

Dr. RazackImran Jafri

DST-INSPIRE Faculty Fellow

Center for Fuel Cell Technology

International Advanced Research Center for Powder
Metallurgy and New Materials

IITM Research Park, Taramani,

Chennai, India.

email: imraniit@gmail.com



(91) 9444771931 (Mobile)

(91) 44-66632711 (Office)

Academic qualifications:

Doctor of Philosophy (Physics)

July 2011

(Best Thesis Award)

Indian Institute of Technology Madras, India

Title of thesis: **“SYNTHESIS OF CARBON BASED NANOMATERIALS AND THEIR
APPLICATIONS IN FUEL CELLS AND SUPERCAPACITORS”**

Master of Science (Physics) (78%)

May 2005

S. V. University, India

(University First)

Bachelor of Science (83%)

(May 2003)

S. V. University, India

Details of Professional Recognitions, Awards, and Fellowships received:

1. DST-INSPIRE Faculty Award 2011

(Department of Science and Technology's – Innovation in Science Pursuit for Inspired Research)

2. Prof. A. L. Laskar Prize for presenting best Ph.D Thesis in Physics for the year 2011
3. University First Rank by securing highest marks in M.Sc Degree Examination in Physics
4. GATE qualified (87.96 percentile in 2005)
5. Junior Research Fellow at IITMadras (2006-08)
6. Senior Research Fellow at IITMadras (2008-11)

Ongoing projects:

Title	Principal Investigator	Amount	Duration	Funding Agency
DST-INSPIRE Faculty Award	R. Imran Jafri	35 Lakhs	5 years (2012-2017)	DST

Work/Teaching experience:

Working in the field of *synthesis of Nano materials* and application of these in *Fuel cells (Polymer Electrolyte Membrane Fuel Cells, Direct Methanol Fuel Cells, Direct Ethanol Fuel Cells & Micro Fuel cells)* and *Supercapacitors* since past 8 years. Worked as Half Time Teaching Research Assistant (HTRA)- Research Scholar for 5 years during Ph.D.

Field of interest:

- *Synthesis of different carbonnanomaterials (*Multi Walled Carbon Nanotubes, Single Walled Carbon Nanotubes, Multi Walled Carbon Nanocoils and Graphene*)
- *Synthesis of nitrogen doped carbon nanostructures and their application in *Polymer electrolyte membrane fuel cells*
- **Durability* studies of nitrogen doped carbon nanostructures in fuel cell environments
- * Application of these nano materials in the field of energy storage (*Supercapacitors*)
- * Effective utilization of Electrocatlyst for Fuel cells by using Carbon based Nanomaterials as catalyst supports
- * Search for non-Noble metal catalyst
- * Design and development of alcohol based *Micro Fuel cell*

Hands on experience:

- *Construction of complete Fuel cell, Study and Optimization of parameters
- *Synthesis of Electro catalyst for fuel cell, characterization using *X-ray diffraction (XRD), Transmission Electron Microscopy (TEM), Scanning Electron Microscopy (SEM), Raman spectroscopy, Infra red spectroscopy*
- * Design and development of alcohol based *Micro Fuel cell*
- * Preparation and evaluation of *Membrane Electrode Assembly (MEA)*
- * Full cell measurement (*Polarization graphs*), half cell measurements
- **Electro-chemical studies* of electrocatalysts
- * Super capacitor studies
- * *Hydrogen storage* in metal hydrides

Equipments handled:

Fuel cell test station, Electrochemical work station (AUTOLAB and CH Instruments), X-ray diffractometer, Mass flow controllers (AALBORG), R.F. Thin film deposition unit, Electron beam deposition unit, Thermal deposition unit and Hydrogen absorption studies equipment (Seiverts' apparatus)

Papers published/communicated

Citation indices

	All	Since 2010
Citations	728	722
h-index	12	12
i10-index	12	12

Source: www.scholar.google.com

Full List of Publications:

1. **R. Imran Jafri**, N. Rajalakshmi and S. Ramaprabhu, Nitrogen doped graphene nano platelets as catalyst support for ORR in PEMFC, *Journal of Materials Chemistry*, 2010, **20**, 7114-7117. **(Impact factor: 6.101)**
2. **R. Imran Jafri** and S. Ramaprabhu, Pt loaded Nitrogen doped multiwalled carbon nano coils as electrocatalyst for ORR in PEMFC, *Journal of Power Sources*, 2010, **195**, 8080-8083. **(Impact factor: 4.675)**
3. **R. Imran Jafri**, T. Arockiados, N. Rajalakshmi and S. Ramaprabhu, Nanostructured Pt dispersed Graphene-Multi walled Carbon Nanotube hybrid nanomaterials as electrocatalyst for PEMFC, *Journal of Electrochemical Society*, 2010, **157**, B874-879. **(Impact factor: 2.588)**

4. **R. Imran Jafri** and S. Ramaprabhu, Multiwalled carbon nanotubes based micro direct ethanol fuel cell using printed circuit board technology, *International Journal of Hydrogen Energy*, 2010, **35**, 1339-1346. **(Impact factor: 3.548)**
5. **R. Imran Jafri**, N. Sujatha, N. Rajalakshmi and S. Ramaprabhu, Au–MnO₂/MWNT and Au–ZnO/MWNT as oxygen reduction reaction electrocatalyst for polymer electrolyte membrane fuel cell, *International Journal of Hydrogen Energy*, 2009, **34**, 6371-6376. **(Impact factor: 3.548)**
6. B.P. Vinayan, **R. Imran Jafri**, Rupali Nagar, N. Rajalakshmi, K. Sethupathi and S. Ramaprabhu, Catalytic activity of platinum–cobalt alloy nanoparticles decorated functionalized multiwalled carbon nanotubes for oxygen reduction reaction in PEMFC, *International Journal of Hydrogen Energy*, 2012, **37**, 412-421. **(Impact factor: 3.548)**
7. Adarsh Kaniyoor, **R. Imran Jafri**, T. Arockiadoss and S. Ramaprabhu, Nanostructured Pt decorated graphene and multi walled carbon nanotube based room temperature hydrogen gas sensor, *Nanoscale*, 2009, **1**, 382 – 386. **(Impact factor: 6.233)**
8. Neetu Jha, **R. Imran Jafri**, N. Rajalakshmi and S. Ramaprabhu, Graphene-multi walled carbon nanotube hybrid electrocatalyst support material for direct methanol fuel cell, *International Journal of Hydrogen Energy* 2011, **36**, 7284-7290. **(Impact factor: 3.548)**
9. A. Leela Mohana Reddy, **R. Imran Jafri**, Neetu Jha, S. Ramaprabhu and Pulickel M. Ajayan, Carbon nanocoils for multi-functional energy applications, *Journal of Materials Chemistry*, 2011, **21**, 16103-07 **(Impact factor: 6.101)**
10. A.S.S. Jyothirmayee, **R. Imran Jafri**, N. Rajalakshmi and S. Ramaprabhu, Solar exfoliated graphene-carbon nanotube hybrid nanocomposite as efficient catalyst support for proton exchange membrane fuel cells, *Journal of Materials Chemistry*, 2011, **21**, 18199-18204 **(Impact factor: 6.101)**
11. Jaidev, **R. Imran Jafri**, Ashish Kumar Mishra and Sundara Ramaprabhu, Polyaniline–MnO₂ nanotube hybrid nanocomposite as supercapacitor electrode material in acidic

electrolyte, *Journal of Materials Chemistry*, 2011, **21**, 17601-17605.(Impact factor: **6.101**)

12. A. LeelaMohana Reddy, F. EstalineAmitha, **R. Imran Jafri** and S. Ramaprabhu, Asymmetric Flexible Supercapacitor Stack, *Nanoscale Research Letters*, 2008, **3**,145-151. (Impact factor: **2.524**)
13. P. Karthika, N. Rajalakshmi, **R. Imran Jafri**, S. Ramaprabhu and K.S. Dhathathreyan, Functionalized 2D graphene sheets as catalyst support for PEMFC electrodes, *Advanced Science Letters*, 2011, **6**, 141.
14. R. Imran Jafri, N. Rajalakshmi, K.S. Dhathathreyan, S. Ramaprabhu, Nitrogen doped graphene prepared by hydrothermal and thermal solid state methods as catalyst supports for fuel cell, *International Journal of Hydrogen Energy*, 2015, **40**, 4337-4348.
15. PrithiJayaraj, **R.ImranJafri**, N. Rajalakshmi*, K.S. Dhathathreyan, Nitrogen doped graphene as catalyst support for sulfur tolerance in PEMFC, *Graphene*,2015 (Accepted manuscript).
16. BirajKakati, AnusreeUnnikrishnan, NatarajanRajalakshmi, **R. ImranJafri**, K S Dhathathreyan, Recovery of Polymer Electrolyte Fuel Cell exposed to sulfur dioxide, *International Journal of Hydrogen Energy (Under review)*.
17. **R. Imran Jafri**,N. Ramesh, N. Rajalakshmi, K.S. Dhathathreyan, Activated carbons derived from cotton for high power supercapacitors, (*Manuscript under preparation*).
18. **R. Imran Jafri**,N. Ramesh, N. Rajalakshmi, K.S. Dhathathreyan, Activated carbons derived from cotton for CO₂ capture, (*Manuscript under preparation*).

Workshop /Symposium/Conference attended:

1. **R. Imran Jafri** and S. Ramaprabhu, Synthesis and Characterisation of MWNT supported Pt and PtSnelectrocatalyst for Fuel cell applications, *National Conference on Advanced Materials, Devices and Technologies*, Feb 2008, S.V. University, Tirupati, India.
2. *Workshop of Nano-Science for health care*, Feb 2008, IIT Madras, Chennai, India.

3. **R. Imran Jafri** and S. Ramaprabhu, Multiwalled Carbon Nanotube supported Chromium Nitride nanocrystalline electrocatalyst for Proton Exchange Membrane Fuel Cell, *International Conference on Advance Nano Materials (ANM-2008)*, June 2008, Portugal
4. **R. Imran Jafri** and S. Ramaprabhu, Novel Gold-Manganese dioxide-Multiwalled Carbon Nanotubes electrocatalyst for Polymer Electrolyte Membrane Fuel Cell, *International Symposium for Research Scholars (ISRS)*, Dec 2008, IIT Madras, Chennai, India.
5. *Workshop on Hydrogen storage and Fuel Cells*, Jawaharlal Nehru Technical University, Dec 2008, Hyderabad, India.
6. **R. Imran Jafri** and S. Ramaprabhu, *National Conference on Advanced Nano-materials, Devices and Technologies (NCANDT)*, July 2009, SVDC, Kadapa, India.
7. **R. Imran Jafri** and S. Ramaprabhu, Nanostructured Pt dispersed Graphene-Multi walled Carbon Nanotube hybrid nanomaterials as electrocatalyst for Proton Exchange Membrane Fuel Cells, *Gordon Research Conference*, July 23-28, West Kingston, USA
8. **R. Imran Jafri**, N. Sujatha and S. Ramaprabhu, Multiwalled Carbon Nanotubes supported Gold-Zinc oxide as methanol tolerant oxygen reduction reaction electrocatalyst for Polymer Electrolyte Membrane Fuel Cell, *Materials Research Symposium (MR-09)*, May 6-7, IIT Bombay, Mumbai, India.
9. **R. Imran Jafri**, Neetu Jha and S. Ramaprabhu, Graphene-Multi walled Carbon Nanotube hybrid nanomaterials as catalyst support for Direct Methanol Fuel Cell, Dec 14-15, *ISOHIM-2009*, IIT Madras, Chennai, India.
10. **R. Imran Jafri**, N. Rajalakshmi, and S. Ramaprabhu, High methanol oxidation activity of Pt nanoparticles dispersed on Nitrogen doped Multiwalled carbon nanocoils, 4th *International Conference on Advance Nano Materials (ANM-2012)*, IIT Madras, Chennai, India.
11. **R. Imran Jafri**, N. Rajalakshmi, J.A. Preeti, K.S. Dhathathreyan, Graphene based Pt electrocatalyst for SO₂ tolerance in PEMFC, 10th *HYPOTHESIS Fuel cell and Hydrogen Conference-2013*, 11-12 June 2013, Heriot Watt University, UK.