SOOBHANKAR PATI,
Asst. Professor,
IIT Bhubaneswar,
email: soobhankar@gmail.com

Professional Preparation

Ph.D. Thesis: Electrochemical Evaluation of a Solid Oxide Membrane Electrolyzer. Advisor: Prof. Uday Pal (Boston University)

M.Tech Thesis: Chemical Vapor Deposition of Silicon Carbide on Carbon Substrates. Advisor: Prof. B.K Dhindaw (IIT Kharagpur)

B.Tech Thesis: Processing and Characterization of Gd2O3 doped Zirconia. Advisor: Prof. Santanu Bhattacharya (NIT Rourkela)

Research Experience

Research Engineer, Metal Oxygen Separation Technologies, Natick, MA August 2010 – present

Postdoctoral Fellow, Boston University, Boston University, Boston, MA March 2010 – August 2010

Publications and Patents

Journal Publications:

1) Soobhankar Pati, Srikanth Gopalan, U.B. Pal, "A Solid Oxide Membrane for Production of Hydrogen and Syngas from Steam and Hydrocarbon Waste in Single Step," Int. J. of Hydrogen Energy, Vol 36, pp.152-159 (2011).
2) Soobhankar Pati, K. J. Yoon, Srikanth Gopalan, Uday B. Pal, "Hydrogen Production Using Solid Oxide Membrane Electrolyzer with Solid Carbon Reductant in Liquid Metal Anode," J. of Electrochemical Soc., 156, pp. B1067-B1077 (2009).
3) Soobhankar Pati, K.J.Yoon, Srikanth Gopalan, Uday B. Pal, "Electrochemical Characterization of a Solid Oxide Membrane Electrolyzer for Production of High Purity Hydrogen," Met. & Mat. Trans B., Vol 40B, pp. 1041-1053 (2009).
4) M. Suput, R. Delucas, S. Pati, G. Ye, A. Powell IV, U. B. Pal, "Solid oxide membrane technology for environmentally sound production of titanium," Mineral Processing and Extractive Metallurgy (Trans. IMM C), Vol. 117, (2), pp.118-122 (2008).
5) Soobhankar Pati, Eric Gratz, Adam Powell, Uday B. Pal, "Oxygen Producing Inert Anode for Direct Magnesium Oxide Reduction, Energy and Environmental Science, submitted
6) Soobhankar Pati, Srikanth Gopalan, Uday B. Pal, "Performance Evaluation of a Solid Oxide Membrane Electrolyzer Varying the Nickel Content in the Ni-YSZ Cermet Cathodes," Journal of Electrochemical Society, in preparation.

International Conference Proceedings:

1.1 S. Pati, A. Powell, S. Tucker, S. Derezinski, " Scaling up SOM Electrolyzer for Magnesium Production" Magnesium Technology 2012, TMS (2012).
2) Powell and S. Pati, "Multi-Physics Modeling of Molten Salt Transport in Solid Oxide Membrane (SOM), Electrolysis and Recycling of Magnesium" (Keynote Talk) in Laurentiu Nastac, ed., CFD Modeling and Simulation in Materials Processing, Warrendale, PA: TMS, March 2012.
3) E.Gratz, S. Pati, Milshtein A.Powell, U. B. Pal, "Control of Yttrium Diffusion Out of Yttria Stabilized Zirconia during SOM Electrolysis for Magnesium Production", Magnesium Technology 2012, TMS (2012)

4) E.Gratz, S. Pati, Milshtein A.Powell, U. B. Pal, “Effect of Electronic Current on the Solid Oxide Membrane Process for Magnesium Production” Electrometallurgy 2012, TMS (2012).

5) S.Pati, S. Gopalan, U.B. Pal, “Electrolyzer for Waste to Energy Conversion”” ECS Transactions 2011, to be published in Electrochemical Utilization of Solid Fuels Symposium 2011.

6) E.Gratz, S. Pati, A.Powell, U. B. Pal, “Efficiency and Stability of Solid Oxide Membrane Electrolyzers for Magnesium Production,” Magnesium Technology 2011, pp -39-42, TMS (2011).

7) A.Roan, S. Pati, S. Basu, U. B. Pal, “Solid Oxide Membrane Process for Solar Grade Silicon Production Directly from Silicon Dioxide,” 140th Annual Meeting and Exhibition, Supplemental Proceedings, Volume 1, Materials Processing and Energy Materials, TMS (2011).

8) S. Pati, K. J. Yoon, S. Gopalan, U. B. Pal, “Solid Oxide Membrane Electrolyzer Utilizing the Energy Value in Solid and Gaseous Reductant for Hydrogen Production,” ECS Transactions, Vol 19, pp 1-8, (2009)

9) S. Pati, M. Suput, R. Delucas, U. B. Pal, “Solid Oxide Membrane Process for Calcium Production Directly from Its Oxide,” EPD Congress, S.M. Howard, ed., TMS, Warrendale, PA, pp.121-26 (2008)

10) S. Pati, R. Delucas, U.B. Pal, “Magnesiothermic Reduction of Titanium Oxide using Solid Oxide Membrane Process,” EPD Congress, S.M. Howard, ed., TMS, Warrendale, PA, pp.121-26 (2008)

11) B. K. Dhindaw, S. Pati, “Processing of SiC coatings on Graphite Substrates by CVD Process,” Proceedings of Int. Conf. on Adv. Materials and Composites, 2007, pp. 99-107(2007)

12) B. K. Dhindaw, S. Pati, “Characterization and Kinetics of SiC deposition on Graphite by CVD Process” Materials and Systems Vol. 1, MS&T, 2006, pp. 93-106 (2006)

Selected Presentation and Posters:

1) Soobhankar Pati, Kyung Joong Yoon, Srikanth Gopalan, Uday B. Pal, “Production of Pure Hydrogen from a Source of Waste and Steam,” 2009 MIT Energy Conference, Cambridge ,MA, United States, March 6-7th, (2009).

2) Soobhankar Pati, Kyung Joong Yoon, Srikanth Gopalan, Uday B. Pal, “Polarization Modeling of a Waste assisted Solid Oxide Membrane Electrolyzer for Hydrogen Production ,” Waste Conversion and Reutilization, Rewas 2008, Cancun, Mexico, Sep 12-15th, (2008).

3) Soobhankar Pati, Srikanth Gopalan, Uday B. Pal, “ Electrolyzer for Production of Pure Hydrogen from a Source of Waste and Steam,” 213th ECS Meeting, Abstract #356, Phoenix, AZ, United States, May 18-22, (2008)

Patents:

1. Uday B Pal, Rachel Delucas, Soobhankar Pati, “Magnesiothermic SOM process for production of Metals” Publication Number: WO/2008/046018.

2. Adam Powell, Soobhankar Pati, Jason Douglas, Steve Derenzinski, “Method and Apparatus for Condensing Liquid Magnesium and Other Volatile Metals from Low-Pressure Metal Vapor” USPTO Application Number: 61505958.

3. Adam Powell, Soobhankar Pati, Steve Derezinski, Robert Woodman, “Low-Resistance Oxygen-Producing Inert Anode for Electrolysis of Metal Oxide” USPTO Application Number: 61505975.

4. Adam Powell, Soobhankar Pati, Uday B Pal, Steve Derezinski, “Liquid Anodes and Fuels for Production of Metals from Their Oxides by Molten Salt Electrolysis with a Solid Electrolyte” USPTO App Number: 61526129

5. Adam Powell, Soobhankar Pati, Garret Lau, Steve Derezinski, “Conductor of High Electrical Current at High Temperature in Oxygen and Liquid Metal Environment”, USPTO Application Number: 61530277

Awards:

1. 2012 TMS Extraction and Processing Divison Young Professsional Development Award.

2. 2009 Mann Redmayne co-author award for best paper (IOM3)
3. 2009 Electrochemical Society Student Travel Award
4. Boston University Graduate Teaching Fellow (2005-2006)
5. Ministry of Human Resource India Scholarship (2003-2005)
6. Certificate of Recognition for Mathematics Olympiad

Research Details and Collaboration

As Co-Principal Investigator:

1) Jan 2012- Present- "Solar grade silicon production using SOM process" Co- Principal Investigator with Prof. Uday Pal, BU,sponsored by National Science Foundation, USD 100000
2) 2010- Present - "Low cost low impact magnesium production" with Adam Powell, sponsored by National Science Foundation, USD400000
3) 2010-2011- "Direct Oxide Reduction of MgO" with Steve Derezinski and Adam Powell, sponsored by Department of Energy- Oak Ridge National Lab, USD 450000

As Researcher:

1. 2010-Present - "Direct Oxide Reduction of MgO" with Steve Derezinski and Adam Powell, sponsored by Department of Energy- Vehicles Technology Program – "Low cost electrorefining of automotive magnesium scraps, with Adam Powell", sponsored by DOE's Industrial Technology Program.
2. 2008-2010, " Low cost, high purity hydrogen utilizing energy content in waste" with Uday Pal and Michael Galbo, sponsored by Massachusetts Tech Transfer Center.
3. 2008- 2009, "Conversion of Waste to Hydrogen" with Prof Uday Pal, Boston University Technology Transfer Center.
4. 2005-2006, "Chemical vapor deposited (CVD) mullite coatings for environmental barrier application" with Prof. S.N. Basu and Prof. Vinod Sarin, sponsored by NASA.
5. 2004-2005, "Chemical Vapor Deposition (CVD) of Silicon Carbide (SiC) on Carbon Substrates" with Prof. B.K. Dhindaw, sponsored DMRL, Hyderabad.

Professional Activities and Service

1. Edited Book: Energy Technology 2012
2. Member of 2 TMS Committees: Energy Committee and Magnesium Technology Committee.
3. Co-Organizer TMS Energy Technology Symposium 2012 and Lead organizer of TMS Energy Technology Symposium 2013.
4. Member of TMS Extraction Processing Division Council
5. Reviewer (since 2010): the Journal of the Electrochemical Society, Materials and Metallurgical Transactions B and Journal of Materials Chemistry and Physics.