

CURRICULUM VITAE

Kothandaraman Ramanujam, FRSC

Associate Professor, Department of Chemistry,
Indian Institute of Technology Madras, Chennai 600 036, Phone: 044 2257 4249

Date of Joining: 4th March 2011

Email: rkraman@iitm.ac.in

Date of Birth: 26th May 1978

Google scholar link: <https://scholar.google.co.in/citations?user=8MvVXi8AAAAJ&hl=en>

Webpage link: <http://chem.iitm.ac.in/faculty/kothandaraman/>

h-index: 19, i10 index: 33, Total citations: 2143, Citations in last five years: 1001

ECS Membership number: 331001

ORCID No.: 0000-0003-2231-2665



1. EDUCATIONAL RECORD

Degree	Major / Specialization	Institute / University	Year of Passing	Marks (% / CGPA) / remarks
U.G	B.Sc in Chemistry	Bharatiyar University (Sri Vasavi College)	1998	90 %/ University Gold Medallist
P.G	M.Sc in Applied Chemistry	Anna University, Chennai	2000	88.8 % / 8.88 (CGPA)
Ph.D.	The thesis titled "Studies on Direct Methanol and Direct Borohydride Fuel Cells" was supervised by Professor Ashok Kumar Shukla	Indian Institute of Science Bangalore	2006	First Class

2. PROFESSIONAL RECORD

Degree	Research Topic and Group Info	Institute / University	Year
Post-Doctoral Researcher	Fuel Cells and Glucose Sensors / Prof. Scott Calabrese Barton	Michigan State University, East Lansing, MI, USA	Mar 2007 - Feb 2009
	Fuel Cells / Prof. Christina Bock and Prof. Barry MacDougall	National Research Council of Canada, Ottawa, Canada	March 2009- Feb 2011

3. SCIENTIFIC CONTRIBUTIONS

Dr Kothandaraman has focused his expertise in electrochemistry on contributing to realize India-centric solutions for the ever-growing need of energy storage and conversion. Therefore, his motivation is in the direction of developing new functional materials, redox-active organic molecules, and utilization of abundant resources such as sodium and zinc towards developing newer energy systems. His academic research pursuits under the broad headings of (i) Lithium/Sodium/Zinc/Vanadium based batteries; (ii) Organic Dyes for Solar Cells; and (iii) Sensors have enabled delivery of “*translatable research*”. He is incubating a startup “Electrobasics” at IIT Madras, which deal with the custom materials related to electrochemistry related science and engineering.

Under the heading of Li/Na batteries and in a bid to find a suitable anode material for sodium-ion battery (NIBs), His initial innovation with naphthalene-2,6-dicarboxylate (NDC) (*JES*, **2018**, 165, A175) provided sustainable and cost-effective alternative, and additional insights for overcoming the challenges posed by other materials explored for the same objective, such as biphenyl tetracarboxylate and perylene-3,4,9,10-tetracarboxylate. NDC demonstrated biphasic sodiation/desodiation behavior with negligible volume change. The use of lithium salt of diimide dicarboxylate solved the solubility issues of cathode (mitigating capacity loss) and led to the development of Li/Na salts of N,N'-bis(glyciny)X (X= perylene diimide, pyromellitic diimide, naphthalene diimide, perylene diimide). Further fine tuning of the conductivity issue associated with these organic scaffolds, by reducing bandgap energy through chromophores and π -conjugation led to the development of lithium 1,1'-biphenyl-4,4'-dicarboxylate as a new material, with a stable capacity of 165 mAh g⁻¹ [*JES*, **2017**, 164, A1720].

The fact that Zinc-ion batteries (ZIB) are much safer compared to LIB and NIBs, as it functions with aqueous electrolyte, inspired Dr Kothandaraman to delve deeper. To enhance the poor diffusion of Zn²⁺ from the commonly used intercalated lattice of α -MnO₂ and vanadium oxides in the ZIB, due to a strong Zn²⁺-oxide ion coulombic interactions, Dr Kothandaraman innovated on reducing the coordination number of the Zn²⁺ ion or increasing the gap between the layers of the host material. The use of highly conjugated pentacenetetraone and electronegative S containing dibenzo[b,i]thiantrene-5,7,12,14-tetraone has paved the way. Capacity as high as 200 mAh g⁻¹ has been achieved for 2000 cycles at 80 mA g⁻¹ The innovation has been patented (*Indian Patent*, **2019**, IDF NO. 1945).

In collaborative mode and under the topic of dye-sensitized solar cells (DSSCs), experimentation with organic scaffolds containing triphenylamine units, carbazole and pyrene-phenothiazine heterocyclic units and less known imidazole based donor moieties has enabled the discovery of new phenothiazine based dye, showing 12% power conversion efficiency (PCE) [*J. Materials Chem. A* **2017**, 5, 10289, one of the best performing dyes in literature] . Among the imidazole based dyes, PCE of 8.1 % has been achieved and this is the best among imidazole based dyes [*New J. Chemistry* DOI: 10.1039/d0nj00137f]. This article will appear soon with a cover-page art of this work in its 25th issue. The photophysical and electronic properties of the redox active organic functional materials developed by molecular engineering for NIBs, ZIBs and DSSC were explained at molecular level using the DFT calculations.

Realizing the importance of sensing physiologically important endogenous molecules, he experimented with sensing of peroxide, dopamine, uric acid, and ascorbic acid using immobilized metal-organic framework and solvent-filled multiwalled carbon nanotubes (MWCNTs) achieving the objective of sensing [*JES* **2019**, 166, B1186]. The novel approach of organic solvent filling of MWCNTs (confirmed by ¹H NMR T1 relaxometry) improved the detection limit by an order of magnitude. His work on copper-benzotriazole modified MWCNTs for oxygen reduction reaction(ORR) was published with cover feature (*ChemElectroChem* **2018**, 5, 1740).

Industry/technology Oriented Contributions: His contributions in fuel cell domain relying on non-platinum catalyst for ORR have fetched two patents, (U.S Patent: (2016) 9379388 and Indian Patent: (2019) 324235). An electrosorption based quick dye staining of TiO₂ photoanode has been developed, which readies photoanode of any dye in an hour, as opposed to 12 to 24 h required in the conventional staining process (*Electrochimica Acta* DoI: 10.1016/j.electacta.2020.136344). Two Indian patents have

been filed on vanadium redox flow battery (VRFB) (App. No. 3713/CHE/201 (2013) and 201641030008 (2016)), and a 300 W/1kWh VRFB system was built and demonstrated to DST-SERI in the last review meeting held in October 2019. He was awarded a consultancy project to the tune of 3.3 crores from ONGC, in Dec 2019, to build 10kW/10kWh VRFB capable of operating at current density $> 100 \text{ mA cm}^{-2}$ at 1.2 V per cell. A CSR funding of ~ 21 lakhs was awarded, to extract micronutrients like zinc from the spent batteries, by Tide Water Oil Co. Ltd. Other contributions include the development of oxygen sensor for Elixir Electronics and electrochemical H_2O_2 production unit for Research Supporters Initiative. In the case of aqueous organic redox flow battery, energy density of quinone type redox couples was improved incorporating multiple alkyl amine handles targeting solubility of the compounds. His products were showcased in the past in two events: (i) New Generation Ideation Contest-2019 organized by HPCL and (ii) KPIT Sparkle 2019 organized by KPIT technologies (his VRFB stack was one of the 30 exhibits showcased in the KPIT grand finale held at Mumbai on 15th February 2019).

The scientific contributions of Dr Kothandaraman find their place in some of the top-notch core electrochemical journals such as *J. Electrochem. Soc. (JES)*, *Electrochimica Acta*, etc. (81 publications to date), and were presented at many national and international conferences.

4. AWARDS, FELLOWSHIPS AND HONOURS

- Visiting Professorship: Energy, Environment & Chemical Engineering Department, WASHINGTON UNIVERSITY @ St. Louis, Missouri (April – July 2019)
- Fellow of Royal Society of Chemistry (FRSC)
- Won “Exploratory Research Grant” from IIT Madras in the year 2016 and 2020.
- Director nominated department representative for the Faculty Council of the Research Park of IIT Madras (since July 2019).
- Member of Board of Global Engagement, IIT Madras
- On invitation from DST, served as expert panel member in the quarterly review meeting of MES on 22nd November 2018 held at IISc-Bangalore.
- Department nominated member of Board of Placement for the year 2018-2019.
- Member of board of studies of Vellore Institute of Technology (VIT) Bhopal Campus
- Member of board of studies of Bannariamman Institute of Technology (BIT), Sathyamangalam
- Adjunct faculty at National Centre for Catalysis Research, IIT Madras, Chennai.
- Awarded Senior Research Fellowship by MHRD, India (Nov 2002- July 2005)
- Awarded Junior Research Fellowship by MHRD, India (Aug 2000- Oct 2002)
- Secured 94.4 percentile score in Graduate Aptitude Test in Engineering (GATE-2000)
- University Gold medallist: Bachelor of Science in Chemistry, Bharathiar University, Coimbatore, Tamil Nadu, India, April, 1998

5. CONFERENCE ORGANIZED AND ONLINE LECTURES DELIVERED AT NATIONAL LEVEL

- Local organizing committee member of 24th CRSI-National Symposium in Chemistry and 13th CRSI-RSC Joint Symposium, 2019
- Convenor of the Chemistry-in-house-symposium, 2015
- Co-convenor of the Chemistry-in-house-symposium, 2014
- Co-organizer of the Chemistry-in-house-symposium held in 2013 and 2012.
- QEEE (Quality Enhancement in Engineering Education), A Program Sponsored by Ministry of Human Resource and Development, Government of India. **Topic:** Electrochemistry and its applications (Video Course for the engineering colleges in India)

6. PH.D THESIS SUPERVISED

1	<p>M. P Karthikayini (2011 – 2016)</p> <p>Thesis title: Metal-nitrogen-carbon (MNC) based non-precious metal catalysts for electrochemical reduction of oxygen in fuel cells</p> <p>Current affiliation: Chemist (Group B Gazetted Officer), Department of Industries and Commerce, Government of Tamilnadu, Guindy, Chennai</p>
2	<p>Rakesh (2012 – 2017)</p> <p>Thesis title: Ternary transition metal oxides and sulphides as new anode materials for rechargeable alkali metal ion (lithium and sodium) battery applications</p> <p>Current affiliation: Postdoctoral Research, Materials Electrochemistry Lab, Department of Materials Science and Engineering, Chonnam National University, 77 Yongbongro Bukgu, Gwangju 61186, South Korea.</p>
3	<p>Veerababu Medabalmi (2012- 2017)</p> <p>Thesis title: Studies on certain aromatic diimides and conjugated carboxylates as electrode materials for secondary lithium/sodium-ion battery applications</p> <p>Current affiliation: Scientist of Energy Technology, Godi India Pvt. Ltd, Hyderabad</p>
4	<p>Anjaiah Sheelam (2012- 2017)</p> <p>Thesis title: Metal-organic complexes and carbon materials derived from metal-organic complexes for oxygen reduction reaction in alkaline medium</p> <p>Current affiliation: Postdoctoral fellow, Center for Condensed Matter Sciences, Department of Physics, National Taiwan University, Taiwan</p>
5	<p>Thippani Thirupathi (2012 – 2017)</p> <p>Thesis title: Cobalt and nitrogen doped carbon materials for rechargeable zinc-air battery and carbon supported g-C₃N₄ for hydrazine sensor applications</p> <p>Current affiliation: Manager, Renewable energy systems limited, Hyderabad</p>
6	<p>Pasala Vasudeva Rao (2013 – 2018)</p> <p>Thesis title: Studies on new electroactive fluids and catalysts for redox flow batteries and membraneless fuel cells</p> <p>Current affiliation: Deputy Manager, R&D Li-ion Battery Technology, Amara Raja Batteries Limited, Karakambadi, Tirupati, Andhra Pradesh – 517520</p>
7	<p>Sudip Mandal (2014 – 2019)</p> <p>Thesis title: Molecular engineering for dye-sensitized solar cells and chemosensors: An</p>

<p>experimental and computational approach</p> <p>Current affiliation: Assistant Professor, Division of Chemistry, Department of Sciences and Humanities, Vignan's Foundation for Science, Technology and Research (Deemed to be University), Guntur, Andhra Pradesh</p>
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7. STUDENTS GRADUATED/ CURRENTLY ENROLLED

Degree	Number of thesis supervised	Waiting for viva	Currently Enrolled
M.Sc	12	-	-
Ph.D	07	-	14
PDF	3 (completed their term)		4

8. DETAILS OF COURSES TAUGHT AT IIT MADRAS

S. No.	Course No.	Title
1	CY 1001	Chemistry: Structure, Bonding & Reactivity
2	CY 6998	Electrochemical Approaches to Functional Supramolecular Systems
3	CY 1002	Chemistry Lab
4	CY 5016	Chemical Kinetics
5	CY 6011	Solid State Chemistry
6	CY 5024	Physical Chemistry Lab
7	CY 2010	Kinetics and Catalysis
8	CY 1051	Chemistry II (Spectroscopy)
9	CY 6015	Electrochemistry
10	ID 6106	Materials for Energy Storage and Conversion
11	ID 5500	Battery Technology

9. LIST OF PUBLICATIONS (Total 85 publications)

S. No.	Title of the paper	Journal Name	Corresponding Author's Name	Rest of the authors as appearing in the journal	Year of publication	Volume	Issue No.	Page Start	Page End
1.	Interplay of the functional units of a binder in the oxygen reduction process of zinc-air battery	Catalysis Today	Kothandaraman R	Nivedha L K and Raja Murugan	2020, Accepted				
2.	Molecular engineering of pyrene carbazole dyes with a single bond and double bond as the mode of linkage	New Journal of Chemistry	Kothandaraman R	Divya Unny, Ganapathi Rao Kandregula and Jagadeeswari Sivanadanam	2020, 10.1039/D0NJ03228J				
3.	Confinement catalysis of non-covalently functionalized carbon nanotube in ascorbic acid sensing	Electroanalysis	Kothandaraman R	Tamilselvi Gurusamy, Raja Murugan, Akalyaa Durairaj	2020, doi.org/10.1002/elan.202060119				
4.	Styrene-co-DVB grafted PVDF proton exchange membranes for vanadium redox flow battery applications	Materials Advances	Kothandaraman R and Vaibhav Kulshrestha	Abhishek Rajput, Harun Khan and Savan K. Raj	2020	1	-	1930	-

5.	Replacing aromatic π -system with cycloalkyl in triphenylamine dyes to impact intramolecular charge transfer in dyes pertaining to dye-sensitized solar cells application	Journal of Photochemistry and Photobiology A: Chemistry	Kothandaraman R and M. Sudip	Ganapathi Rao Kandregula	2020	403	-	112862	-
6.	Functionalised carbazole as cathode for high voltage non-aqueous organic redox flow battery	New Journal of Chemistry	Kothandaraman R and Sankararaman S	Chinmaya R. Mirle, Raja M and Vasudevarao P	2020	44	-	14401	14410
7.	Nickel-based Hybrid Material for Electrochemical Oxygen Redox Reactions in Alkaline Medium	ACS Applied Energy Materials	Kothandaraman R and Sukhendu M	P. Mani, S. Anjaiah, P. Esakki Karthik and Raman Sankar,	2020	3	7	6415	6415
8.	Highly Durable Pt-based Catalyst Supported on Carbon Derived from Tamarind Seeds for Oxygen Reduction Reaction in PEM Fuel Cell	Journal of The Electrochemical Society	Kothandaraman R	Yashwant K, Srinu and Sahu AK	2020	167	-	104515	-
9.	Chromium oxynitride as durable electrode materials for symmetric supercapacitors	Batteries & Supercaps	Tiju Thomas and Kothandaraman R	U. Naveen Kumar, Janraj Naik Ramavath, Sourav Ghosh	2020	3	4	780	788

10.	New cyclic and acyclic imidazole-based sensitizers for achieving highly efficient photoanodes for dye-sensitized solar cells by potential assisted method (* cover page article)	New Journal of Chemistry	Kothandaraman R	Jagadeeswari Sivanadanam, Indrapal Singh Aidhen	2020	44	-	10207	10219
11.	Drastic improvement in dye-sensitized solar cell efficiency by electrosorption based dye staining of titania semiconductor photoanode	Electrochimica Acta	Kothandaraman R	Ganapathi Rao Kandregula and Jagadeeswari Sivanadanam	2020	349	-	136344	-
12.	Excited state properties of metal-free (D2d and T-SB-C) and Ru-based (N719 and Z907) dyes and photoinduced charge transfer processes in FTO/TiCl ₄ /TiO ₂ /Dye photoanodes fabricated by conventional staining and potential-assisted adsorption	Journal of Physical Chemistry A	Dariusz M. Niedwiedzki and Kothandaraman Ramanujam	Ganapathi Rao Kandregula, Jagadeeswari Sivanadanam	2020	124	22	4333	4344
13.	Oxygen sensitive 1-amino-2-naphthol immobilized functionalized-carbon nanotube electrode	New Journal of Chemistry	Kothandaraman R	J. Vanshika, G. Tamilselvi and P. Gayathri	2020	44	-	8849	8858

14.	A computational study on boron dipyrromethene ancillary acceptor-based dyes for dye-sensitized solar cells	New Journal of Chemistry	Kothandaraman R	Ganapathi Rao Kandregula, Sudip Mandal, Prince Gollapalli and Satyesh Yadav	2020	44	12	4877	4886
15.	An all solid-state Li ion battery composed of low molecular weight crystalline electrolyte	RSC Advances	Noriyoshi Matsumi	Prerna Joshi, Raman Vedarajan, Anjaiah Sheelam, Kothandaraman Ramanujam and Bernard Malaman	2019	10	15	8780	8789
16.	Sodalite-type Cu-based Three-dimensional Metal-Organic Framework for Efficient Oxygen Reduction Reaction	Chemistry An Asian Journal	Sukhendu Mandal and Kothadaraman R	Prabu Mani, Sharat Devadas, Tamilselvi Gurusamy, Esakki Karthik and Balu P. Ratheesh	2019	14	24	4814	4818
17.	Electrochemical Sensors Using Liquid Filled Multiwalled Carbon Nanotubes: Enhanced Sensor Characteristics, and NMR Relaxometry Evidence of Liquid Confinement	Journal of The Electrochemical Society	Kothandaraman Ramanujam and Narayanan Chandrakumar	Tamilselvi Gurusamy and Abhishek Banerjee	2019	166	13	B1186	B1195
18.	Paper-Based Disposable Zinc-Vanadium Fuel Cell for Micropower	ChemistrySelect	Kothandaraman Ramanujam	Vasudevarao Pasala	2019	4	29	8398	8403

	Applications								
19.	Mild acidic mixed electrolyte for high-performance electrical double layer capacitor	Applied Surface Science	Kothandaraman Ramanujam	Janraj Naik Ramavath, M. Raja, Sanjeet Kumar,	2019	489	-	867	874
20.	Carbon Supported and Nafion Stabilized Copper (II) Based 1D Coordination Polymer as an Electrocatalyst for Oxygen Reduction Reaction	Journal of The Electrochemical Society	Kothandaraman Ramanujam	Yashwant P. K and Sudip Mandal,	2019	166	7	F3193	F3201
21.	Activated carbon from sugarcane bagasse as a potential positive electrode catalyst for vanadium redox flow battery	Materials Letters	Kothandaraman Ramanujam	Vivekananda Mahanta and M. Raja	2019	247	-	63	66
22.	A chitosan/poly(ethylene glycol)-ranpoly(propylene glycol) blend as an eco-benign separator and binder for quasi-solid-state supercapacitor applications	Sustainable Energy and Fuels	Kothandaraman Ramanujam and Dhamodharan R	M. Raja, S. Balaji Sadhasivam and Janraj Naik R	2019	3	3	760	773
23.	Selective Sensing of the Biotinyl Moiety Using Molecularly Imprinted Polyaniline Nanowires	Journal of The Electrochemical Society	Kothandaraman Ramanujam	Sudip Mandal, Subramanian S, Ian A. Nicholls,	2018	165	14	B669-	678

24.	CVD Grown Nickel Encapsulated N-Doped Carbon Nanotubes as Highly Active Oxygen Reduction Reaction Catalyst without Direct Metal-Nitrogen Coordination	ACS Omega	Kothandaraman Ramanujam	G. Dipsikha, S. Ramaprabhu,,	2018	3	10	13609	13620
25.	Effect of flexible, rigid planar and non-planar donors on the performance of dye-sensitized solar cells	Journal of the Electrochemical Society	Kothandaraman Ramanujam	U. Divya, S. Jagadeeswari, Sudip Mandal, Indrapal Singh Aidhen	2018	165	13	H845-	860
26.	Redox Active Cobalt-Bipyridine Metal Organic Framework-Nafion Coated Carbon Nanotubes for Sensing Ascorbic Acid	Journal of the Electrochemical Society	Kothandaraman Ramanujam	Gayathri P	2018	165	13	B603-	609
27.	Glycination: A Simple Strategy to Enhance the Cycling Performance of Perylene Dianhydride for Secondary Li-ion Battery Applications	ChemistrySelect	Kothandaraman Ramanujam	Veerababu Medabalmi	2018	3	28	10657	10662
28.	A High Voltage Organic Redox Flow Battery with Redox Couples O ₂ /Tetrabutylammonium	Journal of the Electrochemical Society	Kothandaraman Ramanujam	Vasudevarao Pasala, Chinmaya Ramachandra, Sankararaman Sethuraman,	2018	165	11	A2696-	2702

	Complex and Tris (4-bromophenyl) amine as Redox Active Species								
29.	Design of Cone-Shaped Hole Transporting Material Organic Structures for Perovskite Solar Cells Applications	ChemistrySelect	Kothandaraman Ramanujam	Jagadeeswari Sivanadanam, Sudip Mandal, Indrapal Singh Aidhen	2018	28	3	8159	8166
30.	Iron-Dicyano Dichloro Quinone Primary Battery	ChemistrySelect	Kothandaraman Ramanujam	Janraj Naik Ramavath, Chinmaya Ramachandra	2018	37	3	10281	10286
31.	N- and P-co-doped Graphite Felt Electrode for Improving Positive Electrode Chemistry of the Vanadium Redox Flow Battery	ChemistrySelect	Kothandaraman Ramanujam	Vasudevarao Pasala, Janraj Naik , Cheng He, Vijay K. Ramani,	2018	30	3	8678	8687
32.	Synthesis and DSSC application of triazole bridged dendrimers with benzoheterazole surface groups	Solar Energy	Perumal Rajakumar	Kannan Rajavelu, Sudip Mandal and Kothandaraman Ramanujam	2018	166	-	379	389
33.	Computational Investigation of the Influence of π -Bridge Conjugation Order of Thiophene and Thiazole	ChemistrySelect	Kothandaraman Ramanujam	Sudip Mandal, Raman Vedarajan, Noriyoshi Matsumi	2018	3	13	3582	3590

	Units in Triphenylamine Based Dyes in Dye-Sensitized Solar Cells								
34.	Cobalt-based Coordination Polymer for Oxygen Reduction Reaction	ACS Omega	Sukhendu Mandal	Prabu Mani, Anjaiah Sheelam, Shubhajit Das, Guanxiong Wang, Vijay Ramani, Kothandaraman Ramanujam, Swapan Pati	2018	3	4	3830	3834
35.	Redox-active copper-benzotriazole stacked mwcnts for oxygen reduction reaction (* cover page article)	ChemElectroChem	Kothandaraman Ramanujam	Tamilselvi Gurusamy, Gayathri Prakasam, Sudip Mandal	2018	5	14	1837	1847
36.	Exploring the role of the spacers and acceptors on the triphenylamine based dyes for dye sensitized solar cells	International Journal of Hydrogen Energy	Kothandaraman Ramanujam	Jagadeeswari Sivanadanam, Ramesh Mukkamala, Sudip Mandal, Raman Vedarajan, Noriyoshi Matsumi, and Indrapal Singh Aidhen	2018	43	9	4691	4705
37.	Iron(III) Chloride Benzotriazole Adduct for	International Journal of Hydrogen Energy	Kothandaraman Ramanujam	Anjaiah Sheelam	2018	43	9	4754	4762

	Oxygen Reduction Reaction in Alkaline Medium								
38.	Carbon supported g-C ₃ N ₄ for electrochemical sensing of hydrazine.	Electrochemical Energy Technology	Kothandaraman Ramanujam	T. Thirupathi	2018	4	1	21	31
39.	Ternary lithium molybdenum oxide, Li ₂ Mo ₄ O ₁₃ : A new potential anode material for high-performance rechargeable lithium-ion batteries	Electrochimica Acta	Kothandaraman Ramanujam	Rakesh V, Chan-Jin-Park, and Varadaraju U V	2017	258	-	1445	1452
40.	Aquotris(benzotriazole)sulfato-copper(II)-benzotriazole framework assembled on multiwalled carbon nanotubes through π - π interaction for H ₂ O ₂ sensing in pH 7 buffer solution	Journal of The Electrochemical Society	Kothandaraman Ramanujam	Gayathri Prakasam	2017	164	12	B591	B601
41.	Green, Seed-Mediated Synthesis of Au Nanowires and its Efficient Electrocatalytic Activity in Oxygen Reduction Reaction	ACS Applied Materials and Interfaces	Kothandaraman Ramanujam	Sathiya Balasubramaniam, Anjaiah Sheelam, and Dhamodharan Raghavachari	2017	9	34	28876	28886

42.	Metal-Organic Complexes, [Co(bpy) ₃](NO ₃) ₂ and [Co(bpy) ₂ NO ₃](NO ₃) ₂ ·5H ₂ O, for Oxygen Reduction Reaction	Journal of The Electrochemical Society	Kothandaraman Ramanujam	Anjaiah Sheelam	2017	164	9	F1022	F1029
43.	Introduction of carbonyl groups: A novel approach to enhance electrochemical performance of conjugated dicarboxylate for Li-ion batteries	Journal of The Electrochemical Society	Kothandaraman Ramanujam	Veerababu M	2017	164	7	A1720	A1725
44.	Electrochemically synthesized molecularly imprinted polythiophene nanostructures as recognition elements for an aspirin-chemosensor	Sensors and Actuators B: Chemical	Kothandaraman Ramanujam	Subramanian Suriyanarayanan, Sudip Mandal, and Ian A. Nicholls	2017	253	-	428	436
45.	Understanding the photo-electrochemistry of metal-free di and tri substituted thiophene based organic dyes in dye-sensitized solar cells using DFT/TD-DFT studies	Ionics	Kothandaraman Ramanujam	Sudip Mandal, Shamsheer Rao	2017	23	12	3545	3554
46.	Novel ethynyl-pyrene substituted phenothiazine based metal free organic	Journal of Materials Chemistry A	Kothandaraman Ramanujam	Nagarajan Bhanumathi, Suman Kushwaha,	2017	5	21	10289	10300

	dyes in dscc with 12 % conversion efficiency			Ramachandran Elumalai, Sudip Mandal, and Dhamodharan Raghavachari					
47.	Rational Functionalization of Perylene Diimide for Stable Capacity and Long-term Cycling Performance for Li-ion Batteries	Electrochimica Acta	Kothandaraman Ramanujam	Veerababu M	2017	232	-	244	253
48.	Efficient light harvesting in dye sensitized solar cells using broadband surface plasmon resonance of silver nanoparticles with varied shapes and sizes	Materials Letters	Kothandaraman Ramanujam	Dhavalkumar N Joshi, Sudip Mandal, R Arun Prasath	2017	193	-	288	291
49.	Flexible paper-based borohydride-vanadium fuel cell for powering micro-nanosystems	Ionics	Kothandaraman Ramanujam	Vasudevarao P	2017	23	7	1811	1817
50.	On In-situ Redox Balancing of Vanadium Redox Flow Battery Using D-Fructose as Negative Electrolyte Additive	ChemistrySelect	Kothandaraman Ramanujam	Vasudevarao P	2017	2	2	720	727

51.	Reversible Sodium Storage Behavior of Aromatic Diimide Disodium Carboxylates	Journal of The Electrochemical Society	Kothandaraman Ramanujam	Veerababu M, Nirmalendu K	2017	164	1	A6147	A6153
52.	Effect of Protonated Amine Molecules on the Oxygen Reduction Reaction on Metal-Carbon Based Catalysis	Electrocatalysis	Kothandaraman Ramanujam	Karthikayini M.P, Guanxiong Wang, P. A. Bhohe, Anjaiah Sheelam, Vijay K Ramani, K. R. Priolkar	2017	8	1	74	85
53.	A non-platinum counter electrode, MnNx/C, for dye-sensitized solar cell applications	Applied Surface Science	Kothandaraman Ramanujam	Suman Kushwaha, MP Karthikayini, Guanxiong Wang, Sudip Mandal, Preeti A Bhohe, Vijay K Ramani, KR Priolkar	2017	418	-	179	185
54.	Lithium salt of biphenyl tetracarboxylate as an anode material for Li/Na-ion batteries	Applied Surface Science	Kothandaraman Ramanujam	Veerababu Medabalmi, Guanxiong Wang, Vijay K Ramani	2017	418	-	9	16
55.	In-situ carbon coated CuCo ₂ S ₄ anode material for Li-ion battery applications	Applied Surface Science	Kothandaraman Ramanujam	Rakesh Verma, U. V. Varadaraju	2017	418	-	30	39
56.	Synthesis, photophysical, electrochemical and DSSC application of novel donor-	New Journal of Chemistry	P. Rajakumar	Rajavelu K, Sudip Mandal and	2016	40	12	10246	10258

	acceptor triazole bridged dendrimers with triphenylamine core and benzoheterazole as surface unit			Kothandaraman Ramanujam					
57.	DFT/TD-DFT studies of metal-free N-annulated perylene based organic sensitizers for dye-sensitized solar cells: Is thiophene spacer essential for improving the DSSC performance?	ChemistrySelect	Kothandaraman Ramanujam	Sudip Mandal	2016	1	18	5854	5862
58.	A DSSC with an Efficiency of ~10%: Fermi Level Manipulation Impacting the Electron Transport at the Photoelectrode-Electrolyte Interface	ChemistrySelect	Kothandaraman Ramanujam	Suman Kushwaha, Sudip Mandal, Sundar S and A. Subramanyam	2016	1	19	6179	6187
59.	Nitrogen Functionalized Few Layer Graphene Derived from Metal-Organic Compound: A Catalyst for Oxygen Reduction Reaction	Electrochimica Acta	Kothandaraman Ramanujam	Anjaiah Sheelam	2016	216	-	457	466

60.	Nanocrystalline Na ₂ Mo ₂ O ₇ : A New High Performance Anode Material	Electrochimica Acta	Kothandaraman Ramanujam	Rakesh Verma, Varadaraju U V	2016	215	-	192	199
61.	Probing oxygen reduction and oxygen evolution reactions on bifunctional non-precious metal catalysts for metal-air batteries	RSC Advances	Kothandaraman Ramanujam	Thirupathi Thippani, Sudip Mandal, Guanxiong Wang and Vijay K. Ramani	2016	6	-	71122	71133
62.	Carbon supported Co(III) dimer for oxygen reduction reaction in alkaline medium	Ionics	Kothandaraman Ramanujam	Anjaiah Sheelam, Sudip Mandal, Thirupathi Thippani and Ramkumar V	2016	22	11	2183	2194
63.	Metal-free bipolar/octupolar organic dyes for DSSC application: A combined experimental and theoretical approach	Organic Electronics	Kothandaraman Ramanujam	Sudip Mandal, Suman Kushwaha, Ramesh Mukkamala, Vijaya K. Siripina, Indrapal Singh Aidhen and Rajakumar B	2016	36	-	177	184
64.	Disodium dimolybdate: A potential high performance anode material for rechargeable sodium ion battery applications	Journal of Solid State Electrochemistry	Kothandaraman Ramanujam	Rakesh Verma, Varadaraju U V	2016	20	5	1501	1505

65.	Multifunctional Copper Dimer: Structure, Band Gap Energy, Catalysis, Magnetism, Oxygen Reduction Reaction and Proton Conductivity	RSC Advances	Sukhendu Mandal	Debraj Sarkar, Purna Chandra Rao, Harshitha Barike Aiyappa, Sreekumar Kurungot, Sudip Mandal and Kothandaraman Ramanujam	2016	6	44	37515	37521
66.	Highly active and durable non-precious metal catalyst for the oxygen reduction reaction in acidic medium	Journal of The Electrochemical Society	Kothandaraman Ramanujam	Karthikayini M.P, Thirupathi T, Guanxiong Wang and Vijay K Ramani	2016	163	6	F539	F547
67.	Reversible lithium storage behaviour of aromatic diimide dilithium carboxylates	Electrochimica Acta	Kothandaraman Ramanujam	M Veerababu and UV. Varadaraju	2016	193	-	80	87
68.	Controlling the nitrogen content of metal-nitrogen-carbon based non-precious-metal electrocatalysts via selenium addition	Journal of The Electrochemical Society	Kothandaraman Ramanujam	Karthikayini M.P, Venkateshkumar Prabhakaran and Vijay K. Ramani	2015	162	6	F475	F482
69.	Improved electrochemical performance of lithium / sodium perylene-3,4,9,10-tetracarboxylate as an anode material for secondary rechargeable batteries	International Journal of Hydrogen Energy	Kothandaraman Ramanujam	M Veerababu and UV. Varadaraju	2015	40	43	14925	14931

70.	Nitrogen Precursor Effects in Iron-Nitrogen-Carbon Oxygen Reduction Catalysts	Electrochemical and Solid-State Letters	S. C. Barton	N. Vijayadurga, N D. Leonard and Kothandaraman Ramanujam	2011	14	6	B55	B58
71.	CH ₃ OH oxidation activities of an unsupported Pt _x Ru _y powder catalyst before and after different electrochemical treatments	ECS Transactions	C. Bock, and B. MacDougall	Kothandaraman Ramaujam	2010	28	30	91	104
72.	Non-precious oxygen reduction catalysts prepared by high-pressure pyrolysis for low temperature fuel cells	Applied Catalysis B: Environmental	S. C. Barton	Kothandaraman Ramanujam and N. Vijayadurga	2009	92	1-2	209	216
73.	Methanol Anode Modified by Semipermeable Membrane for Mixed Feed DMFCs	Journal of The Electrochemical Society	S. C. Barton	Kothandaraman Ramanujam, Weihua Deng, Moses Sorkin, Arthur Kaufman and Frank Gibbard	2008	155	9	B865	B868
74.	Direct Borohydride/Hydrogen Peroxide Fuel Cell with Reduced Alkali Crossover	Fuel Cells	A. K. Shukla	Kothandaraman Ramanujam	2007	7	3	225	231
75.	Tailoring a Pt-Ru catalyst for enhanced methanol electro-oxidation	Journal of Power Sources	A. K. Shukla	Kothandaraman Ramanujam, A. Gayen, M. S. Hegde, K. R.	2006	157	1	45	55

				Priolkar, P. R. Sarode and S. Emura					
76.	A 28W portable direct borohydride-hydrogen peroxide fuel-cell stack	Journal of Power Sources	A. K. Shukla	Kothandaraman Ramanujam and S. K. Prashant	2006	162	2	1073	1076
77.	An alkaline direct borohydride fuel cell with hydrogen peroxide as oxidant	Journal of Power Sources	A. K. Shukla	N. A. Choudhury and Kothandaraman Ramanujam	2005	143	1-2	1	8
78.	Electro-reduction of hydrogen peroxide on iron tetramethoxy phenyl porphyrin and lead sulfate electrodes with application in direct borohydride fuel cells	Journal of Applied Electrochemistry	A. K. Shukla	Kothandaraman Ramanujam	2005	35	11	1157	1161
79.	Electro-oxidation of ascorbic acid on polyaniline and its implications to fuel cells	Journal of Power Sources	A. K. Shukla	S. K. Mondal, Kothandaraman Ramanujam and N. Munichandriah	2005	145	1	16	20
80.	Advances in mixed-reactant fuel cells	Fuel Cells	A. K. Shukla	Kothandaraman Ramanujam and K. Scott	2005	5	4	436	447
81.	Carbon-Supported Pt-Fe alloy as a methanol-resistant oxygen-reduction catalyst for direct methanol	Journal of Electroanalytical Chemistry	A. K. Shukla	Kothandaraman Ramanujam, N. A. Choudhury, K. R. Priolkar, P. R.	2004	563	2	181	190

	fuel cells			Sarode, S. Emura and R. Kumashiro					
82.	A solid-polymer electrolyte direct methanol fuel cell with a methanol-tolerant cathode and its mathematical modeling	Journal of Applied Electrochemistry	A. K. Shukla	Kothandaraman Ramanujam and G. Murgia	2004	34	10	1029	1038
83.	A high-output voltage direct borohydride fuel cell	Electrochemical and Solid-State Letters	A. K. Shukla	Kothandaraman Ramanujam and N. A. Choudhury	2004	7	12	A488	A491
84.	Methanol-resistant oxygen-reduction catalysts for direct methanol fuel cells	Annual Review of Materials Research	A. K. Shukla	Kothandaraman Ramanujam	2003	33		155	168
85.	An improved-performance liquid-feed solid-polymer-electrolyte direct methanol fuel cell operating at near-ambient conditions	Electrochimica Acta	A. K. Shukla	C. L. Jackson, K. Scott and Kothandaraman Ramanujam	2002	47	21	3401	3407

10. PATENTS GRANTED

1. Novel catalyst for oxygen reduction reaction in fuel cells, SAC Barton, K. **Ramanujam**, V. Nallathambi (U.S. Patent, Year: 2016, # 9,379,388).
2. A method of preparing novel catalysts for oxygen/air reduction of fuel cells and metal-air batteries Kothandaraman, R. and Karthikayini M P (Indian Patent, Year: 2019, Patent No. 324235).

11. PATENTS APPLIED

1. A new 'multilayer sandwich design' of a Redox Flow Battery Cell, Kothandaraman R. and Varadaraju U V (Indian Patent, Year: 2013, App. No.: 3713/CHE/201).
2. Organic materials capable of suppressing H₂ evolution and oxidizable by V⁵⁺ (VO₂⁺) for redox balancing in vanadium redox flow battery. Kothandaraman R and Vasudevarao P (Indian Patent, Year:2016, App. No. 201641030008).
3. Solvent Filled Multiwalled Carbon Nanotubes for Enhanced Electrochemical Sensing Applications. Kothandaraman R, and Tamilselvi G. (Indian Patent, Year: 2018, App. No. 201841042599).
4. Molecular and Electrode Engineering of Pentacene-5,7,12,14-tetraone for sustainable organic Aqueous Zn-ion batteries. Kothandaraman R, Veerababu M, Chinamay R. (Indian Patent, Year: 2019, IDF NO. 1945)
5. Organic catholyte materials for aqueous organic flow battery. Kothandaraman R, Indrapal Singh Aidhen, Raja M and Jagadeeswari S (Indian Patent, Year: 2020, IDF NO. 2067)

12. ACTIVITIES RELATING TO PROMOTION OF SCIENCE

12.1 THESIS REVIEWED/ VIVA-VOCE CONDUCTED

	Year	Thesis title/student name/institution details
1.	2020	Impact of reactive oxygen species in electrogenerated chemiluminescence, C Venkateswara Raju, AcSIR, Central Electrochemical Research Institute, Karaikudi, Tamilnadu
2.	2020	Development of phosphors for solar cells and LED applications, Akta Verma, Indian Institute of Technology (Indian School of Mines), Dhanbad-- 2020
3.	2020	Metal and metal oxide nanostructures for applications in organic solar cells and memory devices, Abhijith T, Department of Physics, National Institute of Technology, NIT Campus P.O-673601, Kozhikode, Kerala
4.	2019	Binary metal oxide nanostructures for energy conversion and storage application Gyan prakash sharma, Indian Institute of Technology Kanpur
5.	2019	Studies on metal-free electrocatalysts for oxygen reduction reaction in polymer electrolyte membrane fuel cells, Srinu Akula, Academy of Scientific and Innovative Research (AcSIR), CSIR-Central Electrochemical Research Institute, Taramani, Chennai
6.	2019	Microbial fuel cells for energy and environmental applications, M. Sindhuja, SRM Institute of Science and Technology, Chennai
7.	2019	Nanoarchitected materials for electrochemical applications
8.		<i>S. Arulmani, National Institute of Technology -Trichy</i>
9.	2018	Development of nano/ultra fine structured silicon ball milling and spark plasma
10.		<i>R Murugasami, National Institute of Technology -Trichy</i>
11.	2019	Heteroatom doped reduced graphene oxide for electrochemical supercapacitor application
12.		<i>S. Suresh Balaji, AcSIR (Academy Of Scientific & Innovative Research) CSIR-CECRI (Council of Scientific & Industrial Research -Central Electrochemical Research Institute), Karaikudi</i>
13.	2018	Eco-benign electrodes and binders for energy storage applications

14.		<i>K.R. Saravanan</i> , AcSIR (Academy Of Scientific & Innovative Research) CSIR-CECRI (Council of Scientific & Industrial Research -Central Electrochemical Research Institute), Karaikudi
15.	2018	Studies on electrode material for lithium-sulfur batteries and supercapacitors ,
16.		<i>R. Aswathy</i> , AcSIR (Academy of Scientific & Innovative Research), CSIR-CECRI (Council of Scientific & Industrial Research -Central Electrochemical Research Institute), Karaikudi
17.	2018	Efficient light harvesting using hybrid plasmonic nanoparticles for energy application
18.		<i>Dhavalkuma N. Joshi</i> , Pondicherry University, Pondicherry
19.	2018	Investigation of polymer materials containing pendant-chromophore for improving the efficiency of dye sensitized solar cells,
20.		<i>R. Selvam</i> , Anna University, Chennai
21.	2017	Kinetics and mechanism of oxidation of aniline and its substituents catalysed by iron (III) phthalocyanine chloride
		<i>P. Tamilselvi</i> , Anna University, Chennai

12.2 INVITED LECTURES (WORKSHOP/CONFERENCE/SYMPOSIUM/SEMINAR)

1.	Title 1: History of lithium based EESS and nobel prize Title 2: Applications of lithium based EESS Organized by: PoisedX, 20 -21 st August 2020
2.	Title: Promising Renewable Energy Storage Options for Sustainable Development in India Webinar organized by: Sathyabhama University and CLRI, 6 th August 2020
3.	Title: Aqueous zinc-ion batteries: focus on the cathode materials for rechargeable battery Webinar organized by: Innovations in Chemical Sciences-2020, VIT Chennai, 21 st August 2020
4.	Title: Sustainable Materials for Energy Storage Seminar Venue: National Centre for Nanoscience and Nanotechnology, University of Madras, Chennai, 16 th March 2020 (this seminar is organized by the Director of National Centre for Nanoscience and Nanotechnology, University of Madras for the post graduate students)
5.	Title: Catalysis on the surface of nanotubes having confined solvent media Conference details: Asian Consortium for Computational Materials Science: International Conference on Materials Genome (ICMG-2020), SRM University, Amaravathi, 5-7 th February 2020.
6.	Title: Solvent Filled Multiwalled Carbon Nanotubes for Sensor and Battery Applications Conference details: Electrochemistry in Industry Health and Environment, BARC, Mumbai, 21-25 th January 2020 (organized by Indian Society for ElectroAnalytical Chemistry)
7.	Title: Ultra high energy efficient redox flow battery,

	Conference details: Frontiers in Materials Processing Applications, Research and Technology (FiMPART, Endorsed by Materials Research Society Singapore), Convention Centre, Ahmedabad, 15-17 th December 2019.
8.	Title: Low Field ¹ H NMR Investigations of Solvent Filled Multiwalled Carbon Nanotubes for Sensor and Battery Applications Symposium details: Solid State and Structural Chemistry Unit, Alumni Symposium 2019, Indian Institute of Science, Bangalore, 13 th December 2019.
9.	Title: Beyond Vanadium Redox Flow Battery: India Specific Solutions for Energy Storage Invited lecture details: Chemical Engineering seminar, Indian Institute of Technology Kanpur, 06 th November 2019
10.	Title: Tuning overpotential and electrolyte structure to realize high energy efficient redox flow battery Conference details: International Conference on Recent Trends in Chemistry of Materials (NCRTCM-2019), Bannari Amman Institute of Technology, Sathyamangalam, 12 th October 2019
11.	Title: Materials for Electrochemical Applications Faculty development program details: STC on 2D Materials, ICSR Hall 3, Indian Institute of Technology Madras, Chennai, 23 rd September 2019
12.	Title: Tuning overpotential and electrolyte structure to realize high energy efficient redox flow battery Conference details: Recent Advances in Materials Science for Sustainable Development-2019 (RAMSSD-2019), VFSTR (Deemed to University), 1 st September 2019
13.	Title: Enhanced Electrochemical Sensing of Endohedral Carbon Nanotubes, Symposium details: Chemistry in-House Symposium (CiHs), Indian Institute of Technology Madras, Chennai, 21 st August 2019
14.	Title: A New Process for Quick Fabrication of Dye Sensitized Solar Cells Invited lecture details: SSN College, Kalavakkam, Chennai, 16 th March 2019
15.	Title: Strategic Partnership with IIT Madras and Joint Workshop Indian Institute of Technology Madras, Chennai 11-13 th July, 2018
16.	Title: Modification of Graphite Felt Electrodes for Vanadium Redox Flow Battery Application Workshop details: Indo-German Joint Scientific Workshop on Membranes for Water and Energy, CSIR- Central Salt and Marine Chemicals Research Institute (CSMCRI), 18 th -20 th February 2019
17.	Title: Recent Developments in Redox Flow Battery Chemistry Conference details: Advanced Nanomaterials for Energy, Environment and Healthcare Applications (ANEH – 2019), Bishop Heber College, Trichy, 05 th February 2019
18.	Title: Stable Radical Ion Based Redox Flow Battery Seminar details: ChEMS Seminar, Chemical Engineering and Materials Science, Michigan State University, 15-16 th October 2018
19.	Title: Metal-air batteries Seminar details: HP Green R&D Centre, Bangalore, 9 th March 2018

20.	Title: Our Recent Experience with Redox Flow Batteries Invited lecture details: CSIR-CECRI (Council of Scientific & Industrial Research -Central Electrochemical Research Institute), Karaikudi, 20 th September 2018
21.	Title: Organic Materials for Energy Science: DFT Guided Molecular Engineering Approach Materials Design and Energy Materials: Computational Approach Seminar details: SRM Institute of Science and Technology, Chennai, 5 th February 2018
22.	Title: Synthetic and Bio-derived Nanostructures for Selective Sensing of Biotinyl Targets Symposium details: Symposium on Materials in Chemistry & Biology, Indian Institute of Technology Gandhinagar, Gujarat, 5 th January 2018.
23.	Title: Metal Organic Framework and Organic Framework Built on Carbon Nanotubes by π - π Interaction for Electrochemical Applications Conference details: CEAMCR-2018, DAE Convention Centre, Anushaktinagar, Mumbai - 15-17 th February-2018
24.	Title: A Strategy of Enhancing the Surface Plasmon Assisted Light Harvesting in Dye Sensitized Solar Cells Conference details: National Convention of Electrochemist (NCE-19), National Institute of Technology –Trichy, 28 - 29 th March 2016
25.	Title: Non-precious metal catalysts for fuel cell application Conference details: INDO-US ECM-2013, Banaras Hindu University, Varanasi, 26 -28 th February, 2013
26.	Title: Non-precious metal catalyst developed by freeze dry method Conference details: Recent Advances in Electrochemical Energy Materials and Devices, Indian Institute of Science (IISc) Bangalore 24-25 th July-2012

13. RESEARCH PROJECTS / GRANT DETAILS

13.1 Consultancy Projects

S.No.	Title of the Project / Role	Amount (Rs. In Lakhs) 1 million = 10 Lakhs	Funding Agency	Year /Status
1.	Converting spent zinc-carbon and zinc based alkaline batteries into a source of nutrients in the manure Role: Principal Investigator (PI)	21	Tide Water Oil Co. Ltd.	2020 /ongoing
2.	Design, Development and Demonstration of 10 kWh/1kW Rechargeable Energy Storage System in Combination with Solar PV Charging: Vanadium Redox Flow Batteries Role: PI	329.45	ONGC	2019 / ongoing

3.	Development of oxygen sensor and gas purification system Role: PI	1.18	Elixir Electronics	2019 / completed
4.	Fuel cell reactor for H ₂ O ₂ production Role: PI	1.50	Research Supporters Initiative	2019 / completed
5.	Gold Colouring Project Role: PI	9.0	Titan Limited	2017 / completed
6.	Current efficiency improvement in KClO ₃ plant Role: PI	0.5	Vaighai Industries Pvt. Ltd. Karaikal	2018/ completed

13.2 Sponsored Projects

S. No.	Title of the Project	Amount (Rs.) in lakhs 1million = 10 lakhs	Funding Agency	Year
1.	Tailoring of quinones as high energy density cathode materials for sustainable secondary aqueous Zn-ion batteries Role: PI	6.1	IIT Madras: Exploratory Research Proposal Category	2020
2.	On the reduction of iR-losses, flow optimization and identifying alternative membranes to Nafion for 1kW4kWh vanadium redox flow battery suitable for residential use Role: PI	98	STARS	2019 (Approved)
3.	Ionogel Electrolyte Membrane Fuel Cell (IEMFC) with Plasma Electrolytic Nitrided (PEN) Metallic Bipolar Plate and Effective Flow Field Design Role: Co-PI	56.7	DST	2019 (On going)
4.	DST-IISc Energy Storage Platform on Supercapacitors DST/TMD/MECSP/2K17/20 (G) & © Role: PI (multi institute project)	95.62	DST	2019 (On going)

5.	DST-IITM Solar Energy Harnessing Centre (DSEHC) Role: PI (Organic photovoltaic vertical of DSEHC)	4000	DST	2018 (On going)
6.	CHE1617147MIMPSREE Development of 10 kW /50 kWh Redox Flow Battery System for Solar PV Applications Role: Co-PI	399.84	IMPRINT	2017 (On going)
7.	CHY1718374DSTXKOTH Development and Demonstration of 250W, 1kWh Vanadium Redox Flow Battery Systems Rechargeable by Renewable Energy such as Solar and Wind Energy Role: PI	81.37	DST-CERI	2017 (On going)
8.	Investigation of Stable Organic and Organometallic Radical Ions and Ions as electroactive species in Organic Redox Flow Batteries (RFBs) in Non-aqueous Media Role: Co-PI	75.59	DST	2017 (On going)
9.	Direct Light to Chemical Energy Conversion: A Hybrid of Solar Cell and Battery Role: PI	7.0	IIT Madras: Exploratory Research Proposal Category	2016 (Completed)
10.	CHY14-15/326/CSIR/KOTH Rechargeable zinc-air battery with novel 3D zinc electrodes structure and durable bipolar cathode Role: PI	3.0	CSIR	2015 (completed)
11.	CHY 14-15/318/DSTX/KOTH Polynuclear Transition Metal Complexes for Electrochemical Reduction of Oxygen Role: PI	24.00	DST-Fast track	2015 (completed)
12.	CHY 13-14/310/DSTX/EDAM Synthesis, Fabrication and Performance Evaluation of Dye Sensitized Solar Cell (DSSC) with Ionic Liquid as Electrolyte and Carbon Rich, Fractal type Molecular	300	DST-SERI	2013 (Completed)

	Assembly as Photon Absorbing Species: A Novel Approach to Enhance the Efficiency of DSSC Role: Co-PI			
13.	CHY1213/297/ICSR/UVVA Demonstration of 1.5W Single Cell all Vanadium Flow Battery Role: Co-PI	7.3	IIT Madras	2013 (completed)
14.	ICSR/ISRO-IITM/CHY/11-12/135/KOTH Non-precious Metal Catalyst for Oxygen Reduction Reaction in Polymer Electrolyte Membrane Fuel Cells (PEMFC) with Improved Durability and Activity Role: PI	29.7	ISRO	2011 (completed)
15.	CHY/11-12/274/NRSP/KOTH Non-precious metal catalysts with increased active catalytic-site density for electrochemical oxygen reduction reaction Role: PI	8.80	Nissan-Renault	2011 (completed)

13.3 NPDF projects hosted / other grant details

S.No	Title of the Project	Amount (Rs. In lakhs) 1 million = 10 lakhs	Scholar Name	Year
1.	INSA visiting scientist programme		Dr. L Kungumadevi	2020 (Approved)
2.	Light induced process of Hierarchical electron cascade system, Materials and Devices for Solar energy conversion (Teachers Associateship For Research Excellence- TARE)	10.05	Dr. M. Asha Jhonsi	2019 (ongoing)
3.	ICS/18-19/832/RFIE/MAHS Iron-Dicyano Dichloro Quinone Primary/Reserve Battery	2.0	ICSR-IITM Innovative Project	2019 (completed)
4.	CHY1718376DSTXKOTH	19.2	Dr. Selvam	2017 (completed)

	Enhance photovoltaic performances of dye-sensitized solar cells sensitized with triphenylamine/phenothiazine-oxindole/dithienobenzotriazole based dyes			
5.	CHY1718389DSTXKOTH Permselective membrane and polymer/garnet electrolyte fro Li-S batteries	19.2	Dr. M. Raja	2017 (completed)
6.	CHY1718394DSTXKOTH Novel porous 3D architectures of Nanocarbons for the Photo and Electrochemical Production of Green fuels from CO ₂ and H ₂ O: A Better solution for the two global problems	19.2	Dr Chiranjeevi Srinivasarao Vusa	2017 (completed)
7.	CHY1617355DSTXKOTH Electroorganic Modifications of Graphene into Redox-mediator-cum-Substrate to Immobilize Glucose Oxidase/Cholestrol Oxidase for Bio-sensor Applications	19.2	Dr. P. Gayathri	2016 (completed)

14. Member of

- The Electrochemical Society, New Jersey-USA
- Royal Society of Chemistry (RSC)
- Society for Advancement of Electrochemical Science and Technology(SAEST), Central Electrochemical Research Institute, Karaikudi, India
- Chemical Research Society of India (CRSI)
- Materials Research Society of India (MRSI), Indian Institute of Science, Bangalore
- Indian Society for ElectorAnalytical Chemistry, Bhabha Atomic Research Centre -Mumbai, India
- SACSE, Kalpakkam, India
- Society for Materials Chemistry (SMC), Bhabha Atomic Research Centre, Mumbai

15. Work presented in International conferences (2011-2020)

1. G. Tamilselvi, and R. Kothandaraman, "1-Amino 2-Naphthol Modified Solvent Filled Carbon Nanotubes for Enhanced Electrochemical Sensing of Bioanalytes" 237th ECS Meeting with the 18th International Meeting on Chemical Sensors (IMCS 2020) (May 10-14, 2020). The Electrochemical Society, **2020**.
2. Ramaprabhu, Sundara, R. Kothandaraman and Dipsikha Ganguly, "Low Pt Loaded Nitrogen Doped Carbon as Efficient Catalyst Support for Proton Exchange Membrane Fuel Cells" 236th ECS Meeting October 13, 2019 - October 17, 2019 Atlanta, GA, Meeting Issue No. 35, Page. No. 1571, The Electrochemical Society, **2019**.

3. Yashwant Pratap. K, Akula, S., Sahu, and R. Kothandaraman, "Synthesis of Pt/C Catalyst Using Carbon Support Derived from Tamarind Seeds through Hetroatom Doping for Oxygen Reduction Reaction" 235th ECS Meeting May 26, 2019 - May 30, 2019 Dallas, TX, Meeting Issue. No. 33, Page No. 1747, The Electrochemical Society, **2019**.
4. R. Kothandaraman and Anjaiah Sheelam "A Simple and Inexpensive Organometallic Compound Catalyzing Oxygen Reduction Reaction" 230th ECS Meeting October 2, 2016 - October 7, 2016 Honolulu, HI, Meeting Abstract No. 2822, Issue No. 38, The Electrochemical Society, **2016**.
5. Veerababu, Medabalmi, U. V. Varadaraju, and R. Kothandaraman "Lithium Biphenyl-3, 3', 4, 4'-Tetracarboxylate Based Anode Material for Li and Na-Ion Battery Application" 229th ECS Meeting May 29, 2016 - June 2, 2016 San Diego, CA, Meeting Abstract No. 505, Issue No. 5, The Electrochemical Society, **2016**.
6. Sheelam, Anjaiah, and R. Kothandaraman "Effect of oxidation states of vanadium in VNC based non-precious metal catalyst for fuel cells in acidic medium" 224th ECS Meeting October 27, 2013 - November 1, 2013 San Francisco, CA, Meeting Abstract No. 306, Issue No. 5, The Electrochemical Society, **2013**.
7. R. Kothandaraman, and M. P. Karthikayini "Mn Based NPM Catalyst for Oxygen Reduction Reaction in Acidic Medium for Pemfcs" 224th ECS Meeting October 27, 2013 - November 1, 2013 San Francisco, CA, Meeting Abstract No. 308, Issue No. 5, The Electrochemical Society, **2013**.
8. R. Kothandaraman "A Novel Approach for Effective ORR NPM Catalysts Development" 221st ECS Meeting May 6 - May 10, 2012 Seattle, Washington, Meeting Abstract No. 291, Issue No. 6, The Electrochemical Society, **2012**.
9. R. Kothandaraman "Improving Oxygen Reduction Activity of the Iron-Nitrogen-Carbon Catalysts by Formation of Fruitful Active Sites" 220th ECS Meeting October 9 - October 14, 2011 Boston, MA, Meeting Abstract No. 322, Issue No. 7, The Electrochemical Society, **2011**