NILESH D. INGALE, Ph.D.

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SUMMARY

- Over 5 years' experience of working on a milestone driven as well as economically competitive project for the development and commercialization of product.
- Over a year of experience on Single Die/Wafer Testing (Probing Process Development) at Intel Corporation.
- Hands on experience in the development of batteries, data analysis, design of experiments, mathematical modeling and simulation of electrochemical systems, multiphase reactions and reactors.
- Creative individual with excellent problem solving skills and practical sense of connecting science with technology.

RESEARCH HIGHLIGHTS

- The research work was funded by a stimulus ARPA-E (DOE, USA) funding.
- The research has led to formation of Urban Electric Power, Inc. (A CUNY Spinout). Now employed more than 20 people in the City of New York.
- Aqueous and non-aqueous battery development and testing, GRIDS integration for peak shaving.
- Put invention in starter batteries for automotive applications as well as START-STOP vehicle applications.
- Developed mathematical model for understanding the behavior of porous electrodes for Li-ion, alkaline battery systems. Developed capacity fade model for Zn-MnO_2 batteries. Developed user-friendly in-house code using Matlab.
- Mathematical modeling and simulation of multiphase reactions and reactors.
- Trainee internship at Alkyl Amines Chemicals Ltd. (Chemical Industry) India.

EDUCATION

- **Ph.D.**, Chemical Engineering (GPA: 3.9/4.0) 2009 – November 2014
  City College of the City University of New York

- **Master in Chemical Engineering** (Distinction) 2006 – 2008
  Institute of Chemical Technology, Mumbai, India. (Formerly known as UDCT)

- **Bachelor in Chemical Engineering** (First Class) 2002 – 2006
  Institute of Chemical Technology, Mumbai, India. (Formerly known as UDCT)

EXPERIENCE

Sort Test Technology Development Engineer (January 2015 – Present)
Intel Corporation, Hillsboro, OR

Currently working on a project to develop tool for innovative single die sort (Known good die sorting). The main focus is on probing process development.

Doctoral Research: CUNY Energy Institute
Advisor: Professor Sanjoy Banerjee
PhD Dissertation: "Rechargeability in alkaline Zn-MnO_2 batteries: Experimental and Mathematical Studies."

- The goal was to develop battery for cheap and reliable electricity energy storage for ARPA-E Grids project. Responsible for the development of rechargeable Zn-MnO_2 battery that lasts for more than 2500 cycles.
- Responsible for development of batteries for high power and transient current applications such as automotive starter battery and UPS applications.
- The next goal involved scale up of batteries to MWh or kWh size with economical advantage. The 80Ah, 12V starter car battery prototype was built and tested in a car as well as tested with UPS.
- Developed mathematical model to study the electrochemical and transport phenomena in porous electrodes and their effect on battery performance. Capacity fade model was developed to understand the degradation in Zn-MnO_2 batteries.
- Studied the application of ionic liquids for electrodeposition of metals and their use as battery electrolytes.

M.S. Research: Institute of Chemical Technology, Mumbai, India. (Formerly known as UDCT)
Advisor: Professor J. B. Joshi
M.S. dissertation: "Mathematical Modeling and Simulation of Multiphase Reactions and Reactors for NOx absorption"

- Modeled and simulated the absorber and bleacher column in nitric acid plant and validated model predictions.
- Integrated absorber and bleacher model into nitric plant model and recommended optimization strategies with validation of the developed model with plant data.

TECHNICAL EXPERTISE

Analytical/Laboratory Skills: Porous electrode manufacturing, building and testing batteries, electrochemical impedance spectroscopy (EIS), atomic absorption mass spectroscopy (AAS), FT-IR spectroscopy, UV-VIS spectroscopy, Raman Spectroscopy, Scanning Electron Microscopy (SEM), Thermogravimetry (TGA), Dynamic Light Scattering (DLS), Particle Size Analyzer, Nuclear Magnetic Resonance spectroscopy (NMR)

Software: COMSOL Multiphysics 4.3b, Fortran, Matlab, Origin, C, C++, MS Office

TEACHING EXPERIENCE

Prepared and co-taught lectures, recitation classes for the graduate and undergraduate courses at the Department of Chemical Engineering, the City College of New York.

Chemical Kinetics (Fall 2009), Separation Processes (Spring 2010), Process Control (Fall 2010).

PATENT APPLICATIONS

Nilesh Ingale, Tal Sholklapper, Sanjoy Banerjee, "Secondary Rechargeable Alkaline Zinc-Manganese Dioxide (Zn-MnO_2) Batteries for High Power Applications", US20150311503.

Tal Sholklapper, Joshua Gallaway, Daniel Steingart, **Nilesh Ingale**, Michael Nyce, "Alkaline Battery Operational Methodolgy", US20150030891 A1.

PUBLICATIONS AND PRESENTATIONS

Nilesh Ingale, Joshua W. Gallaway, Michael Nyce, Alexander Couzis, Sanjoy Banerjee, "Rechargeability and Economic Aspects of Alkaline Zinc-Manganese Dioxide Cells for Electric Storage and Load Leveling". *Journal of Power Sources,* 276, pp 7-18 (2015). Very high quality work as reviewer's comment.

Nilesh Ingale, Joshua Gallaway, Michael Nyce, Tal Sholklapper, Daniel Steingart, Alexander Couzis and Sanjoy Banerjee, "Improved Cycle Life Performance of MnO_2 Cathode and Zn Anode for Secondary Rechargeable Alkaline Batteries". 2012 AIChE Annual Meeting, Pittsburgh, USA.

Joshua Gallaway, **Nilesh Ingale**, Yasumasa Ito, Lev Sviridov, Abhinav Gaikwad, Steve Lever, Ali Firouzi, Sanjoy Banerjee, Daniel Steingart, "Secondary manganese dioxide electrodes for grid-scale batteries". American Institute of Chemical Engineers Annual Meeting, Minneapolis MN, October 2011.

Joshua Gallaway, **Nilesh Ingale**, Yasumasa Ito, Lev Sviridov, Abhinav Gaikwad, Steve Lever, Ali Firouzi, Sanjoy Banerjee, Daniel Steingart, "Cycle life of manganese dioxide electrodes for grid-scale batteries". The Electrochemical Society 220th meeting, Boston, MA, October 2011.

Nilesh Ingale, J. Gallaway, D. Steingart, S. Khatun, P. Sideris, S. Greenbaum, S. Banerjee, and A. Couzis, "Aluminum as Anode Material Electrodeposited from Ionic Liquids for Secondary Rechargeable Batteries". (2011) 219th ECS Meeting, Montreal, QC, Canada.

Nilesh Ingale, Joshua Gallaway, Dan Steingart, Sanjoy Banerjee and Alexander Couzis, "Aluminum as a Secondary Battery Anode Material Electrodeposited From Ionic Liquids". 2010 AIChE Annual Meeting, Salt Lake City, USA.

Nilesh Ingale, Indraneel Chatterjee, J.B. Joshi, "Role of nitrous acid decomposition in absorber and bleacher in nitric acid plant". CHEM. ENG J., vol 155, no.3, pp. 851-858 (2009).

AWARDS & HONORS

STTD 2016 Achievement Award for contributions in Die Sort Probing Process Development.

Student travel grant awarded by Electrochemical Society (ECS) (Spring 2011); Doctoral Student Research Grant (Fall 2011); City College CUNY Fellowship (Fall 2010)

AFFILIATIONS

American Institute of Chemical Engineers (AIChE)

REFERENCES (Available upon request)