

# PRITHI JAYARAJ

## PROJECT SCIENTIST B

Centre for Fuel Cell Technology, ARCI, IIT-Madras Research Park,  
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1

Patent

8

Journal Publications

2

Book Chapters

8+

Years of Experience



## PROFILE

Researcher in Proton Exchange Membrane Fuel Cells (PEMFC) focuses majorly on improving the performance and durability. Major work emphasises the development of alternative stable electrocatalysts and their support in mitigating carbon corrosion and impurity tolerance in a fuel cell.



## EDUCATION

**PhD (Interdisciplinary) | Indian Institute of Technology Madras (IITM), Chennai, IND**  
2014 – 2021

**M. Tech (Nanotechnology) | Anna University, Coimbatore, IND**  
2010 – 2012

**BE (Biomedical Instrumentation Engineering) | Avinashalingam University, Coimbatore, IND**  
2006 – 2010



## RESEARCH EXPERIENCE

**Project Scientist B | Center for Fuel Cell Technology-ARCI, Chennai, IND**

NOV 2017 – PRESENT

PEMFC catalyst and system development

Indigenous development of Pt electrocatalyst and supports with high activity & durability

Durability of Cathode catalyst in PEMFC

Carbon corrosion mitigation due to Start Up and Shut down of fuel cells

Modified carbon support and non-carbon supports for stable cathodes

**Senior Research Fellow | Center for Fuel Cell Technology-ARCI, Chennai, IND**

SEP 2012 – NOV 2017

Air contamination studies on PEMFC

Developed, explored and identified various catalysts for tolerance towards air contaminant, SO<sub>2</sub>.

SO<sub>2</sub> Contamination studies on a single cell, Stack, High-temperature stack.

Durability of Cathode catalyst in PEMFC

**Project Research Intern | IGCAR & BARCF Facilities, Kalpakkam, Chennai, IND**

NOV 2011 – JUNE 2012

Electrospun polymer matrices for sustained and controlled drug delivery - Electrospinning of biocompatible and biodegradable polymer nanofibrous mats, incorporation of antibiotic and drug release studies



## PROFESSIONAL SKILLS

- Electrocatalyst synthesis, testing of catalytic activity using Electrochemical techniques
- Electrode preparation, CCM preparation using spray coating technique, MEA preparation
- Fuel cell assembling and testing
- Hands-on Experience - Operation of XRD, SEM, FESEM, TGA, BET, Electrospinning, Micro GC, Porometer, Optical Profilometer
- Tools: Origin, MatLab (Basics), Ansys (Basics), LabVIEW (CLAD Qualified)



## RESEARCH INTERESTS

- PEMFC system development
- PEMFC Durability
- Electrocatalysis
- Nanomaterials



## PATENTS

Rajalakshmi N, Raman Vedarajan, **Prithi J A**, *Method of Preparation of Carbon Supported Platinum Electrocatalyst for Proton Exchange Membrane Fuel cells* (Application No. 202011035825), Aug 2020.



## PUBLICATIONS

1. **Prithi J A**, Raman Vedarajan, G. Ranga Rao and N. Rajalakshmi. *Functionalization of carbons for Pt electrocatalyst in PEMFC*, IJHE 2021
2. **Prithi. J A**, R. Shanmugam, G. Ranga Rao and N. Rajalakshmi. *Experimental and theoretical study on SO<sub>2</sub> tolerance of Pt electrocatalysts: Role of carbon support*, Electroanalysis (2020) 2555-2563.
3. **Prithi J A**, N. Rajalakshmi and G. Ranga Rao. *Nitrogen Doped Mesoporous Carbon Support for Oxygen Reduction Reaction in Polymer Electrolyte Membrane (PEM) Fuel Cells*, IJHE 43 (2017) 4716 -4725.
4. **Prithi J A**, N. Rajalakshmi and K. S. Dhathathreyan. *Mesoporous Platinum as Sulfur Tolerant Catalyst for PEMFC Cathodes*, J Solid State Electrochem 21 (2017) 3479 - 3485.
5. **Prithi J A**, B. Sasank Viswanath, N. Rajalakshmi and K.S. Dhathathreyan. *Studies on PEMFC Stack for SO<sub>2</sub> Contamination at Air Cathode*, Fuel cells 17 (2017) 308 – 314.
6. **Prithi J A**, R.I. Jafri, N. Rajalakshmi and K.S. Dhathathreyan. *Nitrogen doped graphene as catalyst support for sulfur tolerance in polymer electrolyte membrane fuel cells*, Graphene 2 (2014) 134 – 138.
7. **Prithi J A**, P. Karthika, N. Rajalakshmi and K.S. Dhathathreyan. *Mitigation studies of sulfur contaminated electrodes for PEMFC*, Int. J. Hydrogen Energy. 39 (2014) 12045 – 12051.
8. R. Dave, **Prithi J A**, P. K. Ajikumar, H. Joshi, T. Mathews and V. P. Venugopalan. *Endogenously triggered electrospun fibres for tailored and controlled antibiotic release*, J. Biomater. Sci. Polym. Ed. 24 (2013) 1305 – 1319.



## BOOK CHAPTERS

1. **Prithi J A**, V. Raman and N. Rajalakshmi (2020) Carbon nanomaterials as support for fuel cell, In: Environmental Chemistry for a Sustainable World, Springer
2. Vedarajan, R., Prithi J A and N. Rajalakshmi (2020) Advanced nanocatalysts for fuel-cell technologies, In: Nanomaterials for Sustainable Energy and Environmental Remediation (165–191), Elsevier.



## CONFERENCE PRESENTATIONS

1. **Prithi J A**, Raman Vedarajan, Ranga Rao G, Rajalakshmi N, *Electrocatalyst for PEMFC – A Durability Perspective*, at Young Scientist Conference (YSC), India International Science Festival (IISF-2020), Dec 22-25, 2020 on Virtual Platform.
2. **Prithi. J A**, R. Shanmugam, G. Ranga Rao and N. Rajalakshmi, *Experimental and theoretical study on SO<sub>2</sub> tolerance of Pt electrocatalysts: Role of carbon support* at EIHE-2020, Jan 2020 at BARC Mumbai
3. **Prithi J A**, Raman Vedarajan, Ranga Rao G, Rajalakshmi N, *Evaluation of carbon support corrosion using accelerated stress protocol and impedance spectroscopy at 235<sup>th</sup> ECS Meeting*, 26-30 May 2019, Dallas, Texas, USA. **(Travel grant from DST-SERB-ITS)**.
4. **Prithi J A**, Rajalakshmi N, Ranga Rao G. *Nitrogen Doped Mesoporous Carbon Support for Oxygen Reduction Reaction in Polymer Electrolyte Membrane (PEM) Fuel Cells* at 21th International Symposium on Advances in Electrochemical Science and Technology (*ISAEST-12*), 8-10 Jan 2019, Chennai, India – **Conferred “Best Paper Award”**.
5. **Prithi J A**, Rajalakshmi N, Ranga Rao G. *Durable zirconium carbide supports for oxygen reduction reaction in PEMFC* at Fuel Cell and Hydrogen technical conference - (FCH2 2017), May 31<sup>st</sup> –June 1<sup>st</sup> 2017, Birmingham University, Birmingham, UK.
6. **Prithi J A**, Catherine Swetha A, Rajalakshmi N. *Nafion based composite electrolytes for PEMFC- Hydrocarbon based membrane* at International Conference on Membrane Technology and its applications (MEMSEP-2017), 21st - 23rd Feb 2017 at NIT, Tiruchirappalli, India – **Conferred “Best Oral Presentation Award”**.
7. **Prithi J A**, Rajalakshmi N, Ranga Rao G. *Nitrogen Doped Mesoporous Carbon Support for Oxygen Reduction Reaction in Polymer Electrolyte Membrane (PEM) Fuel Cells* at 11th International Symposium on Advances in Electrochemical Science and Technology (*ISAEST-11*), 8-10 Dec 2016, Chennai, India – **Conferred “Best Paper Award”**.

8. **Prithi J A**, Rajalakshmi N, Ranga Rao G, *Nitrogen doped mesoporous carbon as catalyst support for ORR in PEMFC*, at Chemistry in house symposium (CiHS - 2016) - Poster, Aug 2016, Department of chemistry, IIT Madras, Chennai, India.
9. **Prithi J A**, N. Rajalakshmi, P. Karthika and K.S. Dhathathreyan. *Studies on sulfur tolerance with mesoporous electro catalysts* – Poster, Gordon research seminar and conference (GRS & GRC 2014), Aug 2014, Bryant University, Rhode Island USA. (**Travel grant from DST-SERB-ITS**).



## MEMBERSHIP IN PROFESSIONAL BODIES

1. American chemical Society (ACS) – awarded one-year student membership for best paper award (2020)
2. Electrochemical Society (ECS) Student membership (2017-2020)



## AWARDS/HONORS/GRANTS

1. **'Best Oral Presentation Award'** - recognized by ACS publications at International Conference on Electrochemistry in Industry, Health and Environment (EIHE 2020) held at Bhabha Atomic Research centre (BARC), Mumbai (Jan 2020).
2. **DST-SERB-ITS – Financial Grant** to attend 235th ECS meeting, USA (April 2019)
3. **'Best Paper Award-First Prize'** at 12th International Symposium on Advances in Electrochemical Science and Technology (iSAEST-12) (Jan 2019)
4. **'Best Oral Presentation award'** at International Conference on Membrane Technology and its applications (MEMSEP-2017) (Feb 2017)
5. **'Best Paper Award- First Prize'** at 11th International Symposium on Advances in Electrochemical Science and Technology (iSAEST-11) (Dec 2016)
6. **DST-SERB-ITS – Financial Grant** to attend Gordon Research Seminar and Conference, USA (July 2014)
7. Certified as a CLAD (Certified LabVIEW Associate Developer) by National Instruments (2009).