

**Name**

Dr. R. Balaji

**Designation**

Senior Scientist

**Qualification**

Ph.D. (Chemistry)

**Experience**

07 years

**Research areas of interest**

Electrochemistry, Electrolytic hydrogen Generation, Membrane Electrode Assembly (MEA) for Polymer Electrolyte Membrane (PEM) based water electrolyzer and fuel cell, Electrodeposition, Corrosion and water & waste water treatment.

**List of journal publications**

1. Studies on polymer modified metal oxide anode for oxygen evolution reaction in saline water.  
R Venkatkarthick; S Elamathi; D Sangeetha; Balaji Rengarajan; B Suresh Kannan; S Vasudevan; D Jonas Davidson; G Sozhan; Subbiah Ravichandran  
J. of Electroanalytical Chemistry, 697, 2013, 1-4 (IF: 2.905)
2. Operation method study based on the energy balance of an independent microgrid using solar-powered water electrolyzer and an electric heat pump.  
Shin'ya Obara, Seizi Watanabe, Balaji Rengarajan  
Energy, 36(8), 2011, 5200-5213. (IF: 3.858)
3. Operation planning of an independent microgrid for cold regions by the distribution of fuel cells and water electrolyzers using a genetic algorithm.  
Shin'ya Obara, Seizi Watanabe, Balaji Rengarajan  
International Journal of Hydrogen Energy, 36(22), 2011, 14295-14308 (IF: 4.402)
4. Operational planning of an engine generator using a high pressure working fluid composed of CO<sub>2</sub> hydrate.  
Shin'ya Obara, Takanobu Yamada, Kazuhiro Matsumura, Shiro Takahashi, Masahito Kawai, Balaji Rengarajan  
Applied Energy, 88(12) 2011, 4733-4741 (IF: 4.456)

5. Sulfonated polystyrene-block-(ethylene-ran-butylene)-block-polystyrene (SPSEBS) membrane for sea water electrolysis to generate hydrogen.  
Subbiah Ravichandran , Rengarajan Balaji, Balasingam Suresh Kannan,Swaminathan Elamathi, Dharmalingam Sangeetha, Jothinathan Lakshmi, Subramanian Vasudevan and Ganapathy Sozhan  
ECS Transactions, 33 (27) 157-166 (2011) (IF: 3.00)
6. "Unconventional Hydrogen Compression in an electrochemical method"  
S.Navaneethakrishnan, G.Sozhan,S.Vasudevan,S.Ravichandran, Rengarajan Balaji, Accepted for Publication in Jordan Journal of Mechanical and Industrial Engineering. 2011
7. "Development and Performance evaluation of polymer electrolyte membrane (PEM) Based hydrogen generator for portable applications"  
Rengarajan Balaji, N.Senthil, Subramanian Vasudevan, Subbiah Ravichandran, Ganapathy Sozhan.  
Int.J.Hydrogen Energy, 36 (2011)1399-1403. (IF: 4.402)
8. "An alternative approach to selective sea water oxidation for hydrogen production "  
Rengarajan Balaji, Balasingam Suresh Kannan,Jothinathan Lakshmi, Subramanian Vasudevan, Ganapathy Sozhan, Ashok Kumar Shukla, and Subbiah Ravichandran. Electrochemistry Communication 2009, 11(8) 1700-1703. (IF: 5.159)
9. "Aqueous methanol electrolysis using proton conducting membrane for hydrogen production".  
G.Sasikumar A.Muthumeena, S.Sundar Pethaiah,N.Nachiapanand Rengarajan Balaji. Int. J.of Hydrogen energy. 2008, 33, 5905-5910. (IF: 4.402)
10. "Electrochemical regeneration of chromium containing solution from metal finishing industry".  
Subramanyan Vasudevan, Ganapathy Sozhan, Swaminathan Mohan, Rengarajan Balaji, Pushpavanam Malathy, and Subramanian Pushpavanam  
Ind. Eng. Chem. Res. 2007, 46, 2898-2901. (IF: 2.532)
11. "Recovery of chromium from the solid residue by In-Situ- generated hypochlorite."  
Ganapathy Sozhan, Swaminathan Mohan, Subramanyan Vasudevan, Rengarajan Balaji and Subramanian Pushpavanam  
Ind. Eng. Chem. Res. 2006, 45, 7743-7747. (IF: 2.532)
12. "Electrodeposition of bronze–PTFE composite coatings and study on their tribological characteristics."  
Rengarajan Balaji, Malathy Pushpavanam, K. Yogesh Kumar, K. Subramanian  
Surface & Coatings Technology 2006, 201, 3205-3211. (IF: 2.193)

13. "Methane sulfonic acid in electroplating related metal finishing industry."  
Rengarajan Balaji and Malathy Pushpavanam.  
Translated and Published by Electroplating and Finishing in China 2004, 23(5) 40-45.
14. "Methane Sulfonic Acid in Electroplating Related Metal Finishing Industry"  
Rengarajan Balaji and Malathy Pushpavanam.  
Transaction of Institute of Metal Finishing 2003, 81(5), 154-158. (IF: 1.000)

### **List of Patents**

1. "A Polymer Electrolyte Membrane (PEM) cell and a method of producing hydrogen from aqueous organic solutions in pulse current mode"  
K.S.Dhathathreyan, R.Balaji, K.Ramya, N.Rajalakshmi.  
Patent Application no. 3313/DEL/2012.
2. "A Process for the incorporation of exfoliated graphite separator plates in Polymer Electrolyte. Membrane (PEM) based electrolytic cell for hydrogen generation".  
Patent Application under preparation

### **Conference proceedings**

1. Carbon Assisted Water Electrolysis for Hydrogen Generation"  
S.Sabareeswaran, R.Balaji\*, K.Ramya, N.Rajalakshmi, K.S.Dhathathereyan  
AIP conference proceedings, 1538, 43-47 (2013)
2. "Synergistic effect of stabilizer in alkaline water electrolysis"  
S.Seetharaman , R.Balaji , K.Ramya , K.S.Dhathathereyan , M.Velan  
Paper Presented in Seventeenth National convention of Electrochemists(NCE-17) at B.S.Abdur Rahman University, Chennai on 14-15<sup>th</sup> Sep' 2012
3. "Sulfonated polystyrene-block-(ethylene-ran-butylene)-block-polystyrene (SPSEBS) membrane for sea water electrolysis to generate hydrogen"  
Subbiah Ravichanran ,Rengarajan Balaji, Balasingam Suresh Kannan, Swaminathan Elamathi, Dharmalingam Sangeetha, Jothinathan Lakshmi, Subramanian Vasudevan, Ganapathy Sozhan.  
218<sup>th</sup> ECS Meeting Las Vegas, USA, on October 10-15, 2010.
4. "Electrochemical compression of hydrogen  
Sozhan Ganapathy, Vasudevan Subramanian, Ravichandran Subbiah, Balaji Rengarajan, Navaneethakrishnan Sadayan, Sankari Vasantha, and Lakshmi Jothinathan  
217<sup>th</sup> ECS Meeting. Canada, on April 25-30, 2010.

5. "Hydrogen production from renewable energy sources"  
Rengarajan Balaji, Shinya Obara  
SAEST Newsletter, India 2009, 4(3), 1.
6. "Water oxidation on various carbon electrodes"  
S.Ravichandran, S.Vasudevan, G.Sozhan, N.Senthyl, Rengarajan Balaji, J.Lakshmi.  
3<sup>rd</sup> International conference on Electrochemical Power Systems (ICEPS-3) ,  
Trivanandapuram, India on Nov 26-28, 2008.

#### **Invited Talk Delivered**

1. R. Balaji , "Green electrolytes for Electrodeposition" National Seminar on "Green Chemistry" conducted by KSR College of Engineering, Thiruchengode, Tamilnadu, during 16<sup>th</sup> Feb 2012.
2. "Hydrogen Energy Technologies" Faculty Development Programme, Anna University Coimbatore, Tamilnadu, India, during Dec 24'2011.

#### **Accomplishments as a Team Leader/Member**

- Technology developed on "Electrochemical Hydrogen Compressor" and know-how transferred to M/s.Eastern Electrolyser Ltd. New Delhi on 2009.
- Technology developed on "Activated Nickel Electrodes for Alkaline Water Electrolyzer" and know-how transferred to M/s.Eastern Electrolyser Ltd. New Delhi, on 2009.
- Developed and demonstrated 200 W Hydrogen/Air Polymer Electrolyte Membrane (PEM) fuel cell systems and supplied to Military College of Electronics and Mechanical Engineering College in Secunderabad on May' 2007.
- Electrolytes developed for "White and Yellow Bronze Coatings" for decorative applications and technology transferred to M/s.K.M. Gadia & Sons, Bangalore on July'2006.
- Process developed on "Electrodeposition of Nickel-Diamond Composite Coatings" and know-how transferred to (i) M/s. L.M. Van Moppes Diamond Tools India Pvt. Ltd. Chennai on Sep'2002. (ii) M/s. Control System & Service Engineers. Jaipur on June'2005.

#### **Affiliation to Professional societies**

Fellow Member - Society for Advancement of Electrochemical Science and Technology (SAEST), India.

## **Awards & Honors**

- 1) Honored as a Reviewer in following International Journals
  - International Journal of Hydrogen energy (ISSN 0360-3199)
  - Corrosion Science (ISSN 0010-938X)
  - Surface and coating Technology (ISSN 0257-8972)
  - Portugaliae Electrochimica Acta (ISSN 1647-1571)
  - Ionics (ISSN 1862-0760)
  - Waste Management journal, (ISSN 0956-053X)
- 2) Cash prize award for the best paper, Electroplating and finishing in China, 2004.

## **Contact Information**

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