibers and Leather	
Copolymers as adhesives, insulators and sealant in aircraft industry	Process for the preparation of novel polysulphide copolymers is provided wherein styrene dibromide is polymerized with ethelene/methylene dibromide in presence of sodium/potassium sulfide using phase transfer catalyst.	Chemical sciences & engineering	Polymers, Plastics, Elastomers, Fibers, Adhesives, Paints, Specialty Polymers, Natural Polymers, Fibers and Leather	Yes
Novel Rechargeable Electricity Storage Battery	A rechargeable DC storage battery that comprises lead oxide / lead dioxide as positive electrode, lead as negative electrode and a saturated ionic solution of sodium / potassium / lithium dichromate as electrolyte.	Chemical sciences & engineering	Energy, Fuels	Yes
Novel process for preparation of carbon nanotube for industrial applications	An improved process for the preparation of carbon nanotube by the catalytic decomposition of cycloalkane on Ni-Mo-MgO catalyst.	Chemical sciences & engineering	Organic Chemicals, Fine Chemicals, Intermediates, Feedstocks	Yes
TAN INCO SOFT-Tannery Inventory Control software	A software that allows users to group chemicals	Mathematical/computational sciences &	Computing & Electronic Devices,	No

	into processing categories for easy stock management, issue and receive stock as well as the chemicals.	engineering	Instrumentation	
Denture substrate composition	Process provides an option to use collagen material for making denture substrate with improved physical and mechanical properties.	Chemical sciences & engineering	Medical Biotechnology, Biomed Products, Medical Healthcare, Diagnostics	Yes
Dog chew from tannery solid wastes	A process for the preparation of dog chew is provided whereby chrome shavings are subjected to alkali hydrolysis followed by fiber size reduction and subsequent drying and shaping.	Chemical sciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	Yes
Formulation for making 3 D impressions of an object	A material useful to capture three dimensional shape and size of an object for industrial applications.	Chemical sciences & engineering	Medical Biotechnology, Biomed Products, Medical Healthcare, Diagnostics	Yes
Improved oxidative process for making chamois leather	An improved oxidative process for making chamois leather which ensures significant reduction in oxidation period.	Chemical sciences & engineering	Polymers, Plastics, Elastomers, Fibers, Adhesives, Paints, Specialty Polymers, Natural Polymers, Fibers and Leather	Yes
Process for making chamois leather	The technology discloses a process	Chemical sciences &	Polymers, Plastics,	Yes

using modified plant oil	for making chamois leathers using modified plant oil.	engineering	Elastomers, Fibers, Adhesives, Paints, Specialty Polymers, Natural Polymers, Fibers and Leather	
A process for the preparation of metal impregnated activated carbon polymer composite for industrial applications	A process for in situ polymerization of metal impregnated carbon with amine, thereby forming a single matrix composite for the accommodation of both the metal ions and conducting polymer to ensure stability as well as conductivity in the resulting product, that finds application in chemical, petrochemical and pharmaceutical industries.	Chemical sciences & engineering	Polymers, Plastics, Elastomers, Fibers, Adhesives, Paints, Specialty Polymers, Natural Polymers, Fibers and Leather	Yes
Novel composite for electromagnetic interference (EMI) shielding applications	A process for the preparation of a novel conducting fibrous composite for electromagnetic interference (EMI) shielding applications	Physical sciences & engineering	Polymers, Plastics, Elastomers, Fibers, Adhesives, Paints, Specialty Polymers, Natural Polymers, Fibers and Leather	Yes
An eco-friendly Slurry Seal mix for road construction	A new Slurry Seal mix for road construction,	Chemical sciences & engineering	Inorganic and Hybrid materials,	Yes

	prepared using collagenous materials obtained from leather industry, thereby replacing partially or even fully dry aggregate such as sand, used in conventional slurry seal mix.		Inorganic materials	
Novel insole sheet for fabricating therapeutic footwear, orthotics, artificial limb and sports shoe	A viscoelastic PU sheet useful for making insole, heel-pad, metatarsal pad, cushion pads etc. for application in footwear industry, especially for fabricating therapeutic footwear, orthotics, artificial limb and sports shoe	Chemical sciences & engineering	Medical Biotechnology, Biomed Products, Medical Healthcare, Diagnostics	Yes
Parchment like material for reinforcement in leather goods.	A thin, flexible as well as transparent sheet resembling a parchment, prepared from materials like chrome shavings, trimmings from skin/hide.	Chemical sciences & engineering	Polymers, Plastics, Elastomers, Fibers, Adhesives, Paints, Specialty Polymers, Natural Polymers, Fibers and Leather	Yes
Corneal implants, Ophthalmic Shields, scaffolds and bioerodable inserts for ophthalmic applications.	Process for preparation of corneal implants, ophthalmic shields, scaffolds and bioerodable inserts for ophthalmic applications.	Life sciences/ biosciences & engineering	Medical Biotechnology, Biomed Products, Medical Healthcare, Diagnostics	Yes

Demineralized Bone Matrix: an innovative bone substitution material	Knowhow to produce an innovative bone substitution material	Chemical sciences & engineering	Medical Biotechnology, Biomed Products, Medical Healthcare, Diagnostics	No
Biodegradable Footwear Soling Materials	Biodegradable PUs having material properties required for soling material	Chemical sciences & engineering	Natural Resources, Water, Environment, Sustainability	No

Title	Technology / Product / Process / Knowhow	Technology Area	Industry Sector	Is patent part of licensing?
Five Axis $\mu$ -CNC Milling Machine	Know how for Five axis micro milling machine tools with gantry configuration useful for micro- scale milling and drilling machining operations	Engineering Sciences	Engineering industries, Tool rooms	Yes
Reconfigurable Micro Factory	Know how for Reconfigurable Micro Factory capable of performing $\mu$ -milling, $\mu$ -turning, $\mu$ EDM, and laser $\mu$ -ablation operations	Engineering Sciences	Engineering industries, Tool rooms	Yes
High Speed Spindle for micro milling and drilling operations	Know how for High Speed Spindle for micro milling and drilling operations	Engineering Sciences	Engineering industries, Tool rooms, Turbine industries	-
Nickel wick for loop heat pipe	Know how to manufacture the wick of the loop heat pipe for application in satellites through metal injection moulding route (MIM)	Engineering Sciences	Space	-
Autonomous Intelligent Robotic Wheel Chair	Know how for Autonomous Intelligent Robotic Wheel Chair. The design provides enhanced mobility and stability and capability to turn full 360° in any narrow corridor. It can also go up slant pavements, maintaining stability over all terrains, offers enough maneuverability to navigate smoothly on small ups and downs.	Engineering Sciences	Engineering and manufacturing industries,	-

	Electronic soft touch control using joystick based commands, voice command and auto navigation facility is provided			
Austempered ductile iron (ADI) technology	Process technology for manufacturing of austempered ductile iron (ADI) components to replace the forged steel components.	Engineering and Material Sciences	Automobile Industries	-
Small Hydraulic Tractor 'PUSHAN'	Know how for hydraulic tractor of 12 hp (christened as PUSHAN). It is a multi-utility vehicle and possesses many advantages over conventional mechanical power transmission systems including easy maneuverability and control. The tractor is suitable for irregular terrain profile, various soil conditions and can be used for cultivation of different crops	Engineering Sciences	Agricultural, Tractor and earth moving industries	-
10-12 HP Small Tractor 'krishiShakti'	Know how for developing small, compact and easily maneuverable tractors of 10-12 hp christened as 'krishiShakti' useful for cultivation in small and fragmented land holdings	Engineering Sciences	Agricultural and Tractor industries	CMVR Certification as an Agricultural Wheeled Tractor
Post-Harvest Technologies	Post-Harvest Technologies for preservation and processing the agro produce such as Ginger, Big Cardamom, Turmeric, Chillies etc. and adding value to these produce by increasing their shelf-life	Engineering Sciences	Agro-processing	-

Metal injection moulding (MIM)	Know how for processing of 316L stainless steel powder through MIM route	Engineering Sciences	Automobile, aero-space, medical, electronics, consumer products, sports, armaments	-
Mobile Bridge Inspection Unit	Know how for Mobile Bridge Inspection Unit, first of its kind in the country. Provides access to the intricate part of the bridges within 25 minutes. Facilitates the structural engineers to conduct the Visual / NDT inspections of the road bridges. temporary structures	Engineering Sciences	Engineering Infrastructure	-
Smart card operated prepaid energy meter	Know how for Smart card operated prepaid energy meter. The meter provides an ideal power management solution in small local networks such as schools, housing complexes, etc	Engineering Sciences	Electronics Devices	-
Colposcope	Know how for development of a portable, cheap Optical Magnifying Instrument for Wide Object to be used for medical investigation of cervix cancer (COLPOSCOPY)	Engineering Sciences	Electronics Devices, Medical instrument	Yes
Cereal cake making machine	Know how for manufacturing cereal cake making machine for producing mid-day meal for anganbari and school children. The machines are designed in such a way that no sharp corners, fissures or cracks exist, where food particles may	Engineering Sciences	Food processing	-



	adhere after washing.			
Serpentine robot	Knowhow to manufacture Serpentine robot It can slide, glide and slither and could be used in many applications like exploration of hazardous environments, inspection and medical interventions	Engineering Sciences	Defence, Medical and mining	Design copyright
Mobile Robotic System	Knowhow to manufacture Mobile robots having potential applications for material handling & transportation in manufacturing environment, as also in nuclear, hazardous chemical or battle field environments where human intervention is dangerous and costly.	Engineering Sciences	Material handling, Defence and mining	-
Outdoor Mobile Robot (OMR)	Know how to manufacture outdoor mobile robot with tracked configuration with exploration capability in rough terrains. It can detect Explosive/ mines. Can be used for Remote handling of IEDs and mines and Remote day and night surveillance	Engineering Sciences	Defence and mining	Design copyright
Tele-operated rotary winged flying robot (RWFR)	Know how for manufacturing Tele-operated rotary winged flying robot (RWFR) field services and tasks like search and rescue, observation, mapping, surveys, crop health monitoring, inspection of bridges and aerial surveillance	Engineering Sciences	Defence, Geotechnical, Agricultural	-
Vision guided mobile robotic system	Know how for manufacturing Vision guided mobile robotic system capable to navigate	Engineering Sciences	Defence, Computing & Electronic Devices,	-

	in specific area for searching of hazardous material. During this searching it will navigate and develop the map of the surrounding simultaneously. The operator can interact with the robotic system with the help of a remote computer, which is connected to the autonomous vehicle by wireless LAN		Instrumentation	
Semi-continuous type biodiesel plants	Know how for manufacturing Semi-continuous type biodiesel plants. It can produce 600 litre of biodiesel per day (24 hours working basis). The maximum power consumption of the plant is 3 kW at peak time and can take any edible & non-edible oils as feed stock	Engineering Sciences	Bio-diesel	-
Biomethanation of jatropa cake	Know how for Biomethanation of jatropa cake for environment friendly disposal of waste and generation of fairly good amount of fuel gas and high quality manure (rich in NPK content)	Environmental Engineering	Waste utilization	-
Inter row rotary cultivator FOR wide-row crops	Technology of Inter row rotary cultivator suitable for Weeding/Inter-cultural operations of wide row crops like vegetables, maize, sugarcane etc. Can include Fertilizing & Earthing operations	Engineering Sciences	Agricultural	-
Pneumatic precision planter for	Technology of Pneumatic precision planter for vegetables. It is suitable	Engineering Sciences	Agricultural	-

vegetables	for direct planting of small/irregular vegetable in seeds in the fields and for bed planting and ridge planting			
Programmable Irrigation Scheduler	Technology for Programmable Irrigation Controller for small & marginal farmers-Greenhouse/Open/Orchard Stations with Pump Operation	Engineering Sciences	Irrigation, Electronics Devices	-

<b>Title</b>	<b>Technology / Product / Process / Knowhow</b>	<b>Technology Area</b>	<b>Industry Sector</b>	<b>Is patent part of licensing?</b>
Mobile Bridge Inspection Unit (MBIU)	MBIU is a non-hydraulic unit with automatic folding and unfolding controls.	Physical sciences & engineering	Transportation	No
Pothole Repair Machine	Knowhow to manufacture machine for repairing potholes	Chemical sciences & engineering	Transportation	Yes
High performance binder for road construction in India.	High Performance Plastomer Modified Binders consisting of a new process technology, which includes modification of conventional VG 10 grade bitumen using polyethylene, ethylene vinyl acetate, suitable antioxidants and adhesion promoters.	Chemical sciences & engineering	Transportation	Yes
Rejuvenating agent for roads to saving aggregate material	An Indigenous process for producing better quality rejuvenating agent which meet the ASTM	Chemical sciences & engineering	Transportation	No

	standard.			
Mild warm to cold mix emulsion for road construction	An environment friendly technology for the production of low energy bitumen emulsion mixes produced using unheated to mildly warm aggregates and emulsion binder for road construction in all weather conditions.	Chemical sciences & engineering	Transportation	No

Title	Technology / Product / Process / Knowhow	Technology Area	Industry Sector	Is patent part of licensing?
Digital Grain Moisture Analyser (DGMA)	A portable, user friendly device for moisture content determination of grains	Physical sciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	No
Antiglare Night Driving Filter (NDF) for automobiles	Successfully field tested, internationally patented technology for a optical filter device to reduce glare during night driving as well as from sun during the day, which can be customized for use in various car and heavy motor vehicles.	Chemical sciences & engineering	Transportation	Yes
Head Up Display (HUD) system for high end cars and other vehicles	Fully indigenously developed technology for Head Up Display device with superior optical and electronic modules, specifically designed for the automotive sector to be employed in luxury cars and other land vehicles	Physical sciences & engineering	Transportation	No
Soil pH sensor	A process for measuring Accurate	Physical sciences &	Agriculture, Agro-biotech,	Yes

	pH sensor for all varieties of soils	engineering	Agro-products, Fertilizers, Food processing & Secondary Agriculture	
Tractor mounted soil Electron Conductivity (EC) mapper	An accurate equipment for measuring electron conductivity of soil	Physical sciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	No
Automatic Rice Classification and Grading system	A software based image analysis system for rice grading	Physical sciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	Yes
Method for electrically sensing condition of automotive oils	Cost-effective, reagent-less electrochemical evaluation of automotive oil condition present in engines, gears and axles.	Physical sciences & engineering	Petrochemicals and Petroleum	No
Low vision aids	Light weight, strong, plastic aspheric lens design based low vision aids with good field of view and no optical aberrations even at high magnifying power to provide best possible optical quality for a clear vision at significantly lower cost.	Physical sciences & engineering	Medical Biotechnology, Biomed Products, Medical Healthcare, Diagnostics	No
Automatic	It is a fast and	Physical	Computing &	Yes

Counterfeit Currency Detector	reliable technology for distinguishing between genuine and counterfeit currencies	sciences & engineering	Electronic Devices, Instrumentation	
Multi-parameter probe for snow parameter measurement	Multi-parameter probe for snow parameter measurement used for snowslide forecasting, characterization of ski racing and snow runway	Physical sciences & engineering	Natural Resources, Water, Environment, Sustainability	No
Myoelectric arm and above elbow prosthesis for amputees with myo-trainer	An artificial, intelligent ie: electromechanically responsive arm with micro-controller based operation, that is to be used as a prosthetic device for the rehabilitation of physically challenged / disabled individuals.	Life sciences/ biosciences & engineering	Medical Biotechnology, Biomed Products, Medical Healthcare, Diagnostics	Yes
Monitoring and control systems for potato storage	Customized storage systems for potatoes that extend storage life without loss of quality	Physical sciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	No
Electronic tongue for tea quality assessment	An electronic tongue device, which has been used for the classification of Indian tea	Physical sciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	No
Oxygen monitoring	Low cost oxygen	Physical	Energy, Fuels	



system for oil fired boilers	monitoring system for oil fired boilers for efficient fuel combustion	sciences & engineering		
Organophosphorus pesticide detection sensors	Biosensor and associated instrumentation for successful detection of low levels of organophosphorus pesticide	Physical sciences & engineering	Computing & Electronic Devices, Instrumentation	No
Surgical microscope for eye surgery	A portable surgical microscope with specialized opto-mechanics in the form of a motorized focusing control by foot paddle, for eye surgeries	Physical sciences & engineering	Computing & Electronic Devices, Instrumentation	
Cephalometric Analysis software for dental and orthodontic investigation	AutoCEPH an automated windows based software tool with a novel method for automatic localization (marking landmarks on lateral x-ray images) of craniofacial structures based on the detected edges in the region of interest in order to detect key cephalometric anatomical features.	Mathematical/ computational sciences & engineering	Computing & Electronic Devices, Instrumentation	No
Pump Efficiency Monitoring System	Pump efficiency monitoring system (PEMS) for measuring pump parameters viz., efficiency and flow using thermodynamic	Physical sciences & engineering	Natural Resources, Water, Environment, Sustainability	No

	principle			
Infrared technique based non contact temperature measurement probe to predict snowslide and to monitor temperature in process control industry	Device for measuring snow temperature for forecasting snowslide and to monitoring of temperature in process control industry	Physical sciences & engineering	Natural Resources, Water, Environment, Sustainability	No
Multifibre Intrusion Detection System	A system for sensing and localization, that is zone identification of perturbations selected from the parameters comprising of displacement, vibration, pressure, stress, strain, temperature, intrusion and acoustic wave in a distributed manner using 2D array of multimode fibers.	Physical sciences & engineering	Computing & Electronic Devices, Instrumentation	Yes
Power Quality Analyzer	Low cost tool for monitoring variation in power quality for industrial applications	Physical sciences & engineering	Energy, Fuels	
Portable Energy Audit Tool	Software tool and device for real time measurement of electrical energy and other physical parameters	Physical sciences & engineering	Energy, Fuels	
Industrial Energy Management System based on LonWorks Technology	Energy management systems based on LonWorks technology for monitoring and controlling utility	Physical sciences & engineering	Energy, Fuels	

	consumption across an industrial plant			
Industrial Energy Management System based on MODBUS protocol	Energy management systems based on MODBUS protocol for monitoring and controlling utility consumption across an industrial plant	Physical sciences & engineering	Energy, Fuels	
Recovery of high purity nanoparticles from industrial waste	Process for recovery of high purity nanoparticles from industrial wastes	Chemical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	
Electronic and Hydraulic knee prosthetics	Hydraulic and pneumatic electro-mechanical knee prosthetics, latter of which is programmable (ie: electronically responds) to the users gait pattern to have variable speed movement control patterns.	Life sciences/ biosciences & engineering	Medical Biotechnology, Biomed Products, Medical Healthcare, Diagnostics	No
Automated Clinical Chemistry Analyser for measurement of blood biochemistry parameters.	A relatively inexpensive, high performance micro-controller based photometric biochemistry analyzer used to measure various blood biochemical parameters	Life sciences/ biosciences & engineering	Computing & Electronic Devices, Instrumentation	
Electronic portal imaging device for radiation therapy	Electronic Portal Imaging Device (EPID) is a device that provides a precise geometric/spatial positioning of the radiation dose to the targeted tumor,	Physical sciences & engineering	Computing & Electronic Devices, Instrumentation	

	for radiation therapy in cancer treatment.			
Portable reading machine for the blind	A portable reading machine for the severely visually impaired individuals which photographs, reads aloud & records hard text material, electronic documents.	Mathematical/computational sciences & engineering	Computing & Electronic Devices, Instrumentation	Yes
Pulse Oximeter for measuring blood oxygen levels and pulse rate	A portable, non-invasive biomedical device for real-time, reagentless measurement of arterial blood oxygen saturation and pulse rate in various medical settings.	Physical sciences & engineering	Computing & Electronic Devices, Instrumentation	No
Snow moisture and density measurement system	A portable wetness and density profiling instrument for snowslide forecasting and flood prediction	Physical sciences & engineering	Natural Resources, Water, Environment, Sustainability	
Portable analog seismograph	A portable seismograph to monitor, process and record the seismic signal from the remote area	Physical sciences & engineering	Natural Resources, Water, Environment, Sustainability	
Induction motor efficiency monitoring system	A system for monitoring efficiencies of induction motor	Physical sciences & engineering	Others	No
Triaxial force balanced accelerometer	Triaxial force balanced accelerometer is a device to enhance the meteorological seismology information by	Mathematical/computational sciences & engineering	Computing & Electronic Devices, Instrumentation	

	providing rapid determination of strong ground motion accelerations after an event.			
Medical Linear Accelerator for radiotherapy of cancer patients	The Medical Linear Accelerator (LINAC) is a high energy X-Ray machine used for treatment of deep seated cancers by Radiation Therapy using high energy photons.	Physical sciences & engineering	Medical Biotechnology, Biomed Products, Medical Healthcare, Diagnostics	No
Dispergraph for assessment of carbon in rubber	Knowhow to manufacture Dispergraph: an instrument for rubber grading	Physical sciences & engineering	Computing & Electronic Devices, Instrumentation	No

<b>Title</b>	<b>Technology / Product / Process / Knowhow</b>	<b>Technology Area</b>	<b>Industry Sector</b>	<b>Is patent part of licensing?</b>
Ultrapure solar salt	Technology to prepare ultrapure solar salt	Chemical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	Yes
Low sodium salt and industrial grade KCl	Process for preparation of low sodium salt and industrial grade KCl	Chemical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	Yes
A novel iodizing agent for preparation of iodized salt	Environment friendly and economical technology for preparation of iodized salt	Chemical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	Yes
Device for estimation of brine density from afar	Knowhow to produce a device for estimation of brine density from afar	Physical sciences & engineering	Computing & Electronic Devices, Instrumentation	Yes
High purity magnesia	An economical route to manufacture high purity magnesia	Chemical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	Yes
Double fortified salt	Technology for producing Double fortified salt (containing iron and iodine)	Chemical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	Yes
Spherical salt	Cost effective technology to produce spherical shaped crystals of	Chemical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	Yes

	common salt.			
Natural salt formulations for seawater substitution, mineral fortification	Cost effective technology for natural salt formulations for seawater substitution, mineral fortification	Chemical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	Yes
Vegetable salts	Knowhow for producing salts from vegetable origin	Life sciences/ biosciences & engineering	Natural Resources, Water, Environment, Sustainability	Yes
Eco-friendly bromine reagent process	An eco-friendly process for preparation of non-hazardous Bromine reagent	Chemical sciences & engineering	Organic Chemicals, Fine Chemicals, Intermediates, Feedstocks	Yes
Polymer based process for the removal of Arsenic from ground water and Arsenic detecting kit	Cost effective process for the removal of arsenic from ground water	Chemical sciences & engineering	Natural Resources, Water, Environment, Sustainability	Yes
Coating for photocatalytic auto-cleaning of stains	Coating that enables photocatalytic auto-cleaning of stained ceramic tile, plane glass or a hard acrylic sheet using photocatalyst material and fluorescent light	Chemical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	Yes
Thin film composite (TFC) reverse osmosis (RO) membrane	Process for manufacturing thin film composite (TFC) reverse osmosis (RO) membrane for desalination and	Chemical sciences & engineering	Natural Resources, Water, Environment, Sustainability	Yes

	water purification application			
Process of preparation of agarose from naturally occurring or cultivated Gracilaria dura	A low cost, energy efficient process to prepare molecular biology grade agarose from naturally occurring or cultivated Gracilaria dura	Life sciences/ biosciences & engineering	Others	Yes
Process for finely divided precipitated silica	Efficient. cost-effective process for in situ production of finely divided precipitated silica with narrow size distribution with simple neutralization procedure	Chemical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	Yes
Process for recovery of palladium from spent silica	An innovative process for recovery of high purity palladium and reusable silica from silica waste column gel	Chemical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	Yes
Hollow fibre (HF) ultrafiltration (UF) membrane manufacturing technology	Process for manufacturing Hollow fibre (HF) ultrafiltration (UF) membranes for water purification and other applications	Chemical sciences & engineering	Natural Resources, Water, Environment, Sustainability	Yes



Efficient and highly active catalyst for asymmetric nitroaldol reaction	An efficient process for preparation of highly efficient chiral heterogeneous catalyst for asymmetric nitroaldol reaction	Chemical sciences & engineering	Pharmaceuticals, Bulk Drugs, Formulations	Yes
Eco-friendly, single step catalytic process for the preparation of isolongifolene	The eco-friendly, single step and solvent free catalytic process for the preparation of tricyclic sesquiterpene hydrocarbon i.e. isolongifolene	Chemical sciences & engineering	Pharmaceuticals, Bulk Drugs, Formulations	Yes
Eco-friendly process for production of precipitated calcium carbonate from calcium carbonate rich by-product	An eco-friendly process for production of precipitated calcium carbonate from a calcium carbonate-rich by-product generated in an industrial process, such as a by-product generated by a nitrophosphate plant in the fertilizer industry	Chemical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	Yes
Efficient catalytic process for preparation of 2-phenyl ethanol	An efficient and eco-friendly process for preparation of 2-phenyl ethanol by catalytic hydrogenation	Chemical sciences & engineering	Pharmaceuticals, Bulk Drugs, Formulations	Yes

	of styrene oxide.			
Process for carbon dioxide removal by adsorptive separation and preparation of carbon dioxide selective adsorbent	An efficient process for carbon dioxide removal from a gaseous mixture containing carbon dioxide such as in power plant flue gas and gases less polar than carbon dioxide such as nitrogen, oxygen and hydrogen	Chemical sciences & engineering	Natural Resources, Water, Environment, Sustainability	Yes
Production of ethanol and biofertilisers	A process for bioethanol and biofertilizer production from seaweed biomass such as <i>Kappaphycus alvarezii</i>	Life sciences/ biosciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	Yes
Cost effective process for production of carrageenan and liquid biofertilizer	A cost effective and integrated process for production of carrageenan and liquid biofertilizer from fresh seaweeds such as <i>Kappaphycus alvarezii</i>	Life sciences/ biosciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	Yes
Process for production of sulphate of potash (SOP), ammonium sulphate and magnesium hydroxide using kainite mixed salt and ammonia	A novel process for the simultaneous production of sulphate of potash (SOP), ammonium sulphate and magnesium	Chemical sciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	Yes

	hydroxide using kainite mixed salt and ammonia as the only consumable raw materials			
Process for preparation of affordable refreshing drink from refined seaweed sap	A process for production of nutritious, tasty and affordable drink made from the refined sap of readily cultivable Kappaphycus alvarezii seaweed	Life sciences/ biosciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	Yes
A method for cultivation of marine algae	An improved tissue culture method of cultivation for marine algae euclidean to develop fast growing variant	Life sciences/ biosciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	Yes
Seaweed polysaccharide based films as alternatives to animal gelatin for use in soft capsules and edible applications.	A process for the preparation of cost effective and eco-friendly semi refined kappa carrageenan (SRC) based biodegradable, heat sealable thin films.	Life sciences/ biosciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	Yes

<b>Title</b>	<b>Technology / Product / Process / Knowhow</b>	<b>Technology Area</b>	<b>Industry Sector</b>	<b>Is patent part of licensing?</b>
Low cost ELISA plates for fast and sensitive immunochemical detection of molecules for diagnostic applications	Image-based ELISA on an activated polypropylene microtest plate offering a highly cost effective, sensitive, specific, and rapid diagnostic assay	Life sciences/ biosciences & engineering	Medical Biotechnology, Biomed Products, Medical Healthcare, Diagnostics	Yes
Dry reagent strip for detecting urea in adulterated milk	Knowhow to produce reagent strips for detection of adulterated milk	Life sciences/ biosciences & engineering	Industrial Biotechnology	No
Process for colour reduction of pulp and paper effluent	A cost-effective, biological process for colour reduction of pulp & paper effluent	Life sciences/ biosciences & engineering	Industrial Biotechnology	Yes
Biobleaching process of kraft pulp	A cost effective and eco friendly process for bleaching of kraft pulp using bacterial consortia	Life sciences/ biosciences & engineering	Natural Resources, Water, Environment, Sustainability	Yes
Genome information and protein function cum interaction analysis software	Software suite for deciphering cum prediction of protein coding gene, along with the discovery of function and	Mathematical/ computational sciences & engineering	Computing & Electronic Devices, Instrumentation	Yes

	interactions of so identified protein for vaccine discovery.			
Biotechnological process for neutralizing alkaline beverage industrial waste water	An efficient and economical process for neutralizing alkaline beverage industrial waste water	Life sciences/ biosciences & engineering	Industrial Biotechnology	Yes

Title	Technology / Product / Process / Knowhow	Technology Area	Industry Sector	Is patent part of licensing?
Superoxide dismutase	<p>Superoxide dismutase (SOD) enzyme with enhanced stability at higher temperature for extended periods while functioning in the range of &lt;-5 °C to &gt;50°C. First reported SOD that substantially tolerates autoclaving (heating at 121 °C) as well as boiling. For use as free radical oxygen scavenger in the plant and animal cells.</p> <p>Gene cloned in bacterial system (<i>E.coli</i>) for production of SOD.</p>	Biological Sciences & engineering	Biotechnology, medical, cosmetic & food	
Tea based herbal mouth freshener	<p>Herbal mouth freshener comprising essential oil of a local plant with known anti-dental caries activity with tea leaf polyphenols and tea aroma extract. Has astringency</p>	Biological Sciences & engineering	Herbal, personal care	

	<p>which cleanses the mouth cavity. Shows good antioxidant activity (84-85 % inhibition compared to ascorbic acid and trolox used as standards)</p>			
Tea nutraceuticals	<p>Green and economical standardized process for bioprocessing of tea catechins for the development of high end value added products and nutraceuticals. The catechins obtained at lab scale are up to 90% pure, and up to 70% at pilot scale.</p> <p>Process for bioproduction of theaflavins from purified catechins using bioreactor. The theaflavins obtained by bioprocessing of catechins have purity level up to 70% at lab scale</p>	Biological Sciences & engineering	Herbal, nutraceutical and cosmetic	
Dietary Fiber from Apple pomace	<p>Dietary fiber for adding bulk to diet. Its intake lowers total and regulates blood sugar. It attracts water and turns to gel during</p>	Biological Sciences & engineering	Health & Food as ingredient in Bakery products; Pasta products; Weaning foods; Ready to eat	

	<p>digestion, trapping carbohydrates. It is known to speed the passage of foods through the digestive system and add bulk to the stool. It also balances intestinal pH and production of short-chain fatty acids; and may reduce risk of colorectal cancer</p>		<p>snacks; Breakfast foods; Non-vegetarian food products; and Beverages</p>	
Extruded snacks	<p>Snacks supplemented with nutritionally rich apple pomace that have high antioxidant activity and micronutrients. Products to enhance immune system of body and health. Easy to digest and shelf life up to one year.</p>	Biological Sciences & engineering	Health & Food	
Stevia	<p>Complete package of production technology including nursery development, cultivation practices, and processing.</p>	Biological Sciences & engineering	Health & Food	



Tea Wine	Process that retains antioxidant property. The product has been evaluated for organoleptic properties over a period of three years. It is free from harmful microbes and pesticides	Biological Sciences & engineering	Health & Food	
Theaflavin	Process that enables conversion of 90% tea catechin into theaflavins at an affordable cost.	Biological Sciences & engineering	Health & Food. It can be used as food colorants, reduces cancer risks, lowers blood cholesterol and improves immune function	
Tea Concentrates	Production of tea concentrates from black and green teas with shelf life of six months. The concentrates are further converted into ready to drink teas (RTDs) with sugar/ sweeteners, purified water and carbonation. The readymade drinks can be blended with other permitted flavours as per the market demand.	Biological Sciences & engineering	Health & Food	
Vanillin	An eco-friendly simple process for extraction of	Biological Sciences & engineering	Food	

	vanillin from vanilla pods			
Vinyl guaiacol flavour	An economic & eco-friendly process for a FEMA approved flavouring agent	Biological Sciences & engineering	Food	
Herbal Toothpicks	Package for toothpicks treated with antimicrobial agents safe for human use and provides fresh breath	Biological Sciences & engineering	Personal care, health & hygiene	
Himalayan Delight™	Perfume based on essential oil from high altitude growing aromatic plants	Biological Sciences & engineering	Essential oils & Perfumery	
Viral Diagnostic Kits	Nucleic Acid & ELISA based kits for detection of viral infection in plants. Kits developed for Bean yellow mosaic virus, Prunus necrotic ringspot virus, Chrysanthemum virus B, Carnation etched ring virus, Carnation mottle virus, Tomato aspermy virus and Cymbidium mosaic virus. cDNA based probes available for ACLSV, ArMV, AIMV, BYMV, CMV, CarMV, CERV, PNRSV, TAV,	Biological Sciences & engineering	Plant protection	

	TBV etc			
Mobile Essential Oil Distillation Unit	Truck mounted mobile distillation unit designed for on-site processing of aromatics and herbals	Biological Sciences & engineering	Essential oils & Perfumery	
Mini Distillation Unit Herbostill™	Portable, cost effective, eco-friendly distillation unit with batch capacity of 4-5 Kg and 8-10 Kg plant material under water, steam and water & steam distillation. The unit is suitable small and medium farmers, household cottage industries, aroma therapists, Research Institutes, Ayurved units, etc	Biological Sciences & engineering	Essential oils & Perfumery	
Mini Laminar Flow Unit Steriflow™	Small sized mini laminar flow, occupies less space and can be used for desktop sterile air applications	Biological Sciences & engineering	Microbiology & Microelectronic	
A Gel Processing and Transfer Device (Geproted™)	The device ensures un-damaged, intact gel during transfer and transportation of the gel from the device onto the membrane or any other support material.	Biological Sciences & engineering	Biotechnology, molecular biology, food and pharmaceutical	
Culture Vessel for Rooting of Microshoots	Culture vessel for micro-propagation enables root	Biological Sciences & engineering	Biotechnology	

	induction in difficult to root systems like rose and tea employing liquid medium.			
Tea Withering Machine	<p>The machine having following advantage over the existing systems:</p> <ul style="list-style-type: none"> <li>• Saves fuel and energy</li> <li>• Prevent reddening of bruised leaf thereby enhances quality</li> <li>• Enables manufacture during cooler period providing better control and quality</li> </ul>	Biological Sciences & engineering	Tea	
Micropropagation Protocol of Bamboos	Method for inducing improved seed germination in a high altitude medicinal and endangered plant <i>Podophyllum hexandrum</i> Royle	Biological Sciences & engineering	Biotechnology, food	
Bamboo Shoots: A Healthy Food Product	<p>Novel food products incorporated with bamboo shoots:</p> <ul style="list-style-type: none"> <li>➤ Bamboo Candy</li> <li>➤ Bamboo Nuggets</li> <li>➤ Bamboo Snacks</li> </ul>	Biological Sciences & engineering	Food	

Natural Colours	Process for production of fully standardized eco-friendly natural colours from potential herbal / natural resources of Himalayan region	Biological Sciences & engineering	Cosmetics, Food & Pharmaceuticals	
iRIS™- An Easy Solution to RNA Isolation	System for simple and rapid (45 min) RNA isolation for those tissues for which some of the commonly available commercial kits failed. It is extremely useful in isolating RNA from tissues recalcitrant to guanidinium extractions. It successfully isolates RNA from as little as 10-100 mg tissue	Biological Sciences & engineering	Biotechnology	
Value added Buckwheat Products of High Altitude Region	Low cost nutritional snack <ul style="list-style-type: none"> <li>• Lauli Puff – Healthy snack and</li> <li>Lauli Puff – Nutri-bar</li> </ul>	Biological Sciences & engineering	Food	
Mango Bar – Nutritionally enriched	Low cost, easily adaptable processing technology for Mango bar. The product is incorporated with nutritionally enriched natural Himalayan bioresources.	Biological Sciences & engineering	Food	

	Rich in iron, calcium, vitamin c and antioxidants. Shelf life up to six months.			
Puffed Rice Bar	Product fortified with local plant bio-resource. Low in fat content. Rich in calcium & vitamin A. Shelf life up to 6 months	Biological Sciences & engineering	Food	

<b>Title</b>	<b>Technology / Product / Process / Knowhow</b>	<b>Technology Area</b>	<b>Industry Sector</b>	<b>Is patent part of licensing?</b>
A novel molecule effective for non-steroidal anti-inflammatory drug induced gastropathy	A novel small molecule SEGA which can prevent pain killer caused gastro trouble.	Life sciences/ biosciences & engineering	Pharmaceuticals, Bulk Drugs, Formulations	Yes
Drug-loaded liposome formulation for Kala Azar treatment	A pharmaceutical composition and cationic liposomal formulation useful as a leishmanicidal agent in the treatment of Visceral Leishmaniasis - Kala azar.	Life sciences/ biosciences & engineering	Pharmaceuticals, Bulk Drugs, Formulations	Yes
Hybrid cell vaccine against Leishmaniasis - Kala Azar	A hybrid cell therapy approach against visceral leishmaniasis and process for the preparation of the hybrid cell vaccine, along with a pharmaceutical formulation comprising the aforesaid hybrid cell vaccine optionally along with a carrier or excipient	Life sciences/ biosciences & engineering	Medical Biotechnology, Biomed Products, Medical Healthcare, Diagnostics	Yes
An herbal based composition for treating (acute and chronic) myeloid and lymphoid leukemia, lymphomas	A synergistic, new pharmaceutical composition for acute and chronic myeloid & lymphocytic leukemia, isolated from any plant parts of Piper betel or any other natural or synthetic source, along with simplified method of isolation of the same.	Life sciences/ biosciences & engineering	Pharmaceuticals, Bulk Drugs, Formulations	Yes
An affordable analytical device for performing immunoassays with ultra-high	An improved, highly cost-effective, easy to manufacture analytical device based on Flow-through principle for	Life sciences/ biosciences & engineering	Medical Biotechnology, Biomed Products, Medical	Yes

sensitivity.	performing rapid immunoassays for visual detection of diagnostically important antigen or antibody		Healthcare, Diagnostics	
Protein biomarker for a diagnostic assay which is simple, sensitive and specific to detect and monitor (relapse) treatment outcome of a particular blood cancer	A process for the preparation of a novel biomarker specific for o-acetylated sialic acid useful for the diagnosis, monitoring outcome of treatment and prediction of relapse of acute lymphoblastic leukemia and biomarker prepared thereby	Life sciences/ biosciences & engineering	Medical Biotechnology, Biomed Products, Medical Healthcare, Diagnostics	Yes
Herbal composition for treating asthma	A simple fast and inexpensive process for preparation of a composition from an abundantly available plant for relief, treatment and cure of asthmatic problem satisfactorily.	Life sciences/ biosciences & engineering	Pharmaceuticals, Bulk Drugs, Formulations	Yes
A pharmaceutical composition useful for the treatment of prostate cancer.	A therapeutically effective compound mahanine obtained from an herbal extract with the process of purification along with a synthetically produced pharmaceutically acceptable salt, as an alternative, for the treatment of prostate cancer.	Life sciences/ biosciences & engineering	Pharmaceuticals, Bulk Drugs, Formulations	Yes
A pure herbal prophylactic contraceptive for HIV infection	A pharmaceutical composition of herbal origin has been derived at, which is useful as a virucidal as well as a spermicidal agent comprising of therapeutically effective amount of the compound Acaciaside-B (non-ionic	Life sciences/ biosciences & engineering	Medical Biotechnology, Biomed Products, Medical Healthcare, Diagnostics	Yes



	<p>saponin), derivatives, analogues and pharmaceutically acceptable salts thereof along with pharmaceutically acceptable excipients, for preparation of chemical barrier against HIV infection during heterosexual interaction or as OTC available vaginal formulation/contraceptive with prophylactic action</p>			
<p>Neem extract as a cure for hyperacidity and peptic ulcers</p>	<p>A process for the isolation of active principle from <i>Azadirachta indica</i> (â€œNeemâ€™) useful for controlling gastric hyperacidity and gastric ulceration</p>	<p>Life sciences/ biosciences &amp; engineering</p>	<p>Pharmaceuticals, Bulk Drugs, Formulations</p>	<p>Yes</p>
<p>A plant flower extract as an anti-peptic ulcer pharmaceutical formulation</p>	<p>A new bioactive extract obtained from the flower of <i>Woodfordia fruticosa</i> in a pharmaceutical composition form to act as an effective therapy against peptic ulcer diseases.</p>	<p>Life sciences/ biosciences &amp; engineering</p>	<p>Medical Biotechnology, Biomed Products, Medical Healthcare, Diagnostics</p>	<p>Yes</p>
<p>Biomarker with detection kit for valvular heart disease</p>	<p>A novel biomarker based diagnostic kit useful for the detection, characterization, treatment and prognosis of valvular heart diseases of rheumatic origin along with a protocol to screen anti-fibrotic drug.</p>	<p>Life sciences/ biosciences &amp; engineering</p>	<p>Medical Biotechnology, Biomed Products, Medical Healthcare, Diagnostics</p>	<p>Yes</p>
<p>A method of preventing and/or treating diabetes type 2</p>	<p>Herbal extract and compound lupinoside and its analogues as anti-diabetic type II drugs from plant <i>Pueraria tuberosa</i> with a simple</p>	<p>Life sciences/ biosciences &amp; engineering</p>	<p>Medical Biotechnology, Biomed Products, Medical Healthcare,</p>	<p>Yes</p>

	process for extraction of the active ingredient.		Diagnostics	
Tryptamine derivatives, their preparation and their use in gastropathy	A new kind of scaffold for the treatment of NSAIDs, ethanol as well as stress-induced gastropathy using novel antioxidant, anti-apoptotic tryptamine (serotonin like molecule) derivative molecules for the treatment of serotonin induced diseases	Chemical sciences & engineering	Pharmaceuticals, Bulk Drugs, Formulations	Yes
A process for the preparation of an enzyme containing high cellobiase activity useful for hydrolysis of cellulose	A novel edible mushroom strain <i>Termitomyces clypeatus</i> and a method for enhancing cellobiase activity of the novel strain <i>Termitomyces clypeatus</i> using 2-deoxy-D-glucose as glycosylation inhibitor	Life sciences/ biosciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	Yes
Human Protein-coding RNA to correct mitochondrial dysfunction caused by genetic disorders.	Compositions and methods for delivery of protein-coding RNAs (Pc RNAs) to correct mitochondrial dysfunction along with composition, method for preparing and using correctional RNA, with a carrier, administered to stimulate respiration of the cells, tissues, organs or the whole organism of normal or diseased subjects.	Life sciences/ biosciences & engineering	Medical Biotechnology, Biomed Products, Medical Healthcare, Diagnostics	Yes
Herbal composition for anti-inflammatory drug	Novel anti-inflammatory drugs having both the bronchodilatory and anti-inflammatory activity, having applicability to treat both COPD as well as asthma.	Life sciences/ biosciences & engineering	Medical Biotechnology, Biomed Products, Medical Healthcare, Diagnostics	Yes

<b>Title</b>	<b>Technology / Product / Process / Knowhow</b>	<b>Technology Area</b>	<b>Industry Sector</b>	<b>Is patent part of licensing?</b>
Thermal insulation coating for metallic sheets	Novel coatings suitable for application on metal surfaces such as housing and industrial applications	Physical sciences & engineering	Polymers, Plastics, Elastomers, Fibers, Adhesives, Paints, Specialty Polymers, Natural Polymers, Fibers and Leather	No
Value added chemical from bidi industry waste	Value added compounds from the leaves of Diospyros melanoxylon	Chemical sciences & engineering	Organic Chemicals, Fine Chemicals, Intermediates, Feedstocks	No
Modular, packaged garbage digestors for biomethane generation	A modular high rate digester suitable for semi-urban and urban use	Chemical sciences & engineering	Natural Resources, Water, Environment, Sustainability	No
Enzymatic degumming of rice bran oil	Technology for enzymatic degumming of rice bran oil	Chemical sciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	Yes
Tocopherols and phytosterols	Technology for production of vegetable oil based nutraceuticals - tocopherols and phytosterols	Chemical sciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	No
Soybean and rice bran oil-based	Cost effective, efficient technologies for	Chemical sciences &	Agriculture, Agro-biotech,	No

lecithin products	production of lecithin products	engineering	Agro-products, Fertilizers, Food processing & Secondary Agriculture	
Biomethanation of poultry litter	Remunerative knowhow for farmers to get revenue in terms of bio-energy and bio-manure while simultaneously addressing issues of waste disposal	Life sciences/ biosciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	No
Biocompatible polymer materials for controlled drug delivery having orthopedic applications	Biocompatible polymer materials for controlled drug delivery using chemically modified chitosan	Chemical sciences & engineering	Medical Biotechnology, Biomed Products, Medical Healthcare, Diagnostics	No
Potential anti-tumour agents against human cancer cell lines.	Benzylidineanthracenone linked pyrrolobenzodiazepine hybrids useful as anticancer agents and process for the preparation thereof.	Chemical sciences & engineering	Pharmaceuticals , Bulk Drugs, Formulations	Yes
Potential anti-tumour agents against five human cancer cell lines.	Pyrrolo[2,1-C][1,4]benzodiazepine linked imidazo[1,5-A]pyridine conjugates as potential antitumour agents and process for the preparation thereof	Chemical sciences & engineering	Pharmaceuticals , Bulk Drugs, Formulations	Yes
Potential anti-tumour agents against 58 human tumor cell lines	Carbazole linked pyrrolo[2,1-c][1,4]benzodiazepine hybrids as potential anticancer agents and process for the preparation thereof	Chemical sciences & engineering	Pharmaceuticals , Bulk Drugs, Formulations	Yes
Organic synthesis of Cetyl myristoleate (CMO) isomers for the treatment of osteoarthritis	A process for the preparation of two isomers of cetyl myristoleate and their evaluation for blocking inflammation and	Chemical sciences & engineering	Pharmaceuticals , Bulk Drugs, Formulations	Yes

and other joint inflammatory diseases.	reduction of adjuvant-induced arthritis in rats			
Novel 4beta-amino podophyllotoxin congeners as antitumour antibiotics	A process for the high yield synthesis of new and stereo-selective 4β-amino derivatives of podophyllotoxin which are useful anticancer or antitumour agents.	Chemical sciences & engineering	Pharmaceuticals , Bulk Drugs, Formulations	Yes
Process for the enrichment of methyl ricinoleate from castor oil methyl esters by liquid-liquid extraction.	A non-destructive process for the enrichment of methyl ricinoleate from castor oil methyl esters by liquid-liquid extraction (LLE) at ambient conditions, in presence of refined vegetable oils using an aqueous polar solvent with good yields (75 to 90%) and purity (95 to 99%).	Chemical sciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	Yes
Potentiometric cholesterol biosensor for the quantitative estimation of total cholesterol in human blood serum	A novel and original potentiometric sensor with its process for the fabrication, for the quantitative estimation of total cholesterol in human blood serum using molecular imprint of cholesterol (MIPC) as sensing material for the working electrode	Chemical sciences & engineering	Medical Biotechnology, Biomed Products, Medical Healthcare, Diagnostics	Yes
Estradiol derivatives useful as anti-cancer agents against gynecological and breast cancers	A process for preparation of a novel series of cationic, lipid-based, 17β-substituted-estradiol derivatives which is the natural ligand for estrogen receptors, with highly selective anticancer activities in estrogen responsive cell lines.	Chemical sciences & engineering	Medical Biotechnology, Biomed Products, Medical Healthcare, Diagnostics	Yes

Integrin binding rgd-lipopeptides with gene transfer activities	A novel series of cationic amphiphiles containing RGD-tripeptide ligands of the integrin-receptors and methods for preparing for non-viral cancer gene therapy.	Chemical sciences & engineering	Medical Biotechnology, Biomed Products, Medical Healthcare, Diagnostics	Yes
Enantioconvergent chemoenzymatic synthesis of (R)- $\beta$ -amino- $\beta$ -hydroxybutyric acid ((R)-GABOB)	A facile, efficient and cost effective approach of a chemoenzymatic process for the stereoselective preparation of (R)-GABOB by lipase mediated kinetic resolution of its racemates and their effective application in the enantioconvergent synthesis of (R)-GABOB.	Chemical sciences & engineering	Organic Chemicals, Fine Chemicals, Intermediates, Feedstocks	Yes
Pharmaceutical composition useful as acetylcholinesterase inhibitors	A pharmaceutical composition comprising the naturally occurring compounds selected from ( $\pm$ ) Marmesin, Columbianetin, Dihydroxanthyletin and substituted coumarin derivatives which possess a high degree of acetylcholinesterase inhibitory (AChE) property, which can be used for the therapeutic management of Alzheimers Disease.	Chemical sciences & engineering	Pharmaceuticals , Bulk Drugs, Formulations	Yes
Process for simultaneous preparation of nanocrystalline anatase titanium dioxide powder and hydrazine monohydrochloride.	A simple, easy to operate, environmentally benign (pollution free), single step process for the simultaneous preparation of high in product purity and homogeneous in product particle nanocrystalline	Chemical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	Yes

	anatase titanium dioxide and hydrazine hydrochloride, in substantial amounts at ambient conditions of temperature and pressure.			
Recovery of sodium thiocyanate from industrial process solution using nanofiltration technique for textile industry.	A membrane-based nanofiltration process for separating sodium thiocyanate (NaSCN) from industrial solution containing impurities such as beta-sulfopropionic acid, beta-sulfopropionitrile, sodium sulfate and salts of iron and calcium in a single step to obtain a colorless aqueous solution for spinning of acrylic fiber in textile industry	Chemical sciences & engineering	Chromophoric Materials, Dyes, Pigments, Colorants	Yes
Process for synthesis of novel cationic amphiphiles containing N-hydroxyalkyl group for intracellular delivery of biologically active molecules	A new class of cationic amphiphiles with high transfection efficiencies and low cellular toxicities with a simple, economical process for their synthesis.	Chemical sciences & engineering	Medical Biotechnology, Biomed Products, Medical Healthcare, Diagnostics	Yes
Herbal chemical composition comprising mixture of lignans isolated from the plant Cedrus Deodara for the treatment of large variety of cancers	A novel synergistic composition of lignans (potent cytotoxic agents from plants) exhibiting anticancer activities for breast, cervix, neuroblastoma, colon, liver, lung, mouth, ovary and prostate cancer obtained from the plant extract of Cedrus deodar.	Chemical sciences & engineering	Medical Biotechnology, Biomed Products, Medical Healthcare, Diagnostics	Yes
Alkylxanthates and their use in the integrated pest	New generation of target specific, non-toxic to other species, easily	Chemical sciences & engineering	Pesticides	Yes

management	biodegradable and less persistent pesticides with process of synthesis of the alkyl xanthates analogues and composition for agricultural applications.			
Process for the preparation of hydroxylated lecithin from crude soybean lecithin.	A simple, rapid and environmentally friendly microwave assisted process for the preparation of commercial (hydroxylated) lecithin from crude soybean lecithin through microwave irradiation.	Chemical sciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	Yes
Process for the preparation of diazonaphthoquinonesulfonylchlorides using diphosgene and triphosgene as high value chemical intermediates in electronics and dye industry.	A process for the preparation of diazonaphthoquinonesulfonylchlorides using diphosgene or triphosgene which can be converted into making various esters and which can be used in formulating the photoresists required for electronics industry.	Chemical sciences & engineering	Organic Chemicals, Fine Chemicals, Intermediates, Feedstocks	Yes
Glycerol-based solid acid catalysts useful for the esterification of fatty acids, a process and use thereof	Highly active, reusable catalysts and the process of their preparation, that simplify the biodiesel process particularly for fatty acids or high FFA containing vegetable oils and animal fats by replacing the traditional homogeneous mineral acid catalysts.	Chemical sciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	Yes
Biosensor device to determine potassium concentration in human blood serum.	A biosensor device for measuring the concentration of ions in human blood serum showing excellent selectivity towards	Life sciences/ biosciences & engineering	Medical Biotechnology, Biomed Products, Medical Healthcare,	Yes



	potassium.		Diagnostics	
Process for synthesis of glycomimicking cationic amphiphiles efficient and safe non-viral gene delivery reagents.	Processes for the synthesis of novel Shikimic acid head-group containing non-toxic cationic amphiphiles capable of facilitating transport of biological macromolecules into cells for treating genetic diseases employed in gene therapy.	Life sciences/ biosciences & engineering	Medical Biotechnology, Biomed Products, Medical Healthcare, Diagnostics	Yes
Irreversible temperature sensitive labels for Pharmaceutical industry	A technology for labels that change color irreversibly from colorless to blue or red at 4, 10, 18, 25 and 40 deg C	Chemical sciences & engineering	Pharmaceuticals , Bulk Drugs, Formulations	No

<b>Title</b>	<b>Technology / Product / Process / Knowhow</b>	<b>Technology Area</b>	<b>Industry Sector</b>	<b>Is patent part of licensing?</b>
Efficient, cost-effective catalyst for LPG Sweetening	A process for manufacturing a novel catalyst for sweetening petroleum products	Chemical sciences & engineering	Petrochemicals and Petroleum	Yes
Biosurfactant based sludge emulsification process	Fast, cost effective & environment friendly process of removal of hardened sludge from crude oil storage tanks in refineries using microbially derived emulsifying agents (bio-surfactant) as an emulsifying agent.	Chemical sciences & engineering	Petrochemicals and Petroleum	
Waste plastics to fuel and petrochemicals	Technology to convert waste plastics to fuel and petrochemicals	Chemical sciences & engineering	Polymers, Plastics, Elastomers, Fibers, Adhesives, Paints, Specialty Polymers, Natural Polymers, Fibers and Leather	Yes
Bimetallic reforming catalyst	A bimetallic reforming catalyst used in petrochemical industry for aromatic production	Chemical sciences & engineering	Petrochemicals and Petroleum	No
Biodegradable 2T Oil	Biodegradable non-edible vegetable oil based 2-stroke engine oil that offers better or similar	Chemical sciences & engineering	Energy, Fuels	No

	performance as petroleum or synthetic oil based products			
Eco-friendly extreme pressure additives for industrial gear oil	Extreme Pressure (EP) additives based on non-edible vegetable oil useful in various load bearing and anti-wear lubricant formulations	Chemical sciences & engineering	Energy, Fuels	Yes
Biodegradable Transformer Oil	Transformer Oil based on non-edible vegetable oil	Chemical sciences & engineering	Energy, Fuels	No
Biodegradable lithium grease	Biodegradable lithium-grease based on non-edible vegetable oils for industrial lubrication	Chemical sciences & engineering	Energy, Fuels	No
Pinch analysis - tool for energy conversion	Services to carry out pinch analysis for process heat integration resulting in energy saving	Chemical sciences & engineering	Petrochemicals and Petroleum	No
Technology for production of paraffin and microcrystalline waxes	A process for production of paraffin and microcrystalline waxes from crude mix with high wax content	Chemical sciences & engineering	Petrochemicals and Petroleum	
Upgradation of FCC recycle oil through solvent extraction	An innovative, proven technology for improving the quality of FCC recycle oil with co-production of high quality CBFS	Chemical sciences & engineering	Petrochemicals and Petroleum	
Aromatic extraction for production of benzene and toluene	Solvent extraction based technology for production of benzene and toluene	Chemical sciences & engineering	Petrochemicals and Petroleum	
Technology for color improvement of re-refined	An effective technology for improving color and	Chemical sciences & engineering	Petrochemicals and Petroleum	No

lubricating base oils	color stability of re-refined lubricating base oils			
Improved soaker technology to revamp visbreaking unit	Technology for revamping existing visbreaking units for improved performance and reduced operating costs	Chemical sciences & engineering	Petrochemicals and Petroleum	No
Bio-jet fuel	Process and knowhow for preparation of jet fuel derived from biomass	Chemical sciences & engineering	Petrochemicals and Petroleum	Yes
Process for making petroleum based impregnating type electrode pitch	Energy-efficient process for making petroleum based impregnating type electrode pitch	Chemical sciences & engineering	Petrochemicals and Petroleum	Yes
Development of New Generation FCC Catalyst	A novel catalyst for the conversion of heavier petroleum fractions for production of LPG, gasoline and middle distillates	Chemical sciences & engineering	Petrochemicals and Petroleum	
Solid catalyst for the production of biodiesel	A novel solid catalyst for biodiesel production from vegetable oils	Chemical sciences & engineering	Petrochemicals and Petroleum	
Bioethanol and value added lignin products from bagasse pith	An integrated process for utilization of bagasse pith for production of bioethanol and value added lignin products	Chemical sciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	
Sulphur Reduction in Naphtha Product Obtained by Fluidised Catalytic Cracking	A process for sulphur reduction in naphtha product obtained by Fluidised Catalytic cracking	Chemical sciences & engineering	Petrochemicals and Petroleum	
Sulpholane extraction technology for	Cost effective technology for for production of food	Chemical sciences & engineering	Petrochemicals and Petroleum	

production of food grade hexane	grade hexane			
Propane De-asphalting Technology	A technology for propane deasphalting based on solvent extraction	Chemical sciences & engineering	Petrochemicals and Petroleum	
Lube Oil Base Stock (LOBS) production through NMP	A process for Lube Oil Base Stock (LOBS) production through NMP	Chemical sciences & engineering	Petrochemicals and Petroleum	
Light naphtha to LPG and high octane gasoline	A catalyst and industrial process for the conversion of commercially less viable feed stocks into LPG and high octane gasoline.	Chemical sciences & engineering	Petrochemicals and Petroleum	Yes
Dual Fuel Industrial Low Air Pressure Burner	Cost effective, Simple to use, Indigenously produced, Robust burner that work on multiple fuels	Chemical sciences & engineering	Energy, Fuels	Yes
Delayed coking of Petroleum Residual Fractions	A process for the up-gradation of residual fractions to distillate and generate lighter fractions as coke free clean liquid products.	Chemical sciences & engineering	Petrochemicals and Petroleum	No
Industrial process to produce motor fuel with antioxidant properties	Industrial scale synthesis of BHT (Di tertiary butyl para cresol)	Chemical sciences & engineering	Petrochemicals and Petroleum	
Production of Phenolic resin for lubricating motor oil additive.	A process for manufacturing of Para tertiary butyl phenol (PTBP), from alkylation of phenol with isobutanol/tertbutanol by using as special grade phenol resin, plasticizer, intermediate for production of lubricating oil	Chemical sciences & engineering	Organic Chemicals, Fine Chemicals, Intermediates, Feedstocks	Yes

	additives, emulsions breakers and insecticides			
Sulfolane production technology	Solvent for extraction processes such as aromatics from catalytic reformat, hydro treated pyrolysis naphtha and kerosene.	Chemical sciences & engineering	Organic Chemicals, Fine Chemicals, Intermediates, Feedstocks	Yes
Ultra low sulphur diesel through oxidative desulphurization	A process and know-how for oxidative desulphurization of HDS diesel containing about 500-ppm sulfur to Ultra low sulfur diesel with less than 50 ppm sulfur.	Chemical sciences & engineering	Petrochemicals and Petroleum	Yes
Desulphurization of fuel gases	An energy efficient, cost effective, environment friendly process with diverse application in hydrocarbon fuels sector for removing sulphur from fuel gases in particular.	Chemical sciences & engineering	Petrochemicals and Petroleum	Yes
Helium recovery from natural gases	A Pressure Swing Adsorption (PSA) single stage process that is a uniquely designed combination of cryogenic distillation utilizing available pressure of natural gas and Pressure Swing Adsorption to extract helium from natural gas.	Chemical sciences & engineering	Natural Resources, Water, Environment, Sustainability	Yes

<b>Title</b>	<b>Technology / Product / Process / Knowhow</b>	<b>Technology Area</b>	<b>Industry Sector</b>	<b>Is patent part of licensing?</b>
Anti-arthritis drug from plant source	Anti-arthritis drug-effective for the treatment of Rheumatoid, arthritis, Osteoarthritis, Juvenile rheumatoid arthritis, Soft tissue rheumatoid, low back pain, myositis and fibrositis.	Biological Sciences	Pharmaceutical industries	No
Paediatric Herbal preparation for GIT dysfunction	Treatment of gastrointestinal dysfunctions in children. AYUSH supplies this preparation to all its hospitals on regular basis.	Biological Sciences	Pharmaceutical industries	No
Anti-tubercular Drug –resorine	Treatment of tuberculosis	Biological Sciences	Pharmaceutical industries	Yes
Natural Calicitriol: A drug for skin diseases	The drug is used for the prevention of osteoporosis and skin disorders like psoriasis.	Biological Sciences	Pharmaceutical industries	No
Herbal formulation as hepatoprotective licensed	hepatoprotective against alcoholic and viral cirrhosis	Biological Sciences	Pharmaceutical industries	Yes
Metal Gluconate technology	A single step fermentation process wherein	Biological Sciences	pharmaceuticals, food and	Yes

	<p>starch hydrolysate is directly converted to gluconates of Calcium, Sodium, Barium etc</p> <p>The gluconate salts are used in nutraceuticals, human and veterinary pharmaceuticals, food and cosmetic industry.</p>		cosmetic industry.	
Microbial fermentation process for the production of DHA (docosahexaenoic acid)	Fermentation technology for production of DHA (cis-4, 7,10,13,16,19-Docosahexaenoic Acid) using marine isolate.	Biological Sciences	Pharmaceutical /nutraceutical industries	



<b>Title</b>	<b>Technology / Product / Process / Knowhow</b>	<b>Technology Area</b>	<b>Industry Sector</b>	<b>Is patent part of licensing?</b>
Production of Alkaline Protease	Alkaline proteases have found increasing applications in detergent and leather industry. A strain of Bacillus sphaericus, isolated by IMTECH scientists showed protease activity up to 70,000 AU/litre in 100 L fermenter with a medium containing starch and soyatose. This know-how can be used for the production of a better quality enzyme for use in detergents and in leather industry for bating etc. The process is available for licensing. The advantage of IMTECH process is its thermotolerance	Life sciences/ biosciences & engineering	Detergent Industry and Leather Industry	

	at higher temperatures.			
Production of Alpha Amylase	This enzyme is used in textiles and food industry and in many other applications. IMTECH scientists have cloned and expressed in B. subtilis, alpha-amylase gene from a thermophilic strain. The know-how is available for transfer at 100 L, process scale.	Life sciences/ biosciences & engineering	Textile Industry and Food Industry	
Production of Urokinase	A thrombolytic and anticoagulant used in the treatment of thrombo-embolic disorder and to clear catheters obstructed by blood clots. This is produced from human urine. IMTECH process consisted of a column filled with special adsorbant and fitted to pot type urinals. After a passage of about 100-150 litres of human urine this column is	Life sciences/ biosciences & engineering	Health Sector	

	removed and the adsorbed urokinase and other proteinaceous material eluated. After further processing through a few steps partially purified urokinase is obtained			
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Title	Technology / Product / Process / Knowhow	Technology Area	Industry Sector	Is patent part of licensing?
Pure metallic cathodes from spent catalysts, sludges, anode slimes, primary and secondary ores	A process for production of Nickel / Cobalt / Zinc / Copper / Molybdenum from primary and secondary materials including spent catalysts, sludge, anode slime, primary and secondary ores.	Chemical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	No
Multi purpose biomass operated dryer	Knowhow to manufacture biomass operated dryer for various agricultural & industrial materials	Physical sciences & engineering	Energy, Fuels	Yes
Energy efficient, biomass based fixed cook stoves	Knowhow for biomass based fixed cook stoves with low gas emission and high energy efficiency for rural application	Physical sciences & engineering	Energy, Fuels	No
Terafil - Water Purification System	A porous and burnt red clay media (disc/candle) which is used for filtration and treatment of turbid raw water	Physical sciences & engineering	Natural Resources, Water, Environment, Sustainability	No

	to obtain clean drinking water without use of electricity.			
Diamond-like carbon multilayer coating	A process for preparation of a hard diamond like carbon coating on SiC powder grains for grinding, polishing and lapping applications.	Physical sciences & engineering	Others	Yes
Ecofriendly pencil-lead	A simple and efficient process for the preparation of pencil lead from the spent or waste pot liners of aluminium industries	Chemical sciences & engineering	Chromophoric Materials, Dyes, Pigments, Colorants	Yes
Pulse Thresher cum Winnower	Knowhow to manufacture a pulse thresher cum winnower for use in rural context	Physical sciences & engineering	Natural Resources, Water, Environment, Sustainability	No
Landslide monitoring systems	Software system for detection, prediction and information dissemination on landslides	Mathematical/computational sciences & engineering	Natural Resources, Water, Environment, Sustainability	No
High-temperature, corrosion resistant, high strength Sialon ceramics from Fly Ash	Preparation of silicon aluminium oxynitride (SiAlON) from fly ash in a thermal plasma.	Chemical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	Yes
Battery Grade Electrolytic Manganese Dioxide (EMD)	A process for the production of battery grade Electrolytic	Chemical sciences & engineering	Energy, Fuels	No

	Manganese Dioxide from manganese bearing material			
Battery grade Nickel Hydroxide	A process for production of Nickel Hydroxide by chemical / electrochemical precipitation technique.	Chemical sciences & engineering	Energy, Fuels	Yes
Antibacterial ceramic material	Preparation of antibacterial ceramic material to be used as tiles	Chemical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	Yes
Low cost dryer for large cardamom and spices	Knowhow to manufacture a spice dryer for use in rural context	Physical sciences & engineering	Natural Resources, Water, Environment, Sustainability	No
Wood fired pottery kiln	Knowhow to design and manufacture a wood fired pottery kiln for use in rural context	Physical sciences & engineering	Natural Resources, Water, Environment, Sustainability	No
Power operated paddy thresher-cum-winnower	Knowhow to design and manufacture a power operated paddy thresher-cum-winnower for use in rural context	Physical sciences & engineering	Natural Resources, Water, Environment, Sustainability	No
Biogas from kitchen and vegetable wastes	Knowhow to design and manufacture a biogas generator from organic, biodegradable wastes	Physical sciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	No

Power operated grain winnower	Knowhow to design and manufacture a power operated grain winnower	Physical sciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	No
Low cost glazing (glass coating) of terracotta	A low cost process for glazing of terracotta	Physical sciences & engineering	Natural Resources, Water, Environment, Sustainability	No
Brick red dye from plant resources	A cost-effective, user friendly process for production of brick red dye from plant resources	Life sciences/ biosciences & engineering	Natural Resources, Water, Environment, Sustainability	Yes

Title	Technology / Product / Process / Knowhow	Technology Area	Industry Sector	Is patent part of licensing?
Process for making cathode material for Solid Oxide Fuel Cell applications	A cost-effective process for preparation of strontium doped cathode material for Solid Oxide Fuel cells.	Chemical sciences & engineering	Energy, Fuels	Yes
Technology for making PZT Actuators for use in vibration control, precision flow control etc.	Process for manufacturing low cost, stacked PZT Actuator for vibration control, precision flow control and other high frequency applications	Physical sciences & engineering	Electronics, Photonics, Magnetics	No
Carbon - carbon composite fasteners (bolts, nuts, screws) for high temperature applications	A process for manufacturing carbon-carbon fibre fasteners that are suitable for demanding and high performance environments in metallurgy, aerospace and automobile applications	Physical sciences & engineering	Defense, Aerospace, Atomic Energy (Strategic)	No
Inexpensive process to make fused silica products by slip cast method	A process for manufacturing fused silica bodies with	Chemical sciences & engineering	Inorganic and Hybrid materials, Inorganic	Yes



	high density using the slip casting process		materials	
Solar selective coating for renewable thermal power generation	Solar selective coating materials for coating parabolic dish and trough collector solar-thermal units that can withstand temperatures from 400 to 500 deg C , resulting in more efficient systems	Chemical sciences & engineering	Energy, Fuels	Yes
Customised High Performance Computing (HPC) solutions	Knowhow to design and build customized end-to-end High Performance Computing (HPC) solutions, including hardware design, software, parallelization, optimization and support services.	Mathematical/ computational sciences & engineering	Computing & Electronic Devices, Instrumentation	Yes
High purity alpha alumina powder for use in ceramic industries	A process for preparation of low-cost, high purity alpha alumina powder used in ceramic industries	Chemical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	Yes

Alumina hydrate fillers for paper and printing ink industry	A process for making low density alumina hydrate fillers for paper and printing ink industry	Chemical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	Yes
Speed sensor based on Magneto Resistive Element (MRE) technology	An improved, simplified and cost effective speed sensor which has a Giant Magento Resisitive (GMR) based magnetic sensor that measures the magnetic field gradient, thus producing a uniform pulse output to display the accurate RPM	Physical sciences & engineering	Transportation	Yes
Zirconia coating on ceramic products for high temperature and chemical barrier applications	A process for applying zirconia coating on graphite or any other substrate	Chemical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	No
Carbon fibre composite materials for aircraft brakes and high-end automobiles	A process for manufacturing carbon fiber reinforced carbon (C/C) and carbon fibre reinforced silicon carbide (C/SiC) composites materials suitable for aircraft brake material	Chemical sciences & engineering	Defense, Aerospace, Atomic Energy (Strategic)	No

Smart fatigue meters for aerospace applications	Fatigue monitoring system for aerospace applications useful for deciding maintenance actions and predicting wear and tear	Physical sciences & engineering	Defense, Aerospace, Atomic Energy (Strategic)	No
Active noise control for pilot helmet and aircraft cabin	Noise cancellation system for pilots, aircrafts and other applications	Mathematical/computational sciences & engineering	Defense, Aerospace, Atomic Energy (Strategic)	No
Electronic displays for aircraft cockpit	Active matrix LCD digital instrument displays with large viewing angle for avionic applications	Physical sciences & engineering	Defense, Aerospace, Atomic Energy (Strategic)	No
Superhard nanocomposite coating on cutting tools for high performance machining	Superhard coating on cutting tools for high performance machining	Physical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	No
Eco-friendly corrosion resistant coating for aircrafts	A process for developing and applying eco-friendly corrosion resistant coating for aerospace applications	Chemical sciences & engineering	Defense, Aerospace, Atomic Energy (Strategic)	No
Integrated Modular Avionics solutions	Integrated Modular Avionics (IMA) solutions as an open	Mathematical/computational sciences & engineering	Defense, Aerospace, Atomic Energy (Strategic)	No

	architecture system for civil aerospace applications			
Vision based technologies for micro air vehicles	Technologies for vision responsive, fully autonomous Micro Air Vehicle for remote aerial reconnaissance	Physical sciences & engineering	Defense, Aerospace, Atomic Energy (Strategic)	No
On-board flight data recording analysis and monitoring software	Software for decoding data from flight data recorder	Mathematical/computational sciences & engineering	Defense, Aerospace, Atomic Energy (Strategic)	No
DRISHTI TRANSMISSOMETER - A visibility measuring system	An indigenously fabricated, state of the art, highly cost effective system with high Mean time between failures (MTBF) for measuring visibility at Airports.	Physical sciences & engineering	Defense, Aerospace, Atomic Energy (Strategic)	No
Radome technology for weather borne and air borne applications	Technology to manufacture radomes	Physical sciences & engineering	Defense, Aerospace, Atomic Energy (Strategic)	No

Title	Technology / Product / Process / Knowhow	Technology Area	Industry Sector	Is patent part of licensing?
A tobacco and nicotine free herbal formulation substitute for gutkha	A herbal formulation which is a substitute for gutkha with antioxidant properties and no side effects	Life sciences/ biosciences & engineering	Traditional Health Systems	Yes
An efficient binosynergistic composition useful as a bioinoculant	An efficient synergistic bioinoculant composition comprising bacterial strains isolated from cow milk for plant growth promoting activity	Life sciences/ biosciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	Yes
Herbal Lip Balm	A natural formulation with herbal colour and natural ingredients such as essential oil and fruity strawberry flavor and without petroleum jelly to protect the lips from dryness and bacterial infection.	Biological Sciences & engineering	Herbal, personal care, cosmetic	
Anticough Syrup	Anti-cough and anti-tussive herbal formulation based on oral indigenous knowledge. It contains a combination of 3-5 indigenous medicinal plants. The product is purely natural and	Biological Sciences & engineering	Herbal, pharmaceutical	

	<p>non-toxic. It prevents dryness of mouth and cracking of voice, soothes throat, prevents soreness of throat</p>			
Herbal Health Drink	<p>Purely natural and non-toxic herbal drinks contain a combination of 5 or 6 indigenous medicinal plants which are fortified with herbs reported in Ayurveda to have health protective and promotive attributes such as hepato-protective, antioxidant, immune modulator, cardio-tonic, diuretic, digestive, choleric, nervine relaxant properties. It is a unique blend of modern nutraceutical concepts with traditional knowledge and wisdom; Soft drink gives instant energy and combat fatigue; Does not contain any toxic substance; and No chemical preservative or colourants are used in this soft drink</p>	Biological Sciences & engineering	Health, Food & beverage	
Fruit Based Herbal Drink (Alcohol 2-5%)	<p>Based on nutraceutical concept to provide better nutrition and has reputed Ayurvedic</p>	Biological Sciences & engineering	Health, nutraceutical & beverage	

	<p>ingredients  Fortified with herbs reported in Ayurveda to have health protective and promotive attributes such as hepatoprotective, antioxidant and immunoenhancing besides providing instant energy and vitality  Provide instant energy fights fatigue  Has self-generated alcohol (1.8-2.5), antioxidant diuretic</p>			
Ointment For Wounds And Cuts	<p>Novel herbal formulation for treatment of cuts, burns and wounds (for external use). It exhibits regeneration of the tissue.  Antimicrobial and antifungal properties, gives immediate relief to inflammation  Unlike the commercial wound healing formulations, it is useful for regeneration of the dead cells and connective tissues</p>	Biological Sciences & engineering	Herbal & pharmaceutical	
Antiulcer Formulation	<p>Novel synergistic formulation for treatment of acute and chronic ulcers in glandular region of the stomach. It comprises of plant</p>	Biological Sciences & engineering	Herbal & pharmaceutical	

	<p>extracts together with the conventional additives to form the oral dosage. The formulation showed a promising activity with diverse mechanism of action in gastric and duodenal ulcers in rats. It neutralizes the excess acid in the stomach. Used in healing and curing of ulcers and also useful in curing internal bleeding</p>			
Herbal Colours	<p>Different shades of colours such as yellow to orange, red to red purple etc from plant source easily available in India, neighboring countries and in market. Being herbal, colour does not have adverse effect such as skin rashes and allergic reactions, unlike synthetic colours Antimicrobial, antioxidant and anti-inflammatory in nature.</p>	Biological Sciences & engineering	Cosmetic	
Herbal gulal	<p>Ecofriendly dry colour for holi and rangoli. Unlike synthetic colours, no side effects</p>	Biological Sciences & engineering	Herbal	



Herbal Sindoor	Herbal sindoor which is non-toxic and without heavy metals	Biological Sciences & engineering	Herbal	
Herbal Beer	Herbal beer based on traditional leads and developed using modern beverage Science/nutraceutical concept. Fruits are used as base material	Biological Sciences & engineering	Health, nutraceutical & beverage	
Herbal Lipstick	Safe, eco-friendly, health protective cosmetic composition containing natural colours developed from medicinal herbs, fortified with various aromas	Biological Sciences & engineering	Cosmetic	
Dehydration of flowers & foliage technologies	Artistic greeting cards, wall plates, landscapes, three dimensional interior decorative items, etc.	Biological Sciences & engineering	Herbal	
Herbal diabetes formulation	Safe, hypoglycemic herbal formulation based on traditional knowledge and scientifically validated	Biological Sciences & engineering	Herbal, Pharmaceutical	

Title	Technology / Product / Process / Knowhow	Technology Area	Industry Sector	Is patent part of licensing?
New Reverse Enteric Polymer (NREP)/Taste masking in drugs	A polymer that can be used in drug formulations for taste masking and custom release purposes.	Chemical sciences & engineering	Pharmaceuticals, Bulk Drugs, Formulations	Yes
Gel-O-Fuel	Polymer based gels, that can absorb organic liquids and fuels	Chemical sciences & engineering	Polymers, Plastics, Elastomers, Fibers, Adhesives, Paints, Specialty Polymers, Natural Polymers, Fibers and Leather	Yes
Value added chemicals from Cashew Nut Shell Liquid(CNSL)	Specialty monomers and polymers from CNSL that have wide ranging industrial and consumer applications	Chemical sciences & engineering	Polymers, Plastics, Elastomers, Fibers, Adhesives, Paints, Specialty Polymers, Natural Polymers, Fibers and Leather	Yes
Titanium Dioxide nanoneedles	A simple one step process for producing pure rutile titanium dioxide nanoneedles at room temperature with high aspect ratio and high morphology control with potential applications in paints,	Chemical sciences & engineering	Electronics, Photonics, Magnetics	Yes

	coating, as photo catalysts, etc			
Ballast Water Treatment	A mechanical process (based on hydrodynamic cavitation) which can be used to kill micro-organisms and purify ballast water released from ships/ to produce drinking water from a contaminated source	Chemical sciences & engineering	Natural Resources, Water, Environment, Sustainability	Yes
Membrane purification of Palm Sap (Neera)	A process for enhancement of shelf life of palm sap by using polymeric membranes to remove microbes and impurities	Chemical sciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	No
Quartz Crystal Micro balance (QCM)	An in situ quartz crystal microbalance (QCM), based on a compact embedded system, that can be used to study molecular recognition and for other scientific/ research purposes	Mathematical/ computational sciences & engineering	Computing & Electronic Devices, Instrumentation	No
Polyurethane (PU) microspheres/ microcapsules	Spherical PU microspheres of uniform shape and size used in getting a film of uniform thickness without any defects or fat edges with applications in coatings, paints, powder coating/molding. PU microcapsules that can encapsulate any chemical of interest,	Chemical sciences & engineering	Polymers, Plastics, Elastomers, Fibers, Adhesives, Paints, Specialty Polymers, Natural Polymers, Fibers and Leather	Yes

	that could be later released when required.			
Membranes for gas/liquid separation	Thin film composite membranes that are used for gas separation, pervaporation (dehydration of organics) and aroma recovery. Uses include producing oxygen enriched air for medical applications and other medical and industrial applications	Chemical sciences & engineering	Polymers, Plastics, Elastomers, Fibers, Adhesives, Paints, Specialty Polymers, Natural Polymers, Fibers and Leather	Yes
New drug target & promising chemical starting point for treating cancer - PIP3 Antagonists	A new therapeutic strategy that identifies a new drug target and development of various promising small molecules that show promising results in animal testing to be further developed into drugs for treatment of cancer.	Life sciences/ biosciences & engineering	Pharmaceuticals, Bulk Drugs, Formulations	Yes
Process for Preparation of Copolymer-1-used in the treatment of multiple sclerosis	Process for synthesis of CoPolymer1 and its pharmaceutically acceptable salts	Chemical sciences & engineering	Pharmaceuticals, Bulk Drugs, Formulations	Yes
Biomaterials from Regenerated Silk Fibroin - with applications in tissue engineering, drug delivery, cosmetics etc.	Various novel methods for producing 3D porous biomaterials from regenerated silk fibroin (RSF) which has wide ranging applications in tissue engineering, wound healing	Life sciences/ biosciences & engineering	Medical Biotechnology, Biomed Products, Medical Healthcare, Diagnostics	Yes

	bandages, drug delivery, cosmetic applications etc			
A library of new small molecules that could be used as anticancer, antiviral drugs	A synthetic routine that allows one to manipulate the substrate flexibility at the final/penultimate steps- yielding a small library of modified nucleosides without the need for synthesising every compound from the beginning, and hence significantly reducing drug development time and costs.	Chemical sciences & engineering	Pharmaceuticals, Bulk Drugs, Formulations	Yes
A New method to synthesize anti malarial drug and its analogues called Flinderoles	A simple and efficient procedure for the chemical synthesis of otherwise naturally derived compound called flinderole and its analogues, which can be used to prepare drugs against multiply resistant strains of the malarial parasite, plasmodium falciparum. The process will enable the user to produce the compounds in commercial quantities.	Chemical sciences & engineering	Pharmaceuticals, Bulk Drugs, Formulations	Yes
Nanoparticle-polymer complex for sustained release of oral care products	A process for preparation of nanoparticle-polymer multilayer complexes for sustained release of active oral agents, which can anchor and retain on the surface	Chemical sciences & engineering	Surfactants, Detergents, FMCG	Yes

	enamel of the teeth, for extended periods of activity.			
Self standing nanoparticle networks/scaffolds with applications in drug delivery, tissue engineering, catalysis etc	A novel process of preparing self standing nano particle networks with adjustable mesh size, prepared from various materials and having a wide variety of applications. The pore size ranges from nano to micro porous (500nm to 1mm) and is very precisely controllable	Chemical sciences & engineering	Medical Biotechnology, Biomed Products, Medical Healthcare, Diagnostics	Yes
Nanogold-loaded sharp-edged carbon bullets as gene carriers	A process for making sharp edged carbon bullets, embedded with nanogold particles for gene delivery applications - with a capacity to carry more DNA cargo and perform efficient transformation when compared to conventional gene delivery methods	Life sciences/ biosciences & engineering	Medical Biotechnology, Biomed Products, Medical Healthcare, Diagnostics	Yes
Injectable biodegradable gels with hydrophobic pockets/cavity for delivery of drugs	Injectable, biodegradable, polymer hydrogel (that cross links in-situ) with one or more hydrophobic cavities which can be used to deliver drugs, with the desired release profile - having various biomedical applications	Life sciences/ biosciences & engineering	Medical Biotechnology, Biomed Products, Medical Healthcare, Diagnostics	Yes
Continuous flow synthesis of	A process for continuous flow	Chemical sciences &	Pharmaceuticals, Bulk	Yes

<p>sulphoxide compounds for use in drug formulations</p>	<p>synthesis of pharmaceutically important sulphoxide compounds (used as Proton Pump Inhibitors- used in treating gastric disorders) with very less reaction time and easy scalability</p>	<p>engineering</p>	<p>Drugs, Formulations</p>	
<p>A novel process for making monomer used in producing Polybenzimidazole (PBI) - a specialty/engineering polymer</p>	<p>A process for production of high yielding, very pure 3,3,4,4 - Tetraamino biphenyl (TAB) monomers, which are used for preparing polybenzimidazole (PBI) polymers.</p>	<p>Chemical sciences &amp; engineering</p>	<p>Defense, Aerospace, Atomic Energy (Strategic)</p>	<p>Yes</p>
<p>Process for the continuous flow synthesis of beta-amino crotonate (for use in anti-hypertensive drugs)</p>	<p>A process for continuous flow synthesis of &gt;99.98% pure beta- amino crotonates which are intermediates to calcium channel blockers (anti-hypertensive drugs)</p>	<p>Chemical sciences &amp; engineering</p>	<p>Pharmaceuticals, Bulk Drugs, Formulations</p>	<p>Yes</p>
<p>Slow release hydrogel system for nutrient delivery to recombinant cell lines</p>	<p>Slow release polymer hydrogel system to feed nutrients to cell lines for optimal selection of high protein yielding recombinant cell lines</p>	<p>Life sciences/ biosciences &amp; engineering</p>	<p>Medical Biotechnology, Biomed Products, Medical Healthcare, Diagnostics</p>	<p>No</p>
<p>A single-step process for the preparation of highly pure alkyl esters used in making lactic acid, poly lactic acid</p>	<p>A single-step process for preparation of highly pure alkyl esters, which is used in the manufacture of lactic acid and further to poly lactic acid – both with wide industrial and commercial applications.</p>	<p>Chemical sciences &amp; engineering</p>	<p>Pharmaceuticals, Bulk Drugs, Formulations</p>	<p>Yes</p>

Process yielding high value fuel additives (octane enhancers) from lignin	Efficient process for the depolymerization of lignin to produce substituted phenolic monomer compounds that are further converted to fuel additives	Chemical sciences & engineering	Energy, Fuels	Yes
Single step process for making high-value chemicals like xylose and arabinose from hemicellulose	Improved single step hydrolytic process for generating high value chemicals such as xylose and arabinose from hemicellulose	Chemical sciences & engineering	Organic Chemicals, Fine Chemicals, Intermediates, Feedstocks	Yes
Low energy consuming novel impeller for stirred tank reactors	A novel impeller that completely covers the stirred tank reactor causing uniform mixing with less power consumption	Chemical sciences & engineering	Organic Chemicals, Fine Chemicals, Intermediates, Feedstocks	Yes
Modified Porous Polymers with Enhanced Biocompatibility for Implants and Tissue Engineering Applications	Surface modified porous polyethylene biomaterial which promotes cell growth and prevents microbial infections for applications in biomedical implants and tissue engineering.	Chemical sciences & engineering	Medical Biotechnology, Biomed Products, Medical Healthcare, Diagnostics	Yes
New Chemical Entities (NCE) for treatment of malaria and CNS disorders	New Chemical Entities (NCE) that may be employed as potential leads to prepare antimalarial drugs or treatment of Central Nervous System (CNS) disorders	Chemical sciences & engineering	Pharmaceuticals, Bulk Drugs, Formulations	Yes
Novel silica based substrate (SBA-15) for efficient small molecules analysis in mass spectrometry	Mesoporous silica (SBA-15) based substrate that enables efficient and selective analysis of small molecules from a	Life sciences/ biosciences & engineering	Computing & Electronic Devices, Instrumentation	Yes



	complex mixture that contains both small and large molecules, using mass spectrometry.			
A cost effective process for manufacture of Yellow 11, an industrial dye with uniform color tone for textile and printing industry	An economical, single step process for synthesis of Yellow 11 (Y-11) dye with on-line UV monitoring system to ensure color uniformity and consistency	Chemical sciences & engineering	Organic Chemicals, Fine Chemicals, Intermediates, Feedstocks	Yes
Continuous flow synthesis of nanocrystalline metal oxides	A process for continuous flow synthesis of nanocrystalline metal oxides used as catalysts and toxic adsorbents	Chemical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	Yes
A device for effective waste water treatment for effluent with high COD load, colour and ammoniacal nitrogen	A device which uses a vortex diode to effectively treat effluents from various industries, such as chemical, paper and pulp, tannery, dyes and pigments	Chemical sciences & engineering	Natural Resources, Water, Environment, Sustainability	Yes
MAGIC (Modular Agile Intensified Continuous) reactors	Technology for adapting conventional batch processes of specialty chemicals to continuous processes leading to compact plants which have lower inventories, are intrinsically safer, have a lower environmental footprint and have consistency in product quality and better control on	Chemical sciences & engineering	Organic Chemicals, Fine Chemicals, Intermediates, Feedstocks	Yes

	selectivity			
Innovative and efficient flow reactor cum heat exchanger for chemical processes with improved mixing and heat transfer	A device which acts as a continuous flow reactor cum heat exchanger useful for the chemical process industry, which can be easily adapted in a quick, reconfigurable manner for enhanced mixing and heat transfer	Chemical sciences & engineering	Organic Chemicals, Fine Chemicals, Intermediates, Feedstocks	Yes
A cost effective process for the preparation of phosphorous ligands and their precursors (valuable intermediates in organic synthesis)	A cost effective, one reactor synthesis process for aryl phosphonates/phosphinates/phosphine oxides which are important ligand useful in organic synthesis	Chemical sciences & engineering	Organic Chemicals, Fine Chemicals, Intermediates, Feedstocks	Yes
An efficient and simple process for preparation of arylsulfones (used as building block for various drugs)	A simple, one step process for the synthesis of aryl sulfones which is an important building block in organic chemistry and medicinal chemistry	Chemical sciences & engineering	Organic Chemicals, Fine Chemicals, Intermediates, Feedstocks	Yes
A cost effective process for the synthesis of beta, gamma-unsaturated ketones	A simple, cost effective process for the synthesis of biologically active compounds beta,gamma-unsaturated ketones useful in synthesis of fine chemicals, utilizing readily available materials	Chemical sciences & engineering	Organic Chemicals, Fine Chemicals, Intermediates, Feedstocks	Yes
A cost effective process for the synthesis of cleistenolide, its derivatives and analogs	A simple, cost effective process for the synthesis of natural product cleistenolide useful as antifungal and anti-	Chemical sciences & engineering	Organic Chemicals, Fine Chemicals, Intermediates, Feedstocks	Yes

	tumor agent			
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<b>Title</b>	<b>Technology / Product / Process / Knowhow</b>	<b>Technology Area</b>	<b>Industry Sector</b>	<b>Is patent part of licensing?</b>
Hydroplume: A high rate circular secondary clarifier for waste water treatment	An innovative and efficient clarifier design for water and waste water treatment application	Chemical sciences & engineering	Natural Resources, Water, Environment, Sustainability	Yes
NEERI-ZAR Instant Water Filter	An instant, portable, compact, gravity-operated water purifier suitable for potable water supply during natural disasters and emergencies	Chemical sciences & engineering	Natural Resources, Water, Environment, Sustainability	No
Eco-friendly electrolytic defluoridation technology for water treatment	A solar energy based electrolytic defluoridation technology for water treatment	Chemical sciences & engineering	Natural Resources, Water, Environment, Sustainability	No
Digital arsenic detection kit	Design and development of a portable, cost effective digital kit for quick measurement of arsenic in water samples.	Chemical sciences & engineering	Computing & Electronic Devices, Instrumentation	
Iron removal technology for community water supply	Large scale aeration based technology using Thin Film Composite RO membrane technology for iron removal in community water supply	Physical sciences & engineering	Natural Resources, Water, Environment, Sustainability	No

Iron removal technology for household water supply	Design & construction of a domestic system for removal excess iron from drinking water	Physical sciences & engineering	Natural Resources, Water, Environment, Sustainability	No
Clean cook-stoves for rural homes	Knowhow to manufacture clean cook stoves for rural homes	Chemical sciences & engineering	Natural Resources, Water, Environment, Sustainability	No
Device for real time gas-liquid separation for analytical detection and biochemical engineering applications.	A device for in-situ gas-liquid separation for wider applicability in low level estimation of covalent metal hydrides by instrumental techniques.	Chemical sciences & engineering	Computing & Electronic Devices, Instrumentation	Yes
Process for the production of zeolite Y from flyash	Hydrothermal process for the synthesis of zeolite compositions from flyash for application as catalyst in automotive exhaust	Chemical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	Yes
Preparation of essential oil compositions for potable liquid disinfection	Compositions comprising an essential oil, methods for preparing the compositions, and methods of disinfecting potable liquid with the compositions.	Life sciences/ biosciences & engineering	Medical Biotechnology, Biomed Products, Medical Healthcare, Diagnostics	Yes
Entrapment of environmentally toxic liquid wastes into solid material for safe disposal in	A techno-commercially effective method for stabilization of liquid hazardous	Chemical sciences & engineering	Natural Resources, Water, Environment, Sustainability	Yes

containment facilities	wastes containing arsenic into a non-leachable solid material for final disposal			
Biotechnological process to be used in crude oil refineries for recovery of hydrocarbons from oily sludge using microbes.	An environment friendly biotechnological process conducted at room temperature for the treatment of crude oil sludge for the economic recovery of hydrocarbons using <i>B. subtilis</i> .	Chemical sciences & engineering	Natural Resources, Water, Environment, Sustainability	Yes
Aerator for bio-treatment of wastewater	An improved mechanical floating aerator for oxygen transfer for biological treatment of wastewater	Physical sciences & engineering	Computing & Electronic Devices, Instrumentation	Yes
Tannery industry effluent treatment plant	An improved effluent treatment plant useful for the treatment of tannery wastewater to obtain non-polluting water.	Chemical sciences & engineering	Natural Resources, Water, Environment, Sustainability	Yes
A process for the preparation of oligodeoxyribo- and oligoribonucleotides using an improved universal polymer support.	A process for the preparation of an improved universal polymer support which is devoid of any nucleosidic material, thus suitable for the synthesis of all possible oligonucleotides, and is compatible to the existing methods of their	Life sciences/ biosciences & engineering	Organic Chemicals, Fine Chemicals, Intermediates, Feedstocks	Yes

	synthesis and cleaving of protective groups			
An improved process for preparation of cellulase to various value-added organic compounds used in petrochemicals.	Biotechnological route to produce petrochemical based product from cellulose saccharification and fermentation through an improved process for the preparation of cellulase substantially employing the weeds which are abundantly available.	Life sciences/ biosciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	Yes
Effective domestic solid waste treatment and disposal methodologies in the form of a new design of dust bin	A novel device in the form of a household dust bin for the storage, segregation and treatment of biodegradable wet-solid waste, offering a sustainable solid waste management system, with economical waste disposal	Life sciences/ biosciences & engineering	Natural Resources, Water, Environment, Sustainability	Yes
Method for the screening of bacterial isolates using a new RAPD detection kit for microbial bioremediation.	A sensitive RAPD DNA test kit for diagnosis of the genetic diversity and to screen bacterial isolates of any environmental or any origin, for assessment of diversity of genera.	Life sciences/ biosciences & engineering	Natural Resources, Water, Environment, Sustainability	Yes
Medical	A natural	Life sciences/	Organic	Yes

composition useful for protecting and/or repairing DNA from oxidative damages.	pharmaceutical composition consisting of redistilled low ammonia containing cow urine distillate antioxidants and method for noble use in effectively preventing and rectifying DNA damage along with process for an improved process of preparing RCUD.	biosciences & engineering	Chemicals, Fine Chemicals, Intermediates, Feedstocks	
Carbon bed electrolyser for treatment of liquid effluents containing difficult to degrade chemicals.	A carbon bed electrolyser (CBE) unit for electrochemical treatment of recalcitrant wastewater, e.g. from chemical industry with a method of intensification for efficient and effective electrolytic ie: electro oxidation process wherein the carbon bed gets regenerated in-situ continuously.	Chemical sciences & engineering	Natural Resources, Water, Environment, Sustainability	Yes
Method of VOC monitoring in indoor environment using novel versatile absorbing materials	Molecular design of nano-structured material for the best control and remediation of Volatile Organic Compounds (VOC) emissions in air, water and	Chemical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	No



	soil through simultaneous adsorption and oxidation.			
Biotechnological methods and processes for capturing carbon dioxide gas from various sources using algae.	Biomitigation of carbon dioxide by micro-algae <i>Chlorella</i> sp. with simultaneous biodiesel precursor production in a bench scale developed high performance photo-bioreactor system	Life sciences/ biosciences & engineering	Natural Resources, Water, Environment, Sustainability	No
Water disinfection using solar energy	Photocatalytic disinfection of water using solar energy irradiation and Titania	Physical sciences & engineering	Natural Resources, Water, Environment, Sustainability	No
Recovery and production of bio-flavours, essential oils from fruit waste and damaged cull fruits.	Bench scale recovery of essential oils from waste peels of citrus fruits based on simple principle of hydro-distillation for its use in food and cosmetic industry.	Life sciences/ biosciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	No
Phosphors for dosimetric applications	Development and mass scale production of high sensitivity phosphors for dosimetric applications.	Physical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	No
Tailor made Molecularly Imprinted Polymers (MIP) for analytical chemistry tools and techniques.	Cross linked copolymer matrix with uniquely functionalized with stereospecific complementarity to interact/dock with given	Chemical sciences & engineering	Polymers, Plastics, Elastomers, Fibers, Adhesives, Paints, Specialty Polymers,	No

	template(s) to be used in analytical & molecular separation techniques.		Natural Polymers, Fibers and Leather	
Carbon dioxide sequestration using single enzyme loaded nanoparticles for biofuel production	Development of functionalized nanomaterials for immobilization, stabilization of Carbonic Anhydrase (CA) on mesoporous materials, for the biomimetic sequestration of anthropogenic carbon dioxide, which gets fixed as calcium carbonate crystals (calcite).	Life sciences/ biosciences & engineering	Inorganic and Hybrid materials, Inorganic materials	No
Nanocatalysts to controlling nitrous oxide emissions	Novel composition and synthesis in nano-structured form of synthetically designed perovskite and mixed oxide type catalyst for the decomposition of nitrous oxide to reduce emission rates	Chemical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	No
A method for detecting the presence of water born pathogens and indicator microorganism including bacteria from water samples.	A specific protocol for detecting the presence of water borne pathogens and indicator microorganism including bacteria from water samples of environmental isolates/niches	Life sciences/ biosciences & engineering	Medical Biotechnology, Biomed Products, Medical Healthcare, Diagnostics	Yes
Degradation of oil	Knowhow for	Life sciences/	Petrochemicals	Yes

using consortium of Pseudomonas Bacteria	biodegradation of oil using consortia of various kind of Pseudomonas bacteria whose growth cycle was controlled appropriately for enhancing the degradation capability	biosciences & engineering	and Petroleum	
A gas-liquid separator for measuring metal hydride	An easy to fabricate and cost effective solution for measuring concentration of metal hydrides from environmental samples, which can be used for feeding the volatile hydrides of metals to instruments like atomic absorption spectrophotometer, bioreactors or any special in-situ reactor systems	Physical sciences & engineering	Computing & Electronic Devices, Instrumentation	Yes

<b>Title</b>	<b>Technology / Product / Process / Knowhow</b>	<b>Technology Area</b>	<b>Industry Sector</b>	<b>Is patent part of licensing?</b>
Automated, digital computing methods for determination of sub-terrain basement depth of sedimentary rock	Digitally implemented method for automatic optimization of gravity fields obtained from 3-d density interfaces using depth dependent density.	Mathematical/computational sciences & engineering	Computing & Electronic Devices, Instrumentation	Yes
An electromagnetic device for geophysical mineral, underground water exploration and mapping of geological subsurface	Moving Source Dipole Electromagnetic Exploration Device for Deeper and Poorer conductors and a Method of Detection of Such Conductors	Physical sciences & engineering	Computing & Electronic Devices, Instrumentation	Yes
Method of Short term Forecasting of Moderate Size Earthquakes	A digital computer implemented method for accurate forecasting of a hypocenter of future moderate size earthquakes.	Mathematical/computational sciences & engineering	Computing & Electronic Devices, Instrumentation	Yes
Selective recording of only SH waves in reflection seismology for Hydrocarbon	Method for selective recording, computing of	Physical sciences & engineering	Computing & Electronic Devices, Instrumentation	Yes

exploration	SH waves and design of an array of sensors to filter out all non SH waves			
Method for the stochastic analysis to quantify the earths subsurface heat flow	Stochastic Analytical Solution to Quantify the Earths sub-surface Heat Flow	Physical sciences & engineering	Energy, Fuels	Yes
Analytical solution and strategy for its digital implementation for the prediction of water table variation	Method of predicting, analytical solution & its digital implementation for the assessment of the dynamic behavior of water table in an anisotropic unconfined aquifer having a general time-varying recharge rate from multiple rectangular recharge basins	Mathematical/ computational sciences & engineering	Computing & Electronic Devices, Instrumentation	Yes
A process and device for geophysical resource exploration	Development of a process and device for the measurement of spectral induced polarization response using Pseudo Random Binary Sequence (PRBS) current source for mining, hydrocarbon and	Physical sciences & engineering	Computing & Electronic Devices, Instrumentation	Yes

	ground water exploration.			
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<b>Title</b>	<b>Technology / Product / Process / Knowhow</b>	<b>Technology Area</b>	<b>Industry Sector</b>	<b>Is patent part of licensing?</b>
A software for decreasing metal casting rejection	Predict possible shrinkage defects in metal casting design using CFD	Mathematical/computational sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	No
Fiber poly wood with novel properties for furniture and other industrial applications	Fibre poly wood with fire and termite resistant properties	Chemical sciences & engineering	Natural Resources, Water, Environment, Sustainability	No
Coir-Rubber-Composites as novel, construction materials	Knowhow to manufacture a range of eco-friendly and durable construction products based on Coir-Rubber-Composites	Chemical sciences & engineering	Natural Resources, Water, Environment, Sustainability	No
Family size household waste treatment system cum biogas plant	A household waste treatment system to produce organic fertilizer for agriculture applications and to produce biogas	Life sciences/ biosciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	Yes
Novel non-toxic, colored inorganic pigments for surface coating applications	A range of novel, safe rare earth based pigments that can be used for surface coating applications and processes for synthesizing them	Chemical sciences & engineering	Chromophoric Materials, Dyes, Pigments, Colorants	Yes
Technology for processing fresh ginger for value added products.	An innovative technology to produce fresh flavors, oleoresins and active principles from green	Life sciences/ biosciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing &	No

	spices such as ginger turmeric, chilli and pepper.		Secondary Agriculture	
Swing Technology for commercial processing of spices	Technology to manufacture spice oils, oleoresins and active constituents with flexibility to process fresh and dry spice in same plant	Life sciences/ biosciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	Yes
Technology for white pepper production	Inexpensive and value added process to produce white pepper from green and black pepper	Life sciences/ biosciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	Yes
Technology for fresh chilli processing plant	Technology for fresh chilli processing plant to produce high color value added products	Physical sciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	No
Palm oil extraction technology	Technology to extract palm oil to produce value added products	Chemical sciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	
Separation of sesame oil lignan for nutraceutical applications	Process for separation of sesame oil lignan for nutraceutical applications	Chemical sciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	
Technology for production of phytosterols from	Technology for production of phytosterols from	Chemical sciences & engineering	Agriculture, Agro-biotech, Agro-products,	Yes



sunflower, soybean oil deodorizer distillate	sunflower, soybean oil deodorizer distillate		Fertilizers, Food processing & Secondary Agriculture	
Biofiltration for industrial odour control	An effective process for removal of industrial odour using biofilters	Chemical sciences & engineering	Natural Resources, Water, Environment, Sustainability	Yes
Synthetic rutile technology	An environment-friendly technology for manufacture of synthetic rutile	Chemical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	Yes
Technology for extraction of banana fibre from left over trunk	A process for the extraction of a solid and fibrous product from natural matrices of plant	Chemical sciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	Yes
Flux-bonded fly ash technology	Flux-bonded fly ash technology to manufacture bricks and tiles	Physical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	
Modular UASB for anaerobic waste water treatment	Technology for modular UASB for anaerobic treatment of soluble wastewaters	Chemical sciences & engineering	Natural Resources, Water, Environment, Sustainability	No
BFBR - A new generation high rate anaerobic reactor for waste-water treatment	Design of a new anaerobic reactor for treatment of effluents with high COD	Chemical sciences & engineering	Natural Resources, Water, Environment, Sustainability	Yes
Self-cleaning, scratch resistant, transparent, water repellent protective coating for ceramic and glass	Self cleaning coatings suitable for flat glass panels, curved glass, all types of ceramic tiles, ceramic sanitary ware, automobile glass	Physical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	No

PCNSL prepolymers	Process to manufacture a resin from Cashew Nut Shell Liquid	Chemical sciences & engineering	Polymers, Plastics, Elastomers, Fibers, Adhesives, Paints, Specialty Polymers, Natural Polymers, Fibers and Leather	No
Currency counterfeit fluorescent material.	Fluorescent material for currency counterfeit detection.	Chemical sciences & engineering	Electronics, Photonics, Magnetics	Yes
Biomethanation for mango waste treatment	Environment friendly process to utilize mango waste to generate biomethane	Life sciences/ biosciences & engineering	Natural Resources, Water, Environment, Sustainability	No
Municipal Solid Waste(MSW) Treatment technology	A proven, efficient technology for biogas production from MSW using a combination of Leach Bed and UASB technology	Chemical sciences & engineering	Natural Resources, Water, Environment, Sustainability	No
Production of novel plant peroxidase from a plant cell/tissue culture.	A novel extra-cellular peroxidase enzyme with higher enzymatic activity, and a process for the preparation of such peroxidase, from a plant cell culture of Neem ( <i>Azadirachta indica</i> ) and Nirgundi ( <i>Vitex negundo</i> ).	Life sciences/ biosciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	Yes
Process for the production of a bioactive pigment, violacein and its derivatives deoxyviolacein from chromobacterium	A process for enhanced production separation and purification of violacein and its derivatives (deoxyviolacein)	Life sciences/ biosciences & engineering	Medical Biotechnology, Biomed Products, Medical Healthcare, Diagnostics	Yes

sp.	containing natural bioactive pigment using a new biologically pure isolate of Chromobacterium sp.			
A cost effective process for the production of liquid crystalline homo and copolyesters	A process for the preparation of liquid crystalline copolyester of formula hydroxyphenylacetic acid and 4-hydroxybenzoic acid which give copolyesters of better melt processability and thermal stability with the expected nematic meso phase for their application in plastic, electronic-computer and biomedical industries.	Chemical sciences & engineering	Polymers, Plastics, Elastomers, Fibers, Adhesives, Paints, Specialty Polymers, Natural Polymers, Fibers and Leather	Yes
A method of preparation of modified bioadsorbent materials for the removal of toxic metal ions and other compounds from water	New immobilized biosorbents, and a method for the preparation of a modified bioadsorbent particles for the removal of toxic metals and other compounds from water.	Life sciences/ biosciences & engineering	Industrial Biotechnology	Yes
H <sub>2</sub> S inhibition for anaerobic reactors	Anaerobic technology for sulphate containing effluents	Life sciences/ biosciences & engineering	Natural Resources, Water, Environment, Sustainability	Yes
A novel cyclic donor-acceptor conjugate as a	A supramolecular fluorescent marker comprising a cyclic	Life sciences/ biosciences & engineering	Chromophoric Materials, Dyes,	Yes

fluorescent marker.	donor-acceptor conjugate, its salt or a pharmaceutical acceptable derivatives in combination with a highly fluorescent indicator is useful as supramolecular probe for the detection and quantification of nucleotides in buffer and biological fluids.		Pigments, Colorants	
Compact Jet Loop Reactor for High Rate Activated Sludge Wastewater treatment	An innovative reactor that can reduce the operating and capital costs of a high rate activated sludge process	Life sciences/ biosciences & engineering	Natural Resources, Water, Environment, Sustainability	No
A process for the production of micronutrients rich rice bran oil using supercritical carbon dioxide extraction	A novel ecofriendly process and health friendly product by the combined extraction and refining of nutritionally superior rice bran oil of maximum yield, using Supercritical Carbon dioxide (SC-CO <sub>2</sub> ) extraction	Life sciences/ biosciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	Yes
A plant extract based anti-diabetic pharmaceutical formulation with extraction process and method for treatment of diabetes.	A novel anti-diabetic formulation, along with a process for obtaining the anti-diabetic agent from the plant <i>Humboldtia decurrens</i> , and a method for treatment of diabetes.	Life sciences/ biosciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	Yes
Single step process for the synthesis of	A single step process for the	Chemical sciences &	Inorganic and Hybrid	Yes

nanoparticles of ceramic oxide powders	synthesis of ultrafine nanoparticle powder of phase pure ceramic oxides of a single or a multi-component system comprising one or more metal ions as aqueous and non-aqueous (using metal salts that are insoluble even in water) precursors.	engineering	materials, Inorganic materials	
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<b>Title</b>	<b>Technology / Product / Process / Knowhow</b>	<b>Technology Area</b>	<b>Industry Sector</b>	<b>Is patent part of licensing?</b>
Autonomous Vertical Profiler (AVP) for profiling coastal waters	Autonomous Vertical Profiler (AVP) is an indigenously developed breakthrough in marine instrumentation which offers an in-situ, self-propelled, automated, fast, cost effective, optimized approach for high resolution vertical profiling of salinity, temperature, chlorophyll, turbidity, and dissolved oxygen in shallow coastal zone waters columns.	Physical sciences & engineering	Natural Resources, Water, Environment, Sustainability	Yes
Integrated Coastal Observation Network (ICON) with near real time reporting internet accessible weather station	A network of real/near-real time reporting sea-level, sea-state and surface meteorological stations providing high quality data sets will lead to improved	Mathematical/computational sciences & engineering	Natural Resources, Water, Environment, Sustainability	

	operational utilities and more efficient forecasting of results			
Marine pigmented bacteria for antioxidant potential	Decolourization and detoxification of molasses spent wash from distilleries using marine fungi.	Life sciences/ biosciences & engineering	Natural Resources, Water, Environment, Sustainability	Yes
Computational sea floor classification on basis of surface roughness	A novel system for seafloor classification using artificial neural network (ANN) hybrid layout with the use of unprocessed multi-beam backscatter data	Mathematical/ computational sciences & engineering	Computing & Electronic Devices, Instrumentation	Yes
Controlled thruster driven Autonomous Underwater Vehicles (AUV) for oceanographic exploration and profiling	AUVs are programmable, self-propelled robot platforms with on-board computers, power packs and vehicle payloads that enable automatic control, navigation and guidance of the vehicle between different coordinates in the 3D volume of the ocean for oceanographic exploration.	Physical sciences & engineering	Computing & Electronic Devices, Instrumentation	Yes
Marine bacteria to decolorize and detoxify textile dyes	Decolorization and Reuse of a Textile Dye	Life sciences/ biosciences & engineering	Industrial Biotechnology	

	(VB-B) by a Marine Bacterium <i>Shewanella decolorationis</i>			
Novel Perfuming and flavoring agent	Novel molecule as perfuming and flavoring agent with new high yield synthetic process	Chemical sciences & engineering	Organic Chemicals, Fine Chemicals, Intermediates, Feedstocks	Yes
Melanin from sponge associated bacteria for UV protective cosmeticeuticals	Isolation of bioactive melanin at significant yield from marine sponge bacteria	Life sciences/ biosciences & engineering	Chromophoric Materials, Dyes, Pigments, Colorants	
Chemically modified coir pith with enhanced oil adsorption	Functionalized coir pith for enhanced physical adsorption of oil, in use for oil spill cleanup	Life sciences/ biosciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	



<b>Title</b>	<b>Technology / Product / Process / Knowhow</b>	<b>Technology Area</b>	<b>Industry Sector</b>	<b>Is patent part of licensing?</b>
Low friction and adjustable hardness nano-composite coating on various types of substrates	Cutting tool industry, automobile component, electrical heavy machines, any friction or wear affected component or machine	Physical sciences & engineering	Defense, Aerospace, Atomic Energy (Strategic)	Yes
A new type of steel with high erosion and cavitation damage resistance	Heavy engineering equipment affected by erosion assisted corrosion like turbines, underwater application component affected by cavitation damage, rotor blades of high speed boats etc.	Physical sciences & engineering	Defense, Aerospace, Atomic Energy (Strategic)	Yes
Recovery of valuable cobalt and lithium from discarded batteries of mobile phone	Process for recovery of substances from electronic waste	Physical sciences & engineering	Computing & Electronic Devices, Instrumentation	Yes
A process for the recovery of neodymium as a value added product from waste hard disk of personal computers.	Recovery of precious metals from e-waste of interest to electronic equipment manufacturers, electronic waste recyclers	Chemical sciences & engineering	Computing & Electronic Devices, Instrumentation	Yes
Recovery of Gold from Waste	Discarded mobile phones can now be a valuable asset since this	Chemical sciences & engineering	Electronics, Photonics, Magnetics	No

	technology will help to recover gold from their waste PCB			
Synthetic Nano-crystalline bone graft.	A process for the synthesis of biphasic granules helps in bone mineralization.	Life sciences/ biosciences & engineering	Medical Biotechnology, Biomed Products, Medical Healthcare, Diagnostics	No
Hydroxyapatite nanopowders with biologically equivalent function in bones	Biomimetic nano bioceramics for bone graft	Life sciences/ biosciences & engineering	Medical Biotechnology, Biomed Products, Medical Healthcare, Diagnostics	No
Polymer-hydroxyapatite load bearing nanocomposites	Biphasic calcium phosphate nano-bio ceramic for dental and orthopedic applications	Life sciences/ biosciences & engineering	Medical Biotechnology, Biomed Products, Medical Healthcare, Diagnostics	No
Biocompatible water soluble iron based fluid for biomedical application	A biomimetic process for the synthesis of aqueous Ferro-fluids for biomedical applications	Life sciences/ biosciences & engineering	Medical Biotechnology, Biomed Products, Medical Healthcare, Diagnostics	Yes
Microbiologically assisted extractive metallurgy of zinc from mine wastes	Bioleaching of zinc tailings and biosynthesis of Zinc Oxide from mine wastes for bio-production of zinc oxide from mine wastes	Life sciences/ biosciences & engineering	Natural Resources, Water, Environment, Sustainability	
Device for health monitoring of metallic structures such as bridges, automobiles, castings, pillars,	Devices to monitor the structural health of structures or components which are in-service and intended to use for	Physical sciences & engineering	Computing & Electronic Devices, Instrumentation	Yes

beams etc.	an extended period			
A novel flux which reduces zinc wastage while zinc coating process on steel	Increase zinc utilization factor in galvanizing process with better coating properties	Chemical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	Yes
Portable testing machine for metal structures using ball indentation method	A machine to assess the health/integrity of critical engineering components for evaluation of mechanical properties	Physical sciences & engineering	Electronics, Photonics, Magnetics	Yes
An improved process for producing high purity copper powder from copper wastes scrap	Knowhow to recover pure copper from non functional machines, scrap, wires etc	Physical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	Yes
Recovery of tungsten as Tungstic acid from hard and soft tungsten-copper alloy scraps and wastes	Knowhow to obtain recovered tungstic acid for use in die industry and for production of tungsten powder	Chemical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	Yes
Innovative use of waste slag and fly ash for manufacturing quick setting geopolymers	To make pavement blocks, self-glazed floor and wall tiles from using industrial waste cementitious material and geopolymer	Chemical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	Yes
New in-situ process to produce super-hard high temperature aluminium zirconium boride composite material	To use super-tough and temperature resistant Al-Zr-Ti composite material for crucibles, cutting tools, bulletproof armors	Physical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	Yes
A process for the preparation of Zirconium diboride powder	To manufacture strategic ZrB <sub>2</sub> powder using cost effective indigenous	Physical sciences & engineering	Defense, Aerospace, Atomic Energy (Strategic)	Yes

	process			
New type of spray to preserve original shine and luster of Silver and Copper articles	Production of anti-tarnishing lacquer for dip, brush coating liquid and spray version	Chemical sciences & engineering	Chromophoric Materials, Dyes, Pigments, Colorants	Yes
A process for production of high purity tungsten metal powder, Yellow Tungsten Oxide & Other Metal Salts from Metal Scraps/Heavy Alloy Swarf	To recover tungsten in the form of metal powder and oxide salts	Chemical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	No
Electrolytic colouring of titanium and its alloys for aesthetic and jewellery applications	To produce colored surfaces of titanium metal and its alloys	Chemical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	No
Simple process for low-grade phosphate rock upgradation	To produce phosphate concentrate from unexploited rock phosphates for use in manufacturing of phosphoric acid and phosphatic fertilizers	Chemical sciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	No
Rust stabilizer base coating for rusted/corroded surfaces	To manufacture stabilizer solution by using phosphoric acid, alcohols, dichromates	Chemical sciences & engineering	Chromophoric Materials, Dyes, Pigments, Colorants	No
Technology for de-ashing of high ash Indian coal	To remove ash from Indian coal so that it can be used for metallurgical use	Chemical sciences & engineering	Energy, Fuels	No
A new type of Nickel coating for corrosion and wear resistance applications	To coat nickel on automobile, textile components using simple electroless process	Chemical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	No

High purity iron oxide from industrial waste	To extract pure iron oxide particles of very fine size and adjustable shape	Chemical sciences & engineering	Chromophoric Materials, Dyes, Pigments, Colorants	No
Certified reference materials for metallurgical industries	Process to make these ultra pure standard reference materials	Chemical sciences & engineering	Chromophoric Materials, Dyes, Pigments, Colorants	No
A new cost effective method to utilise dust and fine particles from iron and steel making industry	To make fluxed and sintered pellets from waste dust from iron ore mines	Physical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	Yes
Cost-effective recovery of valueable Nickel from waste nickel catalyst	To extract nickel from waste catalyst used in chemical and metallurgical industries	Chemical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	No
Simple and cost-effective production Nickel Sulpahte	To make nickel sulpahte from spent Ni-catalyst waste	Chemical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	No
A new process for value additional and beneficiation of Low grade Baryte Ores	To make use of low grade barium containng ores	Physical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	No
Simple process for preparation of a human bone mineral like material as an injectable substitute for bone tissue engineering.	Rapidly self-setting, high compressive strength, biomimetic nanohydroxyapatite with a simple single-step injection clinical application, along with an industrially scalable, energy efficient process for the preparation	Life sciences/ biosciences & engineering	Medical Biotechnology, Biomed Products, Medical Healthcare, Diagnostics	Yes

	of the same using cost effective raw materials.			
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Title	Technology / Product / Process / Knowhow	Technology Area	Industry Sector	Is patent part of licensing?
Afterglow phosphor for marking (in dark) applications	Indigenously created non-radioactive and non-toxic luminescent material activated by visible light, with afterglow time ranging from half an hour to ~12 hr for highlighting critical objects in the dark.	Chemical sciences & engineering	Chromophoric Materials, Dyes, Pigments, Colorants	Yes
Nanocomposites to shield against electromagnetic radiation	Graphene $\alpha\epsilon^s$ aqueous ferrofluid in cement matrix based composite material that absorbs radio waves to microwaves to confer shielding against electromagnetic radiation from electronic sources such as mobile phones, wireless Internet and cell phone towers.	Chemical sciences & engineering	Polymers, Plastics, Elastomers, Fibers, Adhesives, Paints, Specialty Polymers, Natural Polymers, Fibers and Leather	Yes
Digital blood glucose monitoring device	This breakthrough technology is the	Physical sciences & engineering	Medical Biotechnology, Biomed	Yes

	first Indian Amperometric digital biosensor to be developed.		Products, Medical Healthcare, Diagnostics	
Carbon-carbon composites for aerospace applications	Indigenous carbon-carbon composites based nanomaterial for aircraft brake discs and aviation grade carbon brushes.	Physical sciences & engineering	Polymers, Plastics, Elastomers, Fibers, Adhesives, Paints, Specialty Polymers, Natural Polymers, Fibers and Leather	No
Novel form of carbon - a light weight foam for applications in electronics and Li-ion batteries	Carbon (graphite) based light weight, porous yet rigid, high performance structural engineering material with high surface area, specific thermal/electrical conductivity.	Physical sciences & engineering	Polymers, Plastics, Elastomers, Fibers, Adhesives, Paints, Specialty Polymers, Natural Polymers, Fibers and Leather	Yes
Electric sensor for rapid humidity measurement	Fast response time, short recovery time, cost effective, electrical resistance based sensor to detect change in relative humidity.	Physical sciences & engineering	Computing & Electronic Devices, Instrumentation	No
Self-healing corrosion resistant coating for marine environments	Electrically conducting polymer based abrasion and corrosion resistant coatings for metal structures exposed to	Chemical sciences & engineering	Polymers, Plastics, Elastomers, Fibers, Adhesives, Paints, Specialty Polymers, Natural Polymers, Fibers	Yes



	brackish / marine environments		and Leather	
Drug and its preparation for Thalassemia treatment in children	Preparation process and iron chelating pharmaceutical formulation for treating Thalassemia in children at a very low cost	Life sciences/ biosciences & engineering	Pharmaceuticals, Bulk Drugs, Formulations	Yes
Light weight orthopedic supports for physically disabled patients	Half ring external fixator supports made from advanced carbon composite as orthopedic aids, to correct both congenital bone deformities and those acquired due to polio, bone infection and accidents.	Life sciences/ biosciences & engineering	Medical Biotechnology, Biomed Products, Medical Healthcare, Diagnostics	
A PC plug-in portable, light weight device for high quality ECG recording	A portable, self-calibrating ECG device that can be plugged into a computer for remote medical diagnosis	Life sciences/ biosciences & engineering	Medical Biotechnology, Biomed Products, Medical Healthcare, Diagnostics	Yes
Self-cleaning and scratch resistant glass coatings for architectural use	High quality, thin photo-active (self-cleaning), scratch resistant titanium dioxide film coatings on large area glass substrates using indigenously developed, economical manufacturing technology for large scale	Chemical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	

	production.			
Novel magnetic fluid as bearing material for wind turbines	Water based ferrofluid as a bearing for wind energy harvesting system to create useful electric power.	Physical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	No
Polymer membrane for removal of harmful viruses from drinking water.	A process for preparing conducting polymer impregnated porous substrate membrane useful as a filter for capturing viruses in water.	Chemical sciences & engineering	Agriculture, Agro-biotech, Agro-products, Fertilizers, Food processing & Secondary Agriculture	Yes
A novel material for efficient ultra-sensitive and accurate transducers	Measurement of weight, pressure, any transducer involving capacitors	Physical sciences & engineering	Computing & Electronic Devices, Instrumentation	Yes

Title	Technology / Product / Process / Knowhow	Technology Area	Industry Sector	Is patent part of licensing?
Vertical Shaft Kiln-Mini Cement Plant for Cement Manufacture	Vertical Shaft Kiln (VSK) technology has been developed for cement manufacture of different plant capacities ranging from 20-100 TPD. This technology is viable even for a place having small deposits of raw materials.	Engineering	Cement, Construction, Engineering	
Flow Improver	A wide range of flow improvers to suit the Indian crude oils. Flow improvers reduce the pour point, viscosity, and yield value and help in easy restart in case of shut down in the pipeline.	Chemical and Engineering	Petroleum, refining	
Pesticides: Phosphamidon and Quinalphos	Phosphamidon an important organo-phosphorus synthetic insecticide extensively used in various crops. It is particularly effective against	Chemical	Agrochemicals	

	<p>aphids, stem borer, leaf hoppers, mite thrip, grass-hoppers, ball-worms, white flies etc.</p> <p>Quinalphos: It is a contact and stomach insecticide and effective against both biting and sucking insects as well as mites and plant hoppers.</p>			
Mushroom Cultivation	<p>Cultivation process and technology for edible mushroom as well as spawn production technology. At present CSIR maintains 11 species of oyster mushroom, 2 species of European white button mushroom and 3 species each of paddy straw and medicinal mushroom.</p>	Biological	Agriculture	
Low Dust Chalk Pencil	<p>Process for low dust chalk pencil for writing on black board</p>	Chemical and Material	Engineering, Material	
Liquid Deodorant Cleaner	<p>An eco-friendly deodorant cleaner useful for Households, hospitals,</p>	Chemical science	Chemical, hospital, hotel	

	clinical centre, hotels & restaurants			
Green Tea Polyphenols from Assam Tea	Costly antioxidant used in various medicines and functional food	Chemical science	Drugs & Pharma	
Herbal Agarbatti with mosquito repellent property	Know-how for Indigenous plant based Agarbatti which is Eco- friendly mosquito repellent	Biological science	Herbal, Agarbatti	
High Strength Proppants	A proppant is a solid material designed to keep an induced hydraulic fracture open, during or following a fracturing treatment. It is added to a fracking fluid which may vary in composition depending on the type of fracturing used. The developed product meets the specification of American Petroleum Institute and ONGCL.	Material	Engineering, Material, mining	

<b>Title</b>	<b>Technology / Product / Process / Knowhow</b>	<b>Technology Area</b>	<b>Industry Sector</b>	<b>Is patent part of licensing?</b>
Precast light weight panels for wall and roof elements	Technology to manufacture precast, light weight panels that can be assembled on site to build walls and roofs	Physical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	No
Laced composite systems	Laced Steel Concrete Composite (LSCC) systems for controlling explosive spalling	Physical sciences & engineering	Defense, Aerospace, Atomic Energy (Strategic)	Yes
An innovative cement concrete which increases lifespan of buildings and other structures	A process for production of natural rubber latex based cement concretes	Physical sciences & engineering	Natural Resources, Water, Environment, Sustainability	Yes
Seismic base isolators and passive energy dissipation devices	Processes to manufacture passive energy dissipation devices for civil structures to limit damage caused by earthquakes	Physical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	Yes
Ferrocement water tanks and other products	Knowhow for manufacturing ferrocement based products such as water tanks and cupboards	Physical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	No

Concrete manhole covers	Knowhow for fibre reinforced concrete manhole covers	Physical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	No
Slurry Infiltrated Fibrous Concrete (SIFCON)	Special concrete material suitable for underground shelters and ammunition storage structures	Physical sciences & engineering	Defense, Aerospace, Atomic Energy (Strategic)	No
Ultra High Performance Fibre Reinforced Concrete (UHPFRC) and Reactive Powder Concrete	High performance concrete materials for special applications	Physical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	No
Structural Grade Geopolymer Concretes (GPC)	Concrete materials for chemical and temperature resistant applications	Chemical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	No
Fabric Reinforced Concrete (FABcrete)	Innovative building material for versatile construction applications	Chemical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	No
Self compacting concrete double under-reamed piles	Knowhow to manufacture self compacting concrete double under-reamed piles	Physical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	No
Fly ash aggregate	Knowhow to manufacture fly ash aggregate	Chemical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	No
Brick funicular shells for roofing	Knowhow for brick funicular shells that can be used for roofing	Physical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	No

Partially prestressed concrete poles	Knowhow to manufacture partially prestressed concrete poles using portable bed	Physical sciences & engineering	Inorganic and Hybrid materials, Inorganic materials	No
Performance evaluation of railway bridges	Services for performance evaluation of railway bridges using innovative methodology	Physical sciences & engineering	Computing & Electronic Devices, Instrumentation	No
Igloo structures for explosive storage	Designs for blast resistant igloo structures for explosive storage	Physical sciences & engineering	Defense, Aerospace, Atomic Energy (Strategic)	No
Sensors for Structural Health Monitoring	Know-how for Smart Piezo Impedance measuring Embedded Sensor (SPIESE ) for localized structural changes & long term health monitoring of massive concrete structures. Incipient structural fault, such as cracks in concrete and loosening of bolts in steel can be detected and remotely controlled	Physical sciences & engineering	Electronic Devices, Instrumentation	
Smart Energy Harvesters	Know how for smart Energy harvesters from ambient structural	Physical sciences & engineering	Electronic Devices, Instrumentation	



	vibration for seismic mitigation and health monitoring of civil infrastructure			
Distributed damage diagnostic techniques for sustainable SHM using Wireless Smart Sensor Network (WSSN)	A comprehensive distributed software technology based on Imotes and Tiny OS environment for sustainable SHM using smart sensor networks for damage diagnostics and decentralization schemes for Structural Health Monitoring	Physical sciences & engineering	Electronic Devices, Instrumentation	

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