

**GOVERNMENT OF INDIA  
MINISTRY OF SCIENCE AND TECHNOLOGY  
DEPARTMENT OF SCIENTIFIC AND INDUSTRIAL RESEARCH  
LOK SABHA  
UNSTARRED QUESTION NO. 2176  
(TO BE ANSWERED ON 12.03.2025)**

**FUNDS FOR CSIR PROJECTS AND LABORATORIES**

**2176. DR. T SUMATHY ALIAS THAMIZAHACHI THANGAPANDIAN:**

**Will the Minister of SCIENCE AND TECHNOLOGY be pleased to state:**

- (a) whether the Government has taken adequate steps to provide adequate funds for CLRI and other research projects and laboratories of CSIR in Tamil Nadu;**
- (b) if so, the details thereof;**
- (c) the research projects undertaken during the last ten years and at present under the aegis of the Department of Science and Technology; and**
- (d) whether the Government has declined to provide several projects from various universities and research centres in Tamil Nadu due to paucity of funds and if so the details thereof, if not, the reasons therefor?**

**ANSWER**

**MINISTER OF STATE (INDEPENDENT CHARGE)  
SCIENCE AND TECHNOLOGY AND EARTH SCIENCES  
(DR. JITENDRA SINGH)**

- (a)&(b) Yes, Sir. Adequate funds have been allocated to the constituent laboratories/ institutes of Council of Scientific and Industrial Research (CSIR) located in Tamil Nadu including CSIR-Central Leather Research Institute (CSIR-CLRI) for carrying our R&D activities. The details of funds allocated to constituent laboratories/ institutes of CSIR located in Tamil Nadu for the last ten years and the current year is placed at Annexure-I**
- (c) The research projects undertaken in the last 10 years and the current year under the aegis of the Department of Science and Technology in the constituent laboratories/ institutes of Council of Scientific and Industrial Research (CSIR) located in Tamil Nadu is placed at Annexure-II**
- (d) No, Sir. Projects from various universities and research centres in Tamil Nadu have not been declined due to paucity of funds.**

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## Annexure-I

The details of funds allocated to constituent laboratories/ institutes of CSIR located in Tamil Nadu for the last ten years and the current year are as under:

(Rs. in Crore)

| Lab Name  | Financial Year |         |         |         |         |         |         |         |         |         |          |
|---|----------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|----------|
|   | 2014-15        | 2015-16 | 2016-17 | 2017-18 | 2018-19 | 2019-20 | 2020-21 | 2021-22 | 2022-23 | 2023-24 | 2024-25* |
| <a href="#">CSIR-Central Electrochemical Research Institute (CSIR-CECRI), Karaikudi</a> | 90.534         | 130.230 | 119.630 | 125.297 | 109.003 | 122.327 | 125.068 | 120.667 | 154.304 | 173.512 | 176.545  |
| <a href="#">CSIR-Central Leather Research Institute (CSIR-CLRI), Chennai</a>            | 81.390         | 102.490 | 116.000 | 121.923 | 112.221 | 111.017 | 107.705 | 125.769 | 139.758 | 156.299 | 158.237  |
| CSIR-Madras Complex, Chennai  | 11.977         | 12.600  | 15.191  | 19.135  | 20.547  | 18.746  | 19.736  | 24.202  | 24.878  | 26.029  | 28.850   |
| CSIR-Structural Engineering Research Centre (CSIR-SERC), Chennai                        | 47.545         | 59.230  | 45.484  | 67.695  | 68.195  | 81.909  | 64.054  | 70.122  | 78.334  | 82.606  | 98.634   |

\* Allocation made upto 28.02.2025

## Annexure-II

**The research projects undertaken in the last 10 years and at present in CSIR laboratories/institutes located in Tamilnadu under the aegis of the Department of Science and Technology:**

| S. No | Title of Project  | Project Initiation/<br>Launch Year | Project Completion<br>Year | Project Cost<br>(Rs. In lakh) |
|-------|---|------------------------------------|----------------------------|-------------------------------|
| 1.    | An Attempt to Degrade Thermocolusing Selective Microorganisms Under Inspire Fellowship IF 150099  | 2014                               | 2019                       | 20.50                         |
| 2.    | Prospects and Challenges of reduced graphene Nanomaterial using Microbial Species and its application in Biomedical Field Under Inspire Fellowship IF 150123                      | 2014                               | 2019                       | 20.50                         |
| 3.    | Remediation of Saline Soil by Green Methods Under Inspire Fellowship IF 150057  | 2014                               | 2019                       | 20.50                         |
| 4.    | Nanofiber delivery of molecules for wound therapy Under Inspire Fellowship IF 140983  | 2014                               | 2019                       | 20.50                         |
| 5.    | Preparing tailor made protein biosensor through expanding and Engineering the genetic code.   | 2014                               | 2017                       | 23.00                         |
| 6.    | Physico chemical investigations on self aggregation dynamics and microstructure of surfactant - block copolymer systems. ( Under Women Scientist Scheme A WOS-A)                  | 2014                               | 2017                       | 20.46                         |
| 7.    | Supramolecuar functionalized of piconjugated molecules with semiconducting nanorods for optoelectronic applciations. ( INSPIRE Faculty Award Scheme)                              | 2014                               | 2019                       | 46.30                         |
| 8.    | Understanding role of viscoelastic ohases in secondary strcutural features and folding patterns   | 2014                               | 2017                       | 30.63                         |
| 9.    | C.V.Raman International Fellowship for African Researchers 2013-14 (under Post Doctoral Fellowship ) funded by DST-FICCI  | 2014                               | 2017                       | 2.60                          |
| 10.   | Microbial Enzyme Technology for Industrial Applications (DST INSPIRE Fellowship under INSPIRE Programme for pursuing full-time doctoral (Ph.D) Program.[IF NO:140160]             | 2014                               | 2019                       | 13.48                         |
| 11.   | Polymer Nanostructure materials for energy storage appication (Full time doctoral (Ph.D) Prm under the AORC Scheme of the INSPIRE Program.[IF NO:140179]                          | 2014                               | 2019                       | 13.48                         |
| 12.   | Development and delivery of stress induced microbial siderphore for wound healing (under Women Scientist Scheme A (WOS-A)   | 2014                               | 2017                       | 19.79                         |
| 13.   | Studies on Quercetin - INP Chitosan folic acid (QT-INP-CF) as a multifunction nano composite in the treatment of prostrate cancer-cells ( under Women Scientist Scheme A (WOS-A)) | 2014                               | 2017                       | 28.50                         |
| 14.   | Copper catalysed synthesis and photo physical properties of fluorinone based spiro Heterocyclic Compounds (DST-INSPIRE Fellowship) IF NO:131175                                   | 2014                               | 2019                       | 12.52                         |
| 15.   | Development of Polyurethane based Biodegaradable soles and process optimization thereof   | 2015                               | 2017                       | 68.39                         |
| 16.   | Biogeochemical Cycling, micribial diversity and finding novel enzymes from the fire and match works drainage deposit in Sivakasi  | 2015                               | 2018                       | 46.16                         |
| 17.   | Synthesis and Characterization of Amphiphillic PEG foldamer for mimicking Stimuli-responsive lon pump (Start-up Research Grant (Young Scientists)- Chemical Sciences of SERB)     | 2015                               | 2018                       | 20.30                         |

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|-----|---|------|------|-------|
| 18. | Efficient site-specific conjugation of biologically active proteins with non-immunogenic polymers by novel bio-orthogonal chemistry approaches (An India-Belarus Joint Science & Technology Programme ) | 2015 | 2017 | 16.42 |
| 19. | Exploring microbial diversity in traditional fermentatins from India and Argentina and its potential for bioethanol production (An Indo-Argentina Programme of Co-operation)                            | 2015 | 2018 | 12.45 |
| 20. | Development of nano based tools for medical dosimetry and analysis if miRNA expression profile for early detection of radiation induced breast cancer   | 2015 | 2018 | 21.56 |
| 21. | Electrospinning of nanofibrous scaffold impregnated with drug loaded layered double hydroxides for tissue engineering application under Women Scientist Scheme A (WOS-A)                                | 2015 | 2018 | 18.15 |
| 22. | Development of Synthetic methods for the Isatin , Bipyradine and Ferrocen: Synthesis of novel bio-Active and flourescent hetrocyclic molecules  | 2015 | 2019 | 31.64 |
| 23. | Understanding the mechanism of biocide resistance development in leather-borne fungi  | 2015 | 2018 | 18.15 |
| 24. | Design and Development of Two Dimensional Vander Waals Solids and their Applications  | 2015 | 2018 | 42.66 |
| 25. | Approaches towards the synthesis of Biologically  | 2015 | 2017 | 46.16 |
| 26. | Immobilization of Macromolecules on surfaces of silicon and Indium Tin Oxide(ITO)   | 2016 | 2019 | 47.15 |
| 27. | Dual acting methotrexate conjugated oley 1 chitosan coated iron oxide/gold hybrid nanobiocomposites for lung cancer imaging (MRI and CT ) and therapy Under Women Scientist Scheme A (WOS-A)            | 2016 | 2019 | 25.53 |
| 28. | Studies on Leather Solid Waste- Polymer Composites for Acoustic Applications  | 2016 | 2020 | 23.03 |
| 29. | Fibrin Hydrogel incorporated with graphene oxide functionalised superparamagnetic nano-hydroxyapatite as scaffolds for bone repair-In vitro and In vivo study   | 2016 | 2019 | 29.77 |
| 30. | A Novel Strategy for the treatment of Chronic wounds  | 2016 | 2018 | 19.20 |
| 31. | Dual functioning Core-shell scaffold for Biomedical Application   | 2016 | 2018 | 19.20 |
| 32. | Synthesis of Metal oxides loaded nanoporous carbon fibres leather wastes and their applications for the photocatalytic degradation of Chlorophenols   | 2016 | 2019 | 26.62 |
| 33. | Ribosomal Synthesis of Functionalized Congener Bio-nanotubes through expanding the Genetic Code Approach (INSPIRE Fellowship)   | 2017 | 2022 | 19.60 |
| 34. | Bioplastic from Tannery Wastes (INSPIRE Fellowship)   | 2017 | 2022 | 19.60 |
| 35. | Functionalized Prodigiosin Impregnated Composite for the continuous treatment of Antibiotic Resistant Bacteria without bio film formation   | 2017 | 2019 | 17.20 |
| 36. | Metal Complexes based probes for arylamine modified biomolecules  | 2017 | 2020 | 22.86 |
| 37. | Use of nanoparticles as protein aggregation modulators for health care and pharmaceutical applications (India-Swedish (DST-VR) Programme of cooperation in Science & Technology)                        | 2017 | 2020 | 31.77 |

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|-----|--|------|------|--------|
| 38. | Design and Development of Innovative Leather Lifestyle products in combination with ethnic textile material and natural fibres of north eastern part of india for the self-sustainability and socio economic development of rural population in that region (Scheme for young Scientist and technologists) | 2017 | 2020 | 16.90  |
| 39. | Molecular insights into scaffold proteins and their potential application therapeutics   | 2017 | 2022 | 20.50  |
| 40. | Efficacy of Biopolymer Based Nanofibrous Scaffold as Promising Skin care patches   | 2017 | 2019 | 19.20  |
| 41. | π - stacking, conjugated, heterocyclic polymer supports carbon nano (SWCNT/GO/C60) composite materials towards solar cell and suocer capacitor applications  | 2017 | 2019 | 19.20  |
| 42. | Nitrogen, Sulphur Co-doped CeO <sub>2</sub> -TiO <sub>2</sub> as an efficient phoyocatalyst for conversion of Toxic gases into renewable chemicals feedstock's from process Industries   | 2017 | 2019 | 19.20  |
| 43. | Resveratrol-Curcumin dual drug-loaded Nanoparticulate combination therapy:A novel approach to target and treat colorectal cancer   | 2017 | 2023 | 103.49 |
| 44. | Computational Designing of Novel Heterogeneous Photocatalyst for H <sub>2</sub> O Electrolysis   | 2017 | 2019 | 19.20  |
| 45. | Implications of Rare Earth Metal Nanoparticles on structure and assembly of collagen molecules for imparting tunable angiogenic and stem cell differentiation properties for biomaterial applications. (DST Inspire Fellowship)  | 2017 | 2022 | 24.40  |
| 46. | Alkynylated Hybrid Molecules for Near-Infrared and Electroluminescent Applications   | 2017 | 2019 | 38.40  |
| 47. | New water-soluble flourescent probes for the detection of fluoride, ferric and rare earth metal ions   | 2017 | 2022 | 20.50  |
| 48. | Treatment of Tannery Effluents: Custom Designed Membrane separation Approach to reduce the pollution and power load  | 2017 | 2020 | 41.62  |
| 49. | Design and Development of ultrasound assisted leather processing system for large scale application  | 2017 | 2021 | 54.48  |
| 50. | Development of Centrifugal Spun Tissue Engineered Composite Herbal wound Dressing for clinical applications  | 2017 | 2019 | 18.70  |
| 51. | Synthesis of functional polymer for mimicking structure and functions of biological ion channels Under Inspire Fellowship IF 150124  | 2017 | 2022 | 21.24  |
| 52. | Fabrication of a resorbable biomaterial for ocular wound repair  | 2018 | 2022 | 26.80  |
| 53. | Fabrication of Hydrogel Laden with growth factor for Infection related wound healing   | 2018 | 2019 | 19.20  |
| 54. | Themoresponsive N-heterocyclic Carbine (NHC) and related organometallic compounds for catalysis with recyclability   | 2018 | 2023 | 19.60  |
| 55. | New Multipolar Chromophores and their applications   | 2018 | 2021 | 40.14  |
| 56. | Centre for Sustainable Treatment, Reuse and Management for Efficient, Affordable and Synergistic solutions for Water (WATER-IC for SUTRAM of EASY WATER) Work Package: 3.5- Tannery Wastewater Treatment   | 2018 | 2024 | 46.50  |

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| 57. | Centre for Sustainable Treatment, Reuse and Management for Efficient, Affordable and Synergistic solutions for Water (WATER-IC for SUTRAM of EASY WATER)<br>Work Package: 2.4.1- A Point of use single probe multianalyte sensor         | 2018 | 2024 | 45.71 |
| 58. | Designing an Admittance based experimental tool to evaluate mechanical properties and stability of supported lipid bilayers, liposomes, biological cell membranes  | 2018 | 2021 | 28.81 |
| 59. | Fabrication of Biomimetic Interpenetrating Scaffold for enhanced re-epithelialization of burn wounds with minimal scarring Under INSPIRE Scheme  | 2018 | 2023 | 19.60 |
| 60. | Engineered Nanomaterials: New Biomimetic and Catalytic Approaches for Biomedical Applications Inspire Faculty  | 2018 | 2023 | 35.00 |
| 61. | Development and optimization of Performance and Emission Characteristics of CI, SI and Stirling Engine Using Hydrogen Enriched Bio-CNG produced from Anaerobic Co-Digestion with Food Waste, Tannery waste, Stubble waste and STP sludge | 2019 | 2022 | 1.66  |
| 62. | Preparation and application of hybrid mesoporous particles for biomedical applications   | 2019 | 2022 | 21.58 |
| 63. | Ultra-low water pre-tanning and post-tanning technologies for leather making   | 2019 | 2022 | 36.66 |
| 64. | Sequential production of bio fuel, glycerol and protein using pre-tanned leather solid waste   | 2019 | 2024 | 77.37 |
| 65. | DNA Aptamer Conjugated Nano probes for REACH chemicals recognition.  | 2019 | 2023 | 32.93 |
| 66. | Center for waterless Leather Manufacture   | 2019 | 2025 | 70.02 |
| 67. | Synthesis of Bile Acid based thiolate ligand templated noble metal nano clusters and their evaluation in sensing applications - TARE Fellowship  | 2019 | 2022 | 6.70  |
| 68. | Mechanistic Anti-Tumour Activity of vernodalin isolated from Centratherum anthelminticum on colorectal cancer cells - TARE Fellowship  | 2019 | 2022 | 18.30 |
| 69. | Nanonized polydopamine infused amniotic membrane extract for ocular surface treatment and drug delivery (Women Scientist)  | 2019 | 2022 | 26.38 |
| 70. | Nanostructured molecularly imprinted fluorescent polymer for the quantification of catecholamine National Post-Doctoral Fellowship (N-PDF)   | 2019 | 2021 | 26.46 |
| 71. | Synthesis, Characterization and potential Application, studies of novel self-assembled systems based on Gemini surfactants and Macrocyclic host Molecules, National Post Doctoral Fellow   | 2019 | 2021 | 19.20 |
| 72. | Potential exploration of fish gelatin as a substitute for mammalian gelatin ASEAN-Indian Research & Training Fellowship (AIRTF)  | 2019 | 2020 | 3.40  |
| 73. | Design and development of 3D printed prosthetic foot controlled by myoelectric signal, TARE Fellowship   | 2019 | 2022 | 18.30 |
| 74. | Making sodium the new Lithium: Stabilizing Oxygen Redox in High-Energy Sodium-ion Batteries through Acceleration Materials Discovery   | 2020 | 2024 | 24.90 |
| 75. | Biocementation for the improvement of sloppy regions in India using biopolymers  | 2020 | 2023 | 3.90  |
| 76. | Potential application of spent microalgal biomass for eco-friendly reclamation and reuse of chromium in tanning  | 2020 | 2023 | 63.73 |

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|-----|--|------|------|--------|
| 77. | Paper-Based Plasmonic Aptamer Linked Immobilized Sorbent Assay (pALISA) for Screening  | 2020 | 2021 | 10.15  |
| 78. | Tuning the self-assemble of collagen via interplay of intermolecular forces: Implicating structural organization on functional performance   | 2020 | 2023 | 26.49  |
| 79. | Isotope edited Vibrational Circular Dichroism on Amyloid Fibrils   | 2020 | 2024 | 38.12  |
| 80. | First principle design and development of multi-functional van der waals and non-van der waals solids  | 2020 | 2023 | 35.85  |
| 81. | 3D Bioprinting of Electrically conducting Hydrogel with stem cells and Neovasculature Guidance for Functional Cardiac Tissue Regeneration  | 2020 | 2025 | 44.15  |
| 82. | Biosynthesis of chromium nanoparticles from tannery effluent by using marine phosphate solubilizing bacteria and their applications on remediation of tannery effluent National Post-Doctoral Fellow (N-PDF) | 2020 | 2022 | 22.36  |
| 83. | Biomimetic 3D Bilayered scaffold: Implications on Cutaneous Wound Healing  | 2021 | 2024 | 24.19  |
| 84. | Nanotechnological interventions to convert tannery solid waste into value added nanofibrous membranes.   | 2021 | 2023 | 10.70  |
| 85. | Bioinspired Chemistry: Exploring Materials for the Next Generation Self-assembled Metallo-Nanozymes  | 2021 | 2026 | 29.61  |
| 86. | Tailor made tunable recombinant silk protein for Biomedical applications   | 2021 | 2026 | 19.60  |
| 87. | Artificial Light-driven rotatable molecular binding clips as efficient inhibitor to control amyloid cross- $\beta$ fibril formation in Alzheimer's disease   | 2022 | 2025 | 34.16  |
| 88. | Indigenous Development of Affordable Collagen derived Prosthetics for the Cardiac Surgery  | 2022 | 2025 | 197.08 |
| 89. | Development of sunlight assisted self-repairable leathers by Propylene oxide substituted polymeric silica network coating  | 2022 | 2024 | 27.35  |
| 90. | Chemical Synthesis of adducts induced by 3 - nitrobenzanthrone and evaluation of the effect of these adducts on natural DNA synthesis  | 2022 | 2025 | 33.62  |
| 91. | Valorisation of animal hair using greener methods - Process development and scale up studies   | 2022 | 2025 | 34.16  |
| 92. | Discriminating the Mystery of Amyloid Peptide showing Dual Behavior of Toxic Amyloid Fibrils vs Supramolecular Hydrogel Fibrils using Isotope Edited Vibrational Circular Dichroism                          | 2022 | 2027 | 24.60  |
| 93. | Development of Hierarchical Fibril forming Collagen-like peptides using Supramolecular Chemistry for biomedical applications   | 2022 | 2027 | 24.62  |
| 94. | Fabrication of easily biodegradable polymer nanocomposite for footwear application   | 2022 | 2027 | 24.62  |
| 95. | Transition Metal Carbides/Carbonitrides (Mxenes) Catalysts for Biomass conversion  | 2022 | 2024 | 22.36  |
| 96. | 3D Bioprinting Biomimetic Dermo-Epidermal Construct using Engineered Silk Spidroin with Vasculature Guidance for Skin Tissue Regeneration and Organotypic Tissue Model (PROJECT TRANSFERRED TO NIAB)         | 2022 | 2022 | 36.32  |
| 97. | A flexible Ferrocene-appended hydrogen-bonded organic frameworks (HOF) as a new class of second-order nonlinear optics towards wearable applications   | 2022 | 2024 | 22.36  |

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|------|---|------|------|-------|
| 98.  | Luminescent Organic Molecular thermometers and their applications   | 2022 | 2025 | 18.30 |
| 99.  | Studies on engineering support-integrated ultrafine metal-based nanocatalysts for sustainable dehydrogenation of amino-boranes and formic acid  | 2022 | 2024 | 24.97 |
| 100. | Science Technology and Innovation Hub in Khurkhul Makha, Haorang Sabal Block, Imphal West District, Manipur State   | 2023 | 2024 | 13.62 |
| 101. | Lab Scale demonstration of integrated electrochemical technology for achieving near-zero liquid discharge for tanneries   | 2023 | 2025 | 54.05 |
| 102. | Fabrication of microporous methacrylated collagen-attapulgitite hybrid biomaterial for bone regeneration  | 2023 | 2026 | 24.36 |
| 103. | Synthesis of 7-Azaisatin Based Fluorescent and Bioactive 3-Spirocarbo/Heterocyclic 7-Azaindolones via Copper Mediated Coupling and Morita-Baylis-Hillman Reactions  | 2023 | 2028 | 12.06 |
| 104. | Anaerobic co-digestion of tannery wastewater with various organic waste using halophilic bacteria for enhanced biogas and fertilizer production   | 2023 | 2026 | 35.93 |
| 105. | Functionalization of Collagen,Leather and biodegradable leather like cellulose materials by click reactions using thermoresponsive polymer - based catalyst   | 2023 | 2028 | 29.19 |
| 106. | Bio-active peptide-functionalized hydrogel scaffolds combined with antifibrogenic drug: Implications on polytherapy as a regenerative medicine for chronic ulcers   | 2023 | 2028 | 29.19 |
| 107. | Design and fabrication of herbal extract loaded nanocapsules for medicinal leather  | 2024 | 2027 | 30.00 |
| 108. | Structure, dynamics and transport of synthetic fluorinated anticancer drugs with hybrid lipid-polymer vesicles - A comprehensive NMR approach   | 2024 | 2027 | 35.24 |
| 109. | Enhancing the Fading Process and Properties of Vegetable-Alum Tanned leather using Antioxidants and UV-Inhibitors   | 2024 | 2024 | 2.40  |
| 110. | Development of functionalized granulated carbon and magnetic carbon materials from solid wastes of leather processing and their application in wastewater treatment and development of Heterogeneous catalyst | 2024 | 2027 | 37.39 |
| 111. | Fabrication of inorganic minerals and their composite as flame retardants to produce functional fabrics for strategic applications  | 2024 | 2027 | 21.41 |
| 112. | Next generation nanomaterials-based artificial enzymes addressing selectivity and specificity limitations by pore engineering of MOFs   | 2024 | 2027 | 21.41 |
| 113. | Immobilized Enzyme on Metal Organic Framework for Leather Application   | 2024 | 2027 | 21.41 |
| 114. | Designing Improved Sodium-rich Cathode Materials for High-Capacity Sodium-ion Batteries Through Electronic Structure Tuning   | 2024 | 2029 | 35.69 |
| 115. | Evaluation of wound healing property of Microbial Metabolites Harnessed from Agro waste   | 2024 | 2029 | 29.19 |
| 116. | Textile Reinforced Concrete Median Barrier as Cost Effective Life Saving Technology   | 2015 | 2017 | 21.97 |
| 117. | Development of a Drive-by-vehicle for Bridge Health Monitoring of a population of Bridges   | 2021 | 2024 | 35.78 |

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| 118. | Development of multiscale framework for investigating the role of carbon-based nano materials in enhancing the component-level performance of offshore engineering structures | 2021 | 2024 | 23.78  |
| 119. | A Generalized framework for multi-hazard response analysis and fragility assessment of structures using force-based real-time hybrid simulation                               | 2021 | 2024 | 23.36  |
| 120. | Nano/micro scale investigation for prediction of fracture and visco-elastic properties of sustainable UHSC  | 2021 | 2025 | 26.49  |
| 121. | Mentor for “Mix Optimization and design guidelines for fully recycled geopolymer concrete”  | 2022 | 2025 | 10.05  |
| 122. | Intelligent Fiber Optic based sensing system for monitoring and predicting structural-disasters in critical infrastructures (I-Sense)   | 2023 | 2026 | 49.32  |
| 123. | Development of a novel cost effective and smart building material for indoor thermal comfort and enhanced energy storage  | 2023 | 2025 | 6.90   |
| 124. | Mentor for project titled “Geopolymer concrete using scrap steel slag coarse aggregate”   | 2022 | 2025 | 10.05  |
| 125. | Development of Value-added Fly ash Composite blocks for Bulk Utilization of Fly ash in Agriculture  | 2024 | 2026 | 9.37   |
| 126. | Mass seedling production of <i>Kappaphycus alvarezii</i> through tissue culture technique and supply of tissue cultured seedlings to the farmers of Tamil Nadu coast          | 2020 | 2022 | 96.40  |
| 127. | Pre-feasibility studies and establishment of pilot scale farming of the commercially valuable seaweeds in Andaman coast   | 2021 | 2023 | 82.74  |
| 128. | Pilot Scale seed production of <i>Kappaphycus alvarezii</i> for promoting extensive farming along Tamil Nadu coast  | 2021 | 2022 | 53.18  |
| 129. | Algae-based flue gas CO <sub>2</sub> sequestration with coproduction of high-value biochemical  | 2023 | 2026 | 178.76 |
| 130. | Process development for the production of phytol and lutein from microalgae through valorization of agro-wastes   | 2020 | 2023 | 44.42  |
| 131. | Process development for tank-based cultivation technology for edible green seaweed <i>Ulva</i> towards functional food application  | 2024 | 2026 | 21.00  |
| 132. | Macroalgal cultivation and bio-processing of feed stock   | 2023 | 2026 | 45.00  |
| 133. | Selection of superior strain from unexplored carrageenophytes for carrageenan production and other value added products in a biorefinery mode                                 | 2020 | 2023 | 21.12  |
| 134. | CSIR Integrate Skill Initiative programme   | 2019 | 2024 | 1.75   |
| 135. | Studies on the current seaweed diversity and their ecology in islands of Gulf of Mannar Biosphere Reserve   | 2020 | 2023 | 8.23   |
| 136. | Farming of Seaweeds in Andhra Pradesh: Pre-feasibility studies and hands on seaweed cultivation   | 2020 | 2021 | 15.16  |
| 137. | Electrochemical-based Eco-friendly Recovery of Bioactive Compounds and Polymers from Seaweeds   | 2024 | 2026 | 55.66  |
| 138. | Culture-independent and -dependent bacterial cataloging of diseased <i>Kappaphycus alvarezii</i> : an integrated approach to support sea farming economy                      | 2024 | 2026 | 24.32  |
| 139. | Process for the preparation of fine and leather chemicals (5-methylfurfural, rhamnose, biotanning agents and biocolorants) from seaweed and their applications                | 2024 | 2026 | 79.12  |

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|------|---|------|------|---------|
| 140. | Studies on R-phycoerythrin content in various red edible seaweeds available in the west and south east coast of India with an eye to develop a sustainable method to extract the pigment following a bio-refinery route | 2021 | 2024 | 26.75   |
| 141. | Development of seaweed – Based Larvicide for control of Mosquito vectors of VBDs (Two sites)  | 2023 | 2025 | 20.15   |
| 142. | Identification of potential locations across India for seaweed cultivation and their valorization   | 2021 | 2024 | 1582.24 |
| 143. | Skilling, Capacity building, and Pre-feasibility assessment of seaweed cultivation in and around Kori Creek, Gulf of Kachchh, Gujarat   | 2023 | 2025 | 53.20   |
| 144. | Sustainable Methods for Cultivation and Eco-friendly Recovery of Bioactive Compounds and Polymers from Seaweeds   | 2024 | 2026 | 129.42  |
| 145. | Strategies to initiate seaweed cultivation along the coast of Maharashtra   | 2022 | 2026 | 121.13  |
| 146. | Enhancement of biomineralization with osteoblast cells on biodegradable mg based amorphous alloy coated metallic/polymeric substrates for orthopedic implants   | 2015 | 2018 | 36.65   |
| 147. | Catalytic activation & deactivation mechanisms in electrochemical renewable energy systems  | 2015 | 2017 | 4.28    |
| 148. | Fabrication of high efficiency solid state solar cell using perovskite type nanocrystalline sensitizers and solid state electrolyte   | 2015 | 2018 | 19.80   |
| 149. | New materials for high performance, low cost, sustainable sodium ion batteries  | 2015 | 2017 | 20.44   |
| 150. | Development of double perovskite and pyrochlore based graded thermal barrier coatings and their stability against high temperature fatigue and corrosion  | 2015 | 2019 | 39.18   |
| 151. | Efficient poly(ethylene oxide) based electrolytes for lithium-sulfur batteries  | 2015 | 2018 | 37.71   |
| 152. | Synthesis of nano-scale architectures: study and evaluation of their photophysical and electronic applications  | 2015 | 2018 | 24.54   |
| 153. | Development of high performance carbon nanomaterials for enhancing the cathodic oxygen reduction and performance of anode in microbial fuel cells   | 2015 | 2016 | 2.54    |
| 154. | Switching from silicon to organic materials: new vistas for future generation electronics   | 2015 | 2020 | 35.00   |
| 155. | Studies on $x\text{vo}_3$ ( $x=\text{bi/ba/sr}$ ) vanadates stabilized with various pb –free stable perovskite end members for high temperature dielectric applications   | 2016 | 2018 | 24.80   |
| 156. | Capture & electrochemical conversion reactions of $\text{co}_2$ and $\text{co}$ : search for efficient $\text{co}_2$ reduction catalysts with coupled analysis of reaction products using hyphenated techniques         | 2016 | 2018 | 45.16   |
| 157. | Synthesis, characterization, and studies of novel poly thienoindenoindole based low band gap polymers for organic solar cell applications   | 2016 | 2019 | 32.99   |
| 158. | Applications of homogeneous gold catalysis and c-h activation reactions for the synthesis of bioactive carbo- and heterocycles  | 2016 | 2018 | 19.43   |
| 159. | A supramolecular approach to improve the efficiency of enzyme mimic catalysis   | 2015 | 2020 | 86.27   |
| 160. | Investigation of performance of two dimensional nanomaterials towards biomedical application.   | 2016 | 2018 | 19.20   |
| 161. | Development of cost-effective methods and self-powered biosensor for the determination of food adulterants and contaminants based on electrodeposited transition metal chalcogenides nanostructures                     | 2016 | 2022 | 86.27   |
| 162. | Organic-inorganic halide perovskite for high-performance solar cell   | 2016 | 2019 | 35.00   |

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|------|--|------|------|--------|
| 163. | Investigation on high performance electrodes and electrolytes for advanced zinc-bromine redox flow batteries   | 2016 | 2019 | 42.42  |
| 164. | Photoelectrochemical activity of metal free quantum dots decorated on the surface of tio2 nanotube arrays  | 2016 | 2018 | 19.20  |
| 165. | Nanostructured materials for electrocarboxylation in protic ionic liquid medium  | 2016 | 2020 | 22.92  |
| 166. | Investigation on the inhibition of assimilation of TI alloy with bone marrow   | 2016 | 2018 | 4.36   |
| 167. | Bio carbon anodes for energy storage device applications   | 2016 | 2019 | 19.82  |
| 168. | Sodium ion batteries for efficient and sustainable energy storage  | 2016 | 2019 | 44.38  |
| 169. | Preparation of advanced materials based on graphene-transition metal dichalcogenide (tmds) nanostructures: electrochemical studies and application for the detection of biomarkers | 2016 | 2021 | 84.29  |
| 170. | Quantitative assessment on the interface characteristics of polymer electrolyte membrane electrode assemblies  | 2016 | 2021 | 86.27  |
| 171. | Towards future energy: metal-air batteries and fuel cells – development of highly active hierarchical and durable air electrode  | 2016 | 2021 | 86.27  |
| 172. | Novel porous materials as solid electrolytes for energy devices.   | 2017 | 2019 | 6.30   |
| 173. | Morphology tuned nanomaterials through electrochemical method for hemoglobin, creatinine, sweat, lactate and urea biosensing applications  | 2017 | 2019 | 19.20  |
| 174. | Erosion and erosion–corrosion performance of electrodeposited copper and its alloys  | 2017 | 2020 | 31.12  |
| 175. | Chemical synthesis and characterisation of novel polymelamine and metal coordinated polymemlamine for energy storage and generation application.                                   | 2017 | 2019 | 19.20  |
| 176. | Nanoionics: molecular design principle and charge transport in confined systems for the development of next-generation electrochemical device applications.                        | 2016 | 2022 | 86.27  |
| 177. | Scanning Tunnelling Microscopy Studies On Metalloporphyrins And Phthalocyanines Decorated On 2d Platforms  | 2017 | 2020 | 40.49  |
| 178. | Electrodeposition of silver, gold, brass and some of the refractory metal from ionic liquids and assessment of these deposits in the electrocatalysis and industrial applications  | 2017 | 2020 | 23.06  |
| 179. | Redox flow batteries for renewable energy storage applications   | 2017 | 2022 | 105.79 |
| 180. | Electrochemical biosensors for the detection of harmful chemicals in the agricultural products   | 2017 | 2019 | 19.20  |
| 181. | Metal oxides anchored graphene nanosheets for fabrication of energy storage devices  | 2017 | 2021 | 25.05  |
| 182. | Development of electrochemical biosensors for neurotransmitters and clinically important biomolecules  | 2017 | 2019 | 19.20  |
| 183. | Wearable screen printed electrochemical devices for health & environmental monitoring, drug delivery, energy storage and energy harvesting applications                            | 2017 | 2023 | 86.27  |
| 184. | Exploring alternative materials for anode of lithium ion battery by first principles calculations  | 2017 | 2021 | 28.39  |
| 185. | Phototlabile nanoprobos for light induced delivery, imaging, phototherapy, chemotherapeutics and neurogenic disorders  | 2017 | 2022 | 89.00  |

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|------|--|------|------|--------|
| 186. | Fabrication of symmetric/asymmetric high energy density supercapacitor in non-aqueous electrolytes using bio-derived carbon/carbon nanocomposites  | 2017 | 2021 | 30.52  |
| 187. | Novel graphene reinforced conducting polymer-metal oxide nanocomposites for supercapacitor applications  | 2017 | 2019 | 19.20  |
| 188. | Heteroatom doped graphene aerogel/lithiated metal derivative composites for supercapacitor and smart electronics   | 2017 | 2019 | 19.20  |
| 189. | Development of bio-polymer based fe <sub>2</sub> o <sub>3</sub> /hnt nanocomposites for drug delivery applications   | 2017 | 2019 | 19.20  |
| 190. | A novel approach to design pectin coated zn/chitosan/hydroxyapatite biomaterials for cytotoxicity and antibacterial orthopedic implant   | 2017 | 2019 | 19.20  |
| 191. | Electrochemical immunosensor for handheld rapid detection of dengue virus infection  | 2017 | 2022 | 97.18  |
| 192. | Nanomaterials as cathodes for utilization of co <sub>2</sub> into value added products   | 2017 | 2019 | 19.20  |
| 193. | Synthesis and electrochemical characterization of molecular imprinted polymers electrode for biosensor application   | 2017 | 2019 | 19.20  |
| 194. | Development of noble metal-free catalyst for efficient hydrogen evolution from water under visible-light and their practical implementation  | 2017 | 2019 | 19.20  |
| 195. | Development Of 2d Ti <sub>3</sub> C <sub>2</sub> Mxene Nanosheets Based Hybrid Nanostructures And Aerogels For Electrocatalytic And Energy Storage Applications  | 2017 | 2019 | 19.20  |
| 196. | Vertically Grown And Randomly Aligned One-Dimensional (1d) Tio <sub>2</sub> And Zno Nanowires Decorated With Bivo <sub>4</sub> , A-Fe <sub>2</sub> o <sub>3</sub> And Wo <sub>3</sub> For Photo-Electrochemical And Dye Sensitized Solar Cells | 2017 | 2019 | 14.40  |
| 197. | Design and development of biometallic nanomaterials for green and sustainable energy resources:fuel cells  | 2018 | 2021 | 21.25  |
| 198. | Industrial waste driven sustainable bioionic liquid crystals based solid electrolytes for energy storage device applications   | 2018 | 2022 | 16.48  |
| 199. | Generic smart iot electrochemical platform technology for biomedical applications  | 2018 | 2022 | 2.94   |
| 200. | Development and in operando diagnostic of zn/br flow batteries   | 2018 | 2023 | 109.10 |
| 201. | Rational design and fabrication of metal nanoparticles decorated titania nanotubes array for photoelectrocatalytic conversion of carbon dioxide into solar fuels   | 2018 | 2022 | 35.95  |
| 202. | Degradation mechanisms in lithium-ion batteries with emphasis on corrosion   | 2018 | 2022 | 38.40, |
| 203. | Non-precious electro catalysts for fuel cells and metal-air battery  | 2018 | 2022 | 28.00  |
| 204. | Poly(Lactic Acid)/Functionalized Mesoporous Bioactive Glass Based Hierarchical Biomimetic Composite Scaffolds For Bone Tissue Engineering Via Combined 3d Bioprinting And Electrospinning  | 2017 | 2023 | 86.27  |
| 205. | Investigation of novel solid state electrochemiluminescence platforms for point-of-care applications   | 2018 | 2022 | 22,,79 |
| 206. | Interface modification of lithium garnets for all-solid-state lithium  | 2018 | 2021 | 16.18  |
| 207. | Energy efficient electro and photoelectrochemical hydrogen generation by water splitting deploying photo-synthesized non-precious transition metal catalysts   | 2018 | 2022 | 20.52  |

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|------|---|------|------|--------|
| 208. | Manipulation of quantized conductance for multilevel atomic-scale devices using confined redox-phenomenon.  | 2018 | 2021 | 48.00  |
| 209. | Development of liquid -liquid interfaces using silica membrane : implications in label-free sensing of neurotransmitters.   | 2019 | 2022 | 25.56  |
| 210. | Self-limiting growth based electrodeposition of magnetic nanostructures and their applications.   | 2019 | 2022 | 31.92  |
| 211. | Electro catalytic remediation for ammonia production at ambient condition: an efficient carbon-free hydrogen carrier for polymer electrolyte fuel cells                                   | 2019 | 2022 | 30.38  |
| 212. | Induced co-electrodeposition of refractory (mo, re, w) - transition metal (co, fe,ni) alloys from ionic liquids for high performance engineering applications                             | 2019 | 2022 | 26.64  |
| 213. | Development of microbial electrolysis cell to unravel the mechanism of electrical interplay systems for electromethanogenesis.  | 2018 | 2021 | 10.05  |
| 214. | Nanopatterned bioactive functionally graded porous ti spinal fusion device with antibacterial activity and cell compatibility fabricated by 3D metal printer.                             | 2019 | 2022 | 40.04  |
| 215. | 3D Printed Aminosilica Monoliths: A Practically Scalable Technology For Co2 Capture.  | 2019 | 2022 | 42.10  |
| 216. | Atomic simulation for investigating electronic structure of aluminium based self-healing alloys and its relationship with self-healing mechanism.   | 2019 | 2022 | 30.04  |
| 217. | Covalently functionlized metal-N4 on multi-walled carbon nanotubes for oxygen reduction reaction on hydrogen fuel-cell application  | 2019 | 2024 | 110.00 |
| 218. | Development of visible light active functional materials for efficient photocatalytic and photoelectrocatalytic generation of hydrogen  | 2019 | 2023 | 38.52  |
| 219. | HF and HCl mixed acid recovery from silicon carbide purification process effluent via diffusion dialysis and bipolar membrane electro-dialysis  | 2019 | 2021 | 28.96  |
| 220. | Development of electrochemical biosensor for detection of prostate cancer biomarkers  | 2019 | 2022 | 24.69  |
| 221. | Demonstration and validation of hydrogen ecosystem for stationary power backup application for telecommunication towers   | 2019 | 2024 | 211.19 |
| 222. | Probing the electrochemical events of organic molecules by interference-free electrochemical surface-enhanced raman spectroscopy (EC-sers).   | 2019 | 2021 | 26.35  |
| 223. | Integrated self - powered energy storage system   | 2019 | 2023 | 44.75  |
| 224. | 2D Transition Metal Layered Double Hydroxides: A Cost - Effective Catalyst For Hydrogen Production By (Photo) Electrochemical Water Splitting   | 2019 | 2023 | 24.84  |
| 225. | Self-calibrated and drift-free electrochemical biosensors using dual frequency and dual reporter approach   | 2019 | 2022 | 25.81  |
| 226. | Electrical cell - substrate impedance sensing for monitoring anti-oxidant and -inflammatory effect of semisynthetic nanomaterials in cells-on-a-chip                                      | 2019 | 2021 | 24.24  |
| 227. | Design and development of Mxenes enabled carbon nanostructured materials for li-s batteries   | 2019 | 2022 | 62.15  |
| 228. | Fabrication of AB03-type oxide pervoskite photoanode based high performance dye-sensitized solar cells: validation of plasmonic effect and charging effect on its photovoltaic parameters | 2019 | 2022 | 20.25  |
| 229. | Tailoring Of 3D Printable Hybrid Polymer Electrolyte With Enhanced Thermal Stability For High Performance Lithium Ion Batteries   | 2019 | 2023 | 42.03  |

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|------|---|------|------|--------|
| 230. | Treatment of municipal wastewater using electrochemical techniques  | 2020 | 2023 | 10.05  |
| 231. | Development of bioactive yet antibacterial coatings with enhanced osseointegration and ability to fight infection   | 2020 | 2022 | 24.44  |
| 232. | Combinatorial Development Of Multi-Component Alloys By Sputtering Onto 3D Printed Customized Bone Implants  | 2020 | 2024 | 35.35  |
| 233. | Kinetics of CO <sub>2</sub> corrosion in pipeline: influence of fluid flow and corrosion inhibitors.  | 2021 | 2024 | 25.90  |
| 234. | Development of sensitive and cost-effective sensor for the determination of food adulterants and food contaminants based on hetero atom doped carbon dots embedded electropolymer thin film of Thiadiazole derivative | 2020 | 2023 | 10.05  |
| 235. | Tuning the performance of fe metal anode for energy storage applications  | 2020 | 2023 | 22.78  |
| 236. | Low cost stable lithium sulfur batteries for solar energy storage   | 2021 | 2023 | 15.86  |
| 237. | Fabrication of pouch - type hybrid supercapacitor device with Mxenes - based nonocomposite electrodes in redox additive electrolytes  | 2021 | 2025 | 27.83  |
| 238. | Nanostructured MOFS as electrocatalysts for desulfurisation of organic sulphides in fossil fuels  | 2021 | 2025 | 22.21  |
| 239. | PT free and active sites enriched metal - carbon alloy electro catalysts for polymer electrolyte fuel cells.  | 2021 | 2024 | 28.41  |
| 240. | Inducing internal vacancies in transition metal based LDHS via surface engineering as chalcogenides and ions modifications for water electrolysis   | 2022 | 2025 | 29.99  |
| 241. | Development of heterostructured materials for an efficient photocatalytic and photoelectrochemical water splittig towards green energy harvesting   | 2021 | 2024 | 10.05  |
| 242. | Nanostructured materials for next generation energy conversion and storage devices  | 2022 | 2026 | 16.80  |
| 243. | Electrochemical poc device for detection vitamin B12 and vitamin A  | 2022 | 2025 | 40,05  |
| 244. | Automation and AI/ML-assisted development of solid state battery  | 2022 | 2025 | 108.99 |
| 245. | Lithium salts as leachable corrosion inhibitors and potential replacement for hexavalent chromium in hybrid sol-gel coatings for active corrosion protection of mg alloys.  | 2022 | 2025 | 26.71  |
| 246. | Centre for rechargeable energy storage systems for augmenting transportation and electrification (CREATE)   | 2022 | 2027 | 1.42   |
| 247. | Vritika - training for expertise in fabrication and testing for photoelectrochemical device for hydrogen production   | 2022 | 2022 | 1.50   |
| 248. | Karyashala - high - end workshop on advanced materials for energy conversion and storage  | 2022 | 2022 | 5.00   |
| 249. | Design of genosensor system compatible biopolymer material ready for infectious diagnostic kit development  | 2022 | 2025 | 23.57  |
| 250. | Understanding the transient potential oscillatory patterns of self-organized systems by time-resolved electrochemical plasmon-enhanced Raman spectroscopy.  | 2022 | 2025 | 30.42  |
| 251. | Development of self-powered wearable biosensors based on sweat actuated microfluidic biofuel cells for healthcare monitoring  | 2022 | 2024 | 46.00  |
| 252. | Design of novel luminophores for high spatiotemporal resolution of ECL imaging towards multiplexed bioassay.  | 2023 | 2026 | 33.01  |
| 253. | Development of miniaturised single - electrode electrochemiluminescence platform for visual   | 2023 | 2026 | 31.85  |

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|------|---|------|------|--------|
|      | and high-throughput sensing of multiplex salivary biomarkers  |      |      |        |
| 254. | Indigenization of the HT-pemfc technology at the raw materials & sub-component level by establishing pre-production scale manufacturing facilities  | 2023 | 2026 | 143.32 |
| 255. | Design and development of flow-electrode capacitive deionization module for continuous water desalination   | 2023 | 2026 | 23.91  |
| 256. | Uniform coatings of doped silicon carbide on complex metallic shapes through electro-co-polymerisation route  | 2023 | 2025 | 46.67  |
| 257. | Electrochemical dating: a non-destructive and inexpensive analysis on metal and alloy based artifacts   | 2023 | 2026 | 39.54  |
| 258. | Therapeutic drug monitoring tdm of anticancer drug in human biological fluid graphene – wrapped plasmonic nanostructures as surface – enhanced raman scattering sers substrate  | 2021 | 2024 | 9.10   |
| 259. | Long cycle life all-solid-state lithium metal batteries encompassing polymer ceramic composite electrolytes   | 2023 | 2026 | 9.45   |
| 260. | Concerted approach to diagnose and manage anemia through development of cost -effective point of care devices.  | 2023 | 2024 | 11.14  |
| 261. | On-chip electrochemiluminescence based quantification of extracellular mirna isolated from cancer spheroids.  | 2022 | 2025 | 10.05  |
| 262. | Surface - modified porous ti-based implants produced by additive methods for cranio-maxillofacial and dental surgery  | 2023 | 2026 | 53.89  |
| 263. | Reinforcement Perfluorosulfonic acid and short chain ionomers and sulfophenylated polyphenylenes with radical scavengers and expanded substrate support via self-polymerizations:its impact as composite membrane in polymer electrolyte fuel cells | 2024 | 2027 | 27.90  |
| 264. | Design of electrified liquid-liquid and liquid-organogel interfaces: an active catalytic environment for CO <sub>2</sub> reduction  | 2024 | 2027 | 27.70  |
| 265. | Development of non-precious solid state redox mediator and bifunctional electrocatalysts based membrane-free decoupled electrolyzer from green hydrogen production  | 2024 | 2027 | 33.10  |
| 266. | Design and development of ai based smart battery management system for energy storage and e-mobility applications   | 2024 | 2027 | 120.00 |
| 267. | Designed concealed defects enriched metal dichalcogenide decorated porous carbon nanostructures as sustainable electrocatalysts for green hydrogen generation   | 2024 | 2027 | 27.34  |
| 268. | Development of oxidation resistant iridium-rhenium (IR-RE) coatings for satellite thrusters   | 2024 | 2026 | 42.74  |
| 269. | Selective laser melted low modulus $\beta$ titanium alloy (TI-NB) bone implant with surface bio functionalization   | 2024 | 2027 | 36.32  |
| 270. | Design and development of lithium-ion batteries and demonstration of 1.5 kwh battery pack for electric vehicle application  | 2024 | 2027 | 185.18 |
| 271. | Soft-organic thermoelectrics: emerging green energy materials for body heat harvesting and temperature control  | 2024 | 2029 | 112.40 |