R. PRAKASH

Scientist F & Team Leader, Centre for Automotive Energy Materials (CAEM)
International Advanced Research Centre for Powder Metallurgy & New Materials (ARCI)
IITM Research Park, 7th Floor, 6-Kanagam Road, Taramani, Chennai-600113. India
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EDUCATION

Ph.D. Chemistry (Apr 1995−May 1999)

Central Salt & Marine Chemicals Research Institute, Bhavnagar University, Bhavnagar, India
Thesis title: Activation of N–N bonds by coordinately unsaturated transition metal complexes and catalytic reduction of nitrogenous compounds in aqueous solution

M.Phil. Chemistry (Jan 1993−Dec 1994)

Department of Chemistry, Bharathiar University, Coimbatore, India
Thesis title: Studies on alpha- and beta-alanine complexes of metal with hydrazine

M.Sc. Chemistry (May 1990−Dec1992)

Sri Ramakrishna Mission Vidyalaya Arts and Science College, Bharathiar University, Coimbatore, India
Thesis title: A study of jigger dyeing on cotton fabrics and beam dyeing of polyester fabrics

B.Sc. Chemistry (May 1987−Apr1990)

Sri Ramakrishna Mission Vidyalaya Arts and Science College, Bharathiar University, Coimbatore, India

PROFESSIONAL EXPERIENCE

Scientist F (Oct 2019-Present), **Scientist E** (Jun 2014-Sep 2019) & **Senior Scientist** (Jan 2012-Jun 2014)
Centre for Automotive Energy Materials (CAEM), ARCI Chennai, India

Scientist (Dec 2007-Dec 2011)
Karlsruhe Institute of Technology (KIT), Institute of Nanotechnology (INT), Karlsruhe, Germany

Research Scientist (Jul 2004−Nov 2007)

Institute of Organic Chemistry, University of Erlangen-Nuernberg, Erlangen, Germany

Postdoctoral Research Fellow (Oct 1999−Jun 2004)

Institute of Inorganic Chemistry, University of Erlangen-Nuernberg, Erlangen, Germany

Provisional Research Associate (Apr 1999−Sep 1999)

Central Salt & Marine Chemicals Research Institute, Bhavnagar, India

Senior/Junior Research Fellow (Apr 1995−Mar 1999)
Central Salt & Marine Chemicals Research Institute, Bhavnagar, India

HONOR / AWARD / FELLOPSHIP / MEMBERSHIP

Jan 2020	'International Distinguished Scientist' by IJRULA and World Research Council and United Medical Council at Trichy for his work on 'Lithium-ion battery'.
Dec 2019	Best Poster Award at NCSSI-13 Conference, IIT-Roorkee, Roorkee.
Jul 2016	Best Poster Award at FCST Conference, NIT-Warangal, Warangal.
Jun 2014	Member of The Electrochemical Society (ECS, No: 364500)
Jan 2012	Reviewer for; Advanced Energy Materials, ACS Sustainable Chemistry& Engineering, Electrochimica Acta Inorganic Chemistry; Nitric Oxide: Biology and Chemistry; Journal of Coordination Chemistry, etc.
Mar 2011	KIT press release and German TV channel -SWR televised my LIB work on conversion materials
Sep 2010	Bibliography inclusion in the 28th Edition of Marquis Who's Who in the World-2011

Jul 2010	Special Poster Award (Nanomaterials in Energy Applications) at ENMAT-2010 conference, Germany
Jul 2009	LIB Research activities telecasted in TV channels (Bayerischen Rundfunks-Alpha & Deutsche Welle (DW)
Mar 2006	Highlighted Paper in Chemistry A European Journal
Jan 2004	Very Important Paper (VIP) in Angewandate Chemistry International Edition
Oct 1999	Postdoctoral Research Fellowship, Deutsche Forschungsgemineschaft, Institut für Anorganische Chemie, Erlangen, Germany
Apr 1999	Provisional Research Associate, Council of Scientific & Industrial Research, New Delhi
Apr 1997	Senior Research Fellowship, Council of Scientific & Industrial Research, New Delhi
Apr 1995	Junior Research Fellow, Central Salt & Marine Chemicals Research Institute, Bhavnagar
Dec 1994	Distinction status for M.Phil. Thesis, Bharathiar University, Coimbatore
Apr 1991	Academic Proficiency Award in M.Sc., SRKMV Arts College, Bharathiar University, Coimbatore
Apr 1990	Academic Proficiency Award in B.Sc., SRKMV Arts College, Bharathiar University, Coimbatore

PROJECT HANDLED/HANDLING

ARCI, Chennai (2012-present)

- Lithium ion batteries and BMS for electric vehicles
- Development of Li-ion batteries for electric vehicle application

Karlsruhe Institute of Technology, Germany (2007-2011)

- Development of high-energy density electrode materials for lithium-ion batteries for energy storage applications

University of Erlangen-Nurnberg, Germany (1999-2006)

- Synthesis of novel metal-centered mixed-valent heterometallic wheels for Single Molecule Magnets applications
- Investigation of sulfur-rich ruthenium nitrosyl complexes as nitric oxide drug delivery agents
- Sulfur-rich Ni/Fe complexes: A structural and functional mimic of [NiFe] hydrogenases
- Studies of sulfur-rich Fe/Ru/Os complexes in relevant to nitrogenases function

CSMCRI, Bhavnagar (1995-1999)

- Denitrification of nitrates and nitrites enriched water/effluents by cationic-membrane-cell electrolysis
- Electrocatalytic reduction of N-N bonds by ruthenium aminopolycarboxylates in aqueous solution
- Electrochemical study of thin-film metal-coated cation-exchange membranes

INVITED TALK / LECTURE

1. An overview of lithium-ion battery technology and materials development at ARCI, Golden Jubilee Conference, DST, India, January 22, **2021**.
2. Lithium-ion cell technology and materials development at ARCI, Indo-African Bilateral Workshop, December 16, **2020**.
3. Energy materials for e-mobility applications, International Conference on Automotive Materials and Manufacturing, ARAI Pune, December 3-4, **2020**.
4. Tailoring the structure of materials and electrode fabrication process for high power lithium ion batteries, International workshop on Materials for Energy Conversion and storage, IIT Tirupati, December 24-25, **2019**.
5. Development of lithium-ion battery for the integration of e-mobility and renewable energy, *Industry-Academia Conclave for the integration of e-mobility and renewable energy*, VIT Vellore, December 13, **2019**.
6. Li-ion battery program at ARCI for electric mobility application, *Meeting on establishment of Center of Excellence in Energy Storage Technologies for EV and portable mobile device applications*, IIT Bhilai, Bhilai, April 30, **2019**.
7. Li-ion batteries for Electric Vehicles, *Workshop for ETWDC*, Kongu College of Engineering, Erode on March 15, **2019**.
8. Li-ion batteries for green energy applications, *National symposium on green energy and its green chemistry for sustainable future*, Menakshi college for Women, Chennai, February 22, **2019**.
9. Li-ion batteries and beyond, *Batteries, innovation and safety, going beyond lithium Workshop*, New Delhi, February 25-27, **2019**.

10. Development of Materials and components for clean energy applications, *National conference on renewable energy and its applications in mitigation of climate changes*, PSGR Krishnammal College of Women, Coimbatore, January 21-22, **2019**.
11. Li-ion battery development at ARCI for electric mobility, *Second IESA ICAT EV Conclave*, IMT Manesar, Gurgaon, May 17-18, **2018**.
12. Development of electrode for fabrication lithium ion batteries for electric vehicle application, *Conclave on Materials & Technologist in Energy Conversion & Storage (MTECS 2018)*, IIITDM, Kanchipuram, December 28 - 29, **2018**.
13. Development and upscaling of electrode materials and fabrication of lithium-ion cell/battery for electric vehicle application, *International Meeting on Energy Storage Devices (IMESD) –2018*, IITR, Roorkee, December 10 –12, **2018**.
14. Lithium-ion battery on electric mobility, *Electric vehicles initiatives and technology (eVIT) conclave*, Vellore Institute of Technology (VIT), Chennai, March 10, **2018**.
15. Green technology development at ARCI, National conference on global warming, green energy and environmental pollution- Go Green 2018, Velammal Institute of Technology, Chennai, March 9, **2018**.
16. Lithium ion battery development program at ARCI for Electric Vehicle Application, *Indo-US Science and Technology Forum workshop on Recent Advances in Multiscale, Multiphysics Analysis of Energy conversion in Li-ion Batteries*, IIT Bombay, Mumbai, June 17-19, **2016**.
17. Lithium ion Battery Technology for Electric Vehicle Application, PoSDAC Workshop, RCI, Hyderabad on April 28, **2015**.
18. Development of large lithium-ion batteries for electrical vehicle applications, *Indo-UK joint seminar on functional energy materials, manufacturing and structures (FAEMMA-2013)*, University of Hyderabad, Hyderabad, Mar 26, **2013**.
19. Metallocene based [M/LiF/C] nanocomposite as stable electrode in lithium ion batteries, *Advanced Research Center International (ARCI) for Powder Metallurgy & New Materials (ARCI)*, Hyderabad, India, Feb 18, **2011**.
20. Ferrocene based carbon–Iron/lithium fluoride nanocomposite as stable electrode material in lithium batteries, *Materials Challenges in Alternative & renewable Energy 2010,* Cocoa Beach, Florida, USA, Feb 21-25, **2010**.
21. Synthesis and reactivity studies of sulfur- and oxygen-rich transition metal compounds, *Institute of Nanotechnology, Forschungszentrum Karlsruhe*, Karlsruhe, Germany, Sep 23, **2007**.
22. High Performance Liquid Chromatography, *School of Biomedical and Natural Sciences, Nottingham Trent University, Nottingham*, UK, May 25, **2007**.
23. Radioactivity– A Context Based Learning, *Centre of Effective Learning in Science (CELS), Nottingham Trent University, Nottingham,* UK, Mar 15, **2007**.
24. Chemistry of Group 14 elements, Department of Chemistry, *National University of Ireland, Galway, Ireland* Oct 23, **2006**.
25. Synthetic model compounds to nitrogenase and hydrogenase enzymes, *Central Salt and Marine Chemicals Research Institute, Bhavnagar*, India, Jan 16, **2002**.

PUBLICATION

Patent

1. Process for the fast formation of solid electrolyte interphase layer on the anode surface in lithium-ion battery, Rikka Vallabha Rao, Sumit Ranjan Sahu, **R. Prakash**, R. Gopalan, G. Sundararajan (filed), **2020**, Indian Patent App. No. **202011052906**.
2. Cathode material for fluoride-based conversion electrodes, method for the production thereof and use thereof. M. Fichtner, H. Hahn, **R. Prakash**, ***US Pat. Appl*. 2013, US8568618 B2**.
3. Carbon encapsulated transition metal oxide nanocomposite, a method for its preparation and its use in Li-ion batteries, M. Fichtner, H. Hahn, **R. Prakash**, ***Eur. Pat. Appl*. 2013, EP 2578539 A1 20130410**.
4. Carbon encapsulated transition metal oxide nanocomposite, a method for its preparation and its use in Li-ion batteries, M. Fichtner, H. Hahn, **R. Prakash**, ***PCT Int. Appl*. 2013**, **WO 2013050115 A1 20130411**.
5. Cathode material for fluoride-based conversion electrodes, method for the production thereof and use thereof. M. Fichtner, H. Hahn, **R. Prakash**, ***PCT Int. Appl*. 2010**, **WO 2010115601 A1 20101014**.

6. Kathodenmaterial für fluorid basierte Konversionselektroden, Verfahren zu seiner Herstellung und seine Verwendung M. Fichtner, **R. Prakash**, H. Hahn, ***Ger. Offen.*** **2010**, **DE 102009017262 A1 20101014**.
7. An improved process for the preparation of ammonia. **R. Prakash**, V. K. Shahi, P. Ray, G. Ramachandraiah, R. Rangarajan, ***Indian Pat. Appl*. 2008**, **IN 2001DE00042 A 20080801**.

Book Chapter

1. Carbon encapsulated-iron lithium fluoride nanocomposite as high cyclic stability cathode material in lithium batteries. **R. Prakash**, C. Kuebel, M. Fichtner, In *Materials Challenges in Alternative & Renewable Energy;* G. Wicks et al. Eds.: *J. American Ceramic Society Transaction volume 224,* John Wiley & Sons Inc., New Jersey, **2011**, pp. 173–181.
2. Electrocatalytic activation and reduction of nitrogen-nitrogen bonds in aqueous solution. **R. Prakash**, G. Ramachandraiah, In *Recent Advances in Basic and Applied Aspects of Industrial Catalysis*; T. S. R. Rao, M. G. Dhar. Eds.; *Studies Surface Science and Catalysis volume 113*, Elsevier, Amsterdam, **1998**, pp. 519–527.

Journal Paper

1. A novel α-MoO_3/single-walled carbon nanohorns composite as high-performance anode material for fast-charging lithium-ion battery, S R. Sahu, V. R. Rikka, P. Haridoss, A. Chatterjee, R. Gopalan, **R Prakash**, *Adv. Energ. Mat.*, **2020**, 10, 2001627.
2. A sustainable tamarind kernel powder based aqueous binder for graphite anode in lithium-ion batteries, V.V. N. Phanikumar, B.V. Appa Rao, K.V. Gobi, R. Gopalan, **R. Prakash**, *ChemistrySelect*, **2020**, 5, 1199-1208.
3. Tailoring micro resistance spot welding parameters for joining nickel tab to inner aluminium casing in a cylindrical lithium ion cell and its influence on the electrochemical performance, V. R. Rikka, S. R. Sahu, A. Roy, S. N. Jana, D. Sivaprahasam, **R. Prakash**, R. Gopalan, G. Sundararajan, *J. Manuf. Process*., **2020**, 49, 463-471.
4. Superior cycling and rate performance of micron-sized Tin using aqueous-based binder as a sustainable anode for lithium-ion batteries, S R. Sahu, V. R. Rikka, P. Haridoss, R. Gopalan, R Prakash, *Energy Technol.,* **2020** 7, 1900849
5. Sc-doping induced cation-disorder in LiNi0. 5Mn1. 5O4 spinel leading to improved electrochemical performance as cathode in lithium ion batteries, S. Bhuvaneswari, U.V. Varadaraju, R Gopalan, R. Prakash, *Electrochim. Acta*, **2019**, 327, 135008.
6. Synthesis of cobalt-rich alloys with high saturation magnetization: A novel synthetic approach by hydrazine reduction method. G S Reddy, S.R. Sahu, **R. Prakash**, M. Jagannatham, *Results Phys.*, 12, **2019**, 652–661.
7. Effect of carbon nanohorns on the electrochemical performance of orthorhombic, hexagonal and monoclinic tungsten trixode nanoplatelets as high-energy anode material for lithium ion batteries S.R. Sahu, V. R. Rikka, P. Haridoss, R. Gopalan, **R. Prakash**, *ECS Meeting (235)*, **2019**, 01, A04.
8. Structural stability and superior electrochemical performance of Sc-doped LiMn2O4 spinel as cathode for lithium ion batteries, S. Bhuvaneswari, U.V. Varadaraju, R. Gopalan, **R. Prakash**, *Electrochimica Acta*, **2019**, 342-351.
9. Investigation on polyvinyl alcohol and sodium alginate as aqueous binders for lithium-titanium oxide anode in lithium-ion batteries, V.V.N. Phanikumar, V.R. Rikka, B. Das, R. Gopalan, B.V.A. Rao, **R. Prakash**, *Ionics*, **2018**, 1-13.
10. N-Doped graphene with anchored ZnFe2O4 nanostructures as an anode for lithium ion batteries with enhanced reversible capacity and cyclic performance, D. Navadeepthy, S. Bhuvaneswari, **R. Prakash**, C. Viswanathanan and N. Ponpandian, *New J. Chem*., **2018**,42, 16564-16570.
11. In Situ/ex Situ Investigations on the Formation of the Mosaic Solid Electrolyte Interface Layer on Graphite Anode for Lithium-Ion Batteries, V.R. Rikka, S.R. Sahu, A Chatterjee, P. V. Satyam, **R. Prakash**, M. S. R. Rao, R Gopalan, G Sundararajan, *J. Phys. Chem. C,* **2018**, 122 (50), 28717–28726.
12. Tungsten trixode nanoparticles-carbon nanohorns composite as anode material for lithium-ion batteries, S.R. Sahu, V.R. Rikka, H. Prathap, R. Gopalan, **R. Prakash**, *ECS Meeting (233)*, **2018**, 1, A01.
13. Tamarind seed skin derived fibre-like carbon nanostructures as novel anode material for lithium-ion battery, Sumit Ranjan Sahu, D. Parimala Devi, V. V. N. Phanikumar, T. Ramesh, N. Rajalakshmi, G. Praveena, **R. Prakash**, B. Das, R. Gopalan, *Ionics*, **2018**, 1-9.

14. Microstructure and Mechanical Properties of Pulse Laser Welded Stainless Steel and Aluminum Alloys for Lithium-Ion Cell Casings, V.R. Rikka, S.R. Sahu, R. Tadepalli, R. Bathe, T. Mohan, **R. Prakash**, G. Padmanabham, R. Gopalan, *Mat. Sci. Eng. B-Adv.*, **2016**, 6, 218-225
15. Synthesis of graphene sheets from single walled carbon nanohorns: Novel conversion from cone to sheet morphology, SR Sahu, Vallabha Rao Rikka, M. Jagannatham, Prathap Haridoss, Abhijit Chatterjee, Raghavan Gopalan, Raju Prakash, Materials Res. Exp., **2017**, 4, 035008.
16. Facile synthesis of carbon encapsulated Fe_3O_4 nanocomposite and its performance as anode material in lithium-ion batteries. **R. Prakash**, K. Fanselau, S. Ren, T. K. Mandal, K. Kuebel, H. Hahn, M. Fichtner, Beilstein *J. Nanotechnol.*, **2013**, *4*, 699.
17. Nano batteries: Future of automotive transportation. T. N. Rao, **R. Prakash**, *Nano Digest*, **2013**, *4*, issue 8, 28-31.
18. Fe_3O_4 anchored onto helical carbon nanofibers as high-performance anode in lithium-ion batteries, S. Ren, **R. Prakash**, D. Wang, V. S. K. Chakravadhanula, M. Fichtner, *ChemSuSChem*, **2012**, *5*, 1394-1400.
19. Synthesis of [Co/LiF/C] nanocomposite and its application as cathode in lithium-ion batteries, C. Wall, **R. Prakash**, K. Kuebel, H. Hahn, M. Fichtner, *J. Alloys Comp.*, **2012,** *530*, 121-126.
20. New battery material for electric vehicles, **R. Prakash**, M. Fichtner, *KIT News Lett*. **2011**, *42*, 1-2.
21. Modified synthesis of [Fe/LiF/C] nanocomposite and its application as cathode material in lithium batteries, **R. Prakash**, A. K. Mishra, C. Wall, C. Kuebel, H. Hahn, M. Fichtner, *J. Power Sources,* **2011**, *196*, 5936–5944.
22. C-encapsulated-Fe/LiF nanocomposite as high stability cathode material in Li batteries. **R. Prakash**, C. Kuebel, M. Fichtner, In *Materials Challenges in Alternative & Renewable Energy;* G. Wicks et al. Eds.: *J. Am. Ceram. Soc. Trans. 224,* John Wiley & Sons Inc., New Jersey, **2011**, 173–181.
23. Ferrocene based carbon-iron lithium fluoride nanocomposite as stable electrode material in lithium batteries, **R. Prakash**, A. K. Mishra, A. Roth, C. Kuebel, T. Scherer, M. Gafari, H. Hahn, M. Fichtner, *J. Mater. Chem*. **2010**, *20*, 1871–1876 (status: **Back Cover Article**).
24. Alternative synthesis, density functional calculations and proton reactivity study of a trinuclear [NiFe] hydrogenase model compound. F. Lauderbach, **R. Prakash**, A. W. Götz, M. Munoz, F. W. Heinemann, U. Nickel, B. A. Hess, D. Sellmann, *Eur. J. Inorg. Chem.* **2007**, 3385–3393.
25. Synthesis and magnetic properties of mixed valent heptanuclear manganese wheels: A high-spin S = 27/2 ground state. R. W. Saalfrank, A. Scheurer, **R. Prakash**, T. Nakajima, F. Hampel, F. W. Heinemann, R. Leppin, B. Pilawa, H. Rupp, P. Müller, *Inorg. Chem*. **2007**, *46*, 1586–1592.
26. Synthesis and redox properties of mixed-valent octanuclear iron defective hexacubanes and a (CaCl) capped body-centered six-sided iron(III) polyhedron. **R. Prakash**, R. W. Saalfrank, H. Maid, A. Scheurer, F. W. Heinemann, A. X. Trautwein, L. H. Boettger, *Angew. Chem. Int. Ed*. **2006**, *45*, 5885–5889; *Angew. Chem.* **2006**, *118*, 6017–6022.
27. Hydrazine nitrosation of metal bound nitric oxide: Structural evidence for the formation of an ammine complex. **R. Prakash**, A. W. Götz, F. W. Heinemann, A. Görling, D. Sellmann, *Inorg. Chem.* **2006**, *45*, 4661–4667.
28. A non-heme dinuclear Fe^{II} complex containing a single unsupported hydroxo bridge, J. P. López, H. Kaempf, M. Grunert, P. Guetlich, F. W. Heinemann, **R. Prakash**, A. Grohmann, *Chem. Commun*. **2006**, 1718–1720.
29. Synthesis and characterization of metal-centered six-membered mixed-valent heterometallic wheels of iron, manganese and indium. R. W. Saalfrank, **R. Prakash**, H. Maid, F. Hampel, F. W. Heinemann, A. X. Trautwein, L. Böttger, *Chem. Eur. J.* **2006**, *12*, 2428–2433 (status: **Highlighted Article**).
30. Visible light induced reversible extrusion of nitric oxide from a Ru^{II} nitrosyl complex: A facile delivery of nitric oxide. **R. Prakash**, A. Czaja, F. W. Heinemann, D. Sellmann, *J. Am. Chem. Soc.* **2005**, *127*, 13758–13759.
31. Protonation and H/D exchange reactions promoted by a sulfur-rich Os^{II} hydride complex: Identification of a labile dihydrogen complex. D. Sellmann, **R. Prakash**, F. W. Heinemann, *Dalton Trans.* **2004**, 3991–3996.
32. Reactivity of thiolate-bridged dinuclear Ru^{II} complex with nitrogenous molecules: Spectroscopic identification of a labile N_2 complex. D. Sellmann, **R. Prakash**, F. W. Heinemann, *Eur. J. Inorg. Chem.* **2004**, 4291–4299.
33. Heterolytic cleavage of molecular hydrogen at a sulfur-bridged dinuclear ruthenium center. D. Sellmann, **R. Prakash**, F. W. Heinemann, M. Moll, M. Klimowicz, *Angew. Chem. Int. Ed.* **2004**, *43*, 1877–1880; *Angew. Chem.* **2004**, *116*, 1913–1916 (status: **Very Important Paper**).
34. Activation of H_2 and CO by sulfur-rich nickel model complexes for [NiFe] hydrogenases and CO dehydrogenases. D. Sellmann, **R. Prakash**, F. W. Heinemann, *Eur. J. Inorg. Chem.* **2004**, 1847–1858.
35. Iron carbonyl, nitrosyl and nitro complexes of a tetrapodal pentadentate amine ligand: Synthesis electronic structure and nitrite-reductase like reactivity. J. P. López, F. W. Heinemann, **R. Prakash**, B. A. Hess, O. Horner, Jean-Louis Oddou, Jean-Marc Latour, A. Grohmann, *Chem. Eur. J*. **2002**, *8*, 5709–5722.

36. Highly-soluble sulfur-rich nickel $[Ni(L)(^{si}S_3)]_3$ complexes ($^{si}S_3$ = bis(2-mercapto-3-trimethylsilylphenyl)sulfide). D. Sellmann, **R. Prakash**, F. Geipel, F. W. Heinemann. *Eur. J. Inorg. Chem.* **2002**, 2138–2146.

37. Ruthenium(III)aminopolycarboxylato complexes active for the reduction of hydrazine and phenylhydrzine in aqueous medium. **R. Prakash**, G. Ramachandraiah, *J. Chem. Soc., Dalton Trans.* **2000**, 85–92.

38. Investigation and characterization of hydrazine and phenylhydazine complexes of Ru^{III} PDTA (1,2-diamino-propanetetraacetate): Facile reduction of hydrazines in relevance to nitrogenases. **R. Prakash**, G. Ramachandraiah, *J. Mol. Catal. A: chemical* **2000**, *151*, 193–204.

39. Solution-membrane equilibrium at metal deposited cation exchange membrane: Chronopotentiometric characterization of metal modified membrane. V. K. Shahi, **R. Prakash**, G. Ramachandraiah, R. Rangarajan, *J. Colloid. Interf. Sci.* **1998**, *216*, 179–184.

40. Electrocatalytic activation and reduction of N-N bonds in aqueous solution. **R. Prakash**, G. Ramachandraiah, In *Recent Advances in Basic and Applied Aspects of Industrial Catalysis*; T. S. R. Rao, M. G. Dhar. Eds.; *Studies Surf. Sci. Catal*.: Elsevier, **1998**, *113*, 519–527.

41. Interaction of $N_2H_4Ph^+$ with Ru^{III} EDTA complexes: Reduction of $N_2H_4Ph^+$ to NH_3 and aniline in aqueous solution. **R. Prakash**, B. Tyagi, D. Chatterjee, G. Ramachandraiah, *Polyhedron* **1997**, *17*, 1235–1240.

42. Electrometric studies on the reduction of Ru^{III} EDTA and its hydrazinium complexes. **R. Prakash**, B. Tyagi, G. Ramachandraiah, *Indian J. Chem.* **1997**, *36A*, 201–205.

43. Voltammetry of $[LRu^{III}(OH_2)]^-$ and $[LRu^{III}(N_2H_5)]$ complexes at mercury electrode in aqueous solution. G. Ramachandraiah, B. Tyagi, **R. Prakash**, *Bull. Electrochem.* **1997**, *13*, 294–298.

44. Chronopotentiometric studies of bipolar membrane in sodium chloride solution. P. M. Gour, **R. Prakash**, R. Rangarajan, G. Ramachandraiah, V. K. Indusekhar, S. K. Adhikary, G. S. Trivedi, B. J. Shah, B. S. Makwana, *Indian J. Chem.* **1996**, *35A*, 796–799.

Conference / Seminar

1. Tamarind kernel powder as a novel aqueous binder for graphite anode in lithium-ion batteries, V. V. N. Phanikumar, B. V. Appa Rao, K. V. Gobi, R. Gopalan and **R. Prakash**, *13th National Conference on Solid State Ionics (NCSSI-13)*, IITR, Roorkee, December 16 –18, **2019** (P).

2. Development of indigenous lithium-ion battery for electric mobility, S. R. Sahu, V. R. Rikka, R. Gopalan and **R. Prakash**, *IISF 2019*, Kolkata, November 5–8, **2019** (T).

3. LiSc0.06Mn1.94O4 as prospective cathode for lithium ion batteries for mobility application, S. Bhuvaneswari, U. V. Varadaraju, R. Gopalan, R. Prakash, *10th International Conference on Materials for Advanced Technologies (ICMAT)*, NTU Singapore, June 23–28, **2019** (P).

4. Scandium-doped LiMn2O4 spinel as stable cathode for lithium ion batteries, S. Bhuvaneswari**,** U. V. Varadaraju, R. Gopalan, R. Prakash, *International Conference on Advanced Materials (ICAM-2019)*, Jamia Millia Islamia University, New Delhi, March 6-7, 2019 (P).

5. Effect of state of charges and depth of discharge on the cycle life of LiFePO4/ Graphite Cell at fast charging for Electric Vehicle Applications, V. R. Rikka, S. R. Sahu, A. Chatterjee, **R. Prakash**, R. Gopalan, G. Sundararajan, *48th Power Sources Conference*, Denver, USA, June 11-14, **2018** (T).

6. Polyvinyl alcohol and sodium alginate as alternate green binders of lithium titanium oxide anode for lithium ion batteries, V.V.N.Phanikumar, B.V. Appa Rao, R.Gopalan and **R. Prakash**, *Third National conference on materials for energy conversion and storage*, IIT-BHU, Varanasi, October 18-20, **2018** (T).

7. Synthesis of bare and metal decorated graphene sheets from single walled carbon nanohorns for lithium ion battery Sumit Ranjan Sahu, Vallabha Rao Rikka, Prathap Haridoss, R. Gopalan, **R. Prakash**, *IMESD 2018*, IIT Roorkee, December 10-12, **2018** (T).

8. Superior Electrochemical Performance of Sc-Doped LiNi0.5Mn1.5O4 Disordered Spinel as Cathode in Lithium Ion Batteries for Electric Vehicle Applications, S. Bhuvaneswari, U. V. Varadaraju, R. Gopalan, **R. Prakash**, *Chemistry Symposium*, IITM Chennai, September 28, **2018** (P).

9. V. V. N. Phanikumar, B. V. Appa Rao, R. Gopalan and R. Prakash, “Effect of polyvinyl alcohol and sodium alginate aqueous binders on lithium titanium oxide anode for lithium-ion batteries” at “National conference on frontiers in chemical sciences and technologies (FCST)” at NIT Warangal, on January 29, **2016** (P)

10. Large scale Lithium ion battery fabrication for EV applications, V. R. Rikka, S. R. Sahu, K. Kumari, S. Vasu, V. V. N. Phanikumar, B. Bhuvaneswari, A. Sivaraj, S. Jana, L. Babu, K. Shanmugam, T.P. Sarangan, R. Gopalan, **R. Prakash**, *Indo - Korean workshop on green mobility and energy materials*, Hyderabad, Nov 26-27, **2015**,(T).

11. Investigation on LiFePO4/C cathode prepared by eco-friendly polyvinyl alcohol (PVA) binder for LIB, K. Tanuja, V. R. Rikka, V. V. N. Phanikumar, S. R. Sahu, **R. Prakash**, R.Gopalan, *National Metallurgists day-annual technical meeting conducted by IIM Kolkata*, Coimbatore, November 13-16, **2015** (P).

12. The effect of electrode thickness on charge/discharge hysteresis of lithium-ion cell, K. Kumari, S.R.Sahu, R.Vallabha Rao, S.Bhuvaneswari, M.B.Sahana, **R.Prakash**, R.Gopalan, *NMD,ATM-2014*, College of Engineering, Pune, November 12-15, **2014** (P).

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PhD Thesis supervision

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2. Synthesis, characterization & doping of olivine/ spinel based materials and its effective binding nature for lithium ion batteries, *V. V. N. Phanikumar*, Centre for Automotive Energy Materials, ARCI Chennai (Dec 2013-present; Ext guide: Prof B. V. Appa Rao, NIT Warangal).
3. Single walled carbon nanohorns-based and carbon nanohorns-derived graphene-based anode materials for lithium-ion battery applications, *Sumit Ranjan Sahu*, Centre for Automotive Energy Materials, ARCI Chennai (Jul 2014-Sep 2020); Ext. guide: Prof. Prathap Haridoss, IITM Chennai).
4. Structure, morphology and electrochemical performance correlation in metal doped spinel (Li Mx Mn2-x OA) (M = Transition metals) as Li ion battery cathode materials, *S. Bhuvaneswari*, Centre for Automotive Energy Materials, ARCI Chennai (Jul 2014-Jun 2020; Ext. guide: Prof. U. V. Varadaraju, IITM Chennai).
5. Investigation of metallocene based materials as conversion cathodes in lithium ion batteries, *Ben Breitung,* Institute of Nanotechnology, Karlsruhe Institute of Technology, Karlsruhe, Germany (Sept 2010- Dec 2011; Group: Dr. M. Fichtner/ Prof. A. Powell).
6. Transition metal fluorides as cathode materials for lithium ion batteries, *Clemens Wall*, Institute of Nanotechnology, Karlsruhe Institute of Technology, Karlsruhe, Germany (Apr 2009- Dec 2011; Group: Dr. M. Fichtner/ Prof. H. Hahn).
7. Synthesis, Structures and Reactivity of Novel Nitrogenase Relevant Transition Metal Complexes with NS_4- and N_3S_3-Donor Atoms *Shaban Y. Shaban*, Institute of Inorganic Chemistry, University of Erlangen-Nuernberg, Germany (Sep 2000–May 2005; Group: Late Prof. D. Sellmann).
8. Structural and Functional Model Compounds for [NiFe] Hydrogenases, *Frank Lauderbach*, Institute of Inorganic Chemistry, University of Erlangen-Nuernberg. Germany (Jan 2002–Dec 2004; Group: Late Prof. D. Sellmann).
9. Synthesis and Reactivity of Ruthenium Complexes with Sulfur Dominated Coordination Spheres *Alexander U. Czaja*, Institute of Inorganic Chemistry, University of Erlangen-Nuernberg. Germany (May 2002–Jul 2005; Group: Late Prof. D. Sellmann).
10. Syntheses, Structures, and Properties of Metal-Organic Networks. *Menase Ayuck Ako*, Institute of Organic Chemistry, University of Erlangen-Nuernberg. Germany (Jul 2004–Dec 2004; Group: Prof. R. W. Saalfrank).

INDUSTRY INTERACTION

Liotech, Russia: Lithium-ion batteries for electric vehicle and other energy storage applications

Mahindra Reva, Bangalore: Lithium ion battery failure analysis

Amara raja Batteries, Tirupati: Fabrication of lithium ion batteries for electric vehicles

Nissan-Renault, Chennai: Joint development of LIB materials/cell for HEV/EV applications

BEL, Pune: Battery management system development

TATA, UK: For future project on Large-lithium-batteries for hybrid vehicles

Literaion-Evonik GmbH, Germany: Develpoment of advanced Lithium-Ion Battery for Automotive Application

Daimler AG, Gremany: Large scale materials development for lithium-ion batteries

LiTec Battery GmbH, Germany: Large-lithium-ion battery project

EXTERNAL COLLABORATION

Prof. Dr. Horst Hohn, Karlsruhe Institute of Technology (KIT), Institute of Nanotechnology, Germany (Nanomaterials synthesis for energy storage materials)

Prof. Dr. Maximilian Flchtner, Helmholtz-Institut Ulm, Germany (Synthesis of high energy density conversion cathode materials)

Prof. Dr. Alain Tressaud, ICMCB-CNRS, University Bordeaux, France (Thermo-gravimetric studies of fluorinated

compounds)

Prof. R. W. E. Winpenny, University of Manchester, Manchester, UK (Solvothermal synthesis of magnetic materials)
Dr. W. Wernsdorfer, Louis Neel Laboratory, Grenoble, France (Magnetic measurements)
Prof. P. Mueller, University of Erlangen-Nuernberg, Erlangen, Germany (Magnetic measurements)
Prof. A. X. Trautwein, University of Luebeck, Luebeck, Germany (Moessbauer spectroscopy)
Prof. A. Grohmann, Technical University, Berlin, Germany (Nitrogen-rich ligands syntheses)
Prof. Dr. R. Szilagyi, Montana State University, Montana, USA (synchrotron study; future project proposal)
Prof. Dr. Goerling, University of Erlangen-Nuernberg, Erlangen, Germany (DFT calculations)
Dr. Andreas Goetz, Vrije University, Amsterdam, Netherlands (DFT calculation and Molecular Modeling)