

Di-Jia Liu

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Professional Experience at Argonne National Laboratory

- **October 2007–Present.** Chemist and Principal Investigator in the Catalysis and Energy Conversion Theme of the Chemical Sciences and Engineering Division. Research activities include leading teams in synthesis and characterization of nanostructured polymeric materials for on-board hydrogen storage application; preparing aligned carbon nanotube based membrane electrode for proton exchange membrane (PEM) fuel cell application; low-cost electrode catalysts as alternative to platinum group metals for fuel cell; studying catalytic transition state via ultrafast X-ray spectroscopy; CO₂ conversion and mitigation through green chemistry; next generation materials for Li-Air battery.
- **April 2002–September 2007.** Chemist, Fuel Cell Technology Department of the Chemical Engineering Division. Research activities include developing diesel reforming catalysts and reactor for production of hydrogen rich reformat; exploring new catalytic materials for direct alcohol fuel cell; characterizing planar solid oxide fuel cell using microfocusing synchrotron X-ray scattering technique.

Professional Experience Prior to Argonne National Laboratory

- **February 2000–April 2002.** Senior Principal Scientist and Project Leader at Aerospace Sector of Honeywell International Inc. Responsibilities include leading a DOE funded project of developing a novel CO remediation technology for PEM fuel cell application; leading a team to develop an emission control device of microturbine power generator for Honeywell Power System; leading a project of developing tubular catalytic heat-exchanger for hydrocarbon/ozone destruction in aircraft environmental control system.
- **October 1996–January 2000.** Principal Scientist at AlliedSignal Inc. Research activities include revamping ozone catalytic converter for Boeing 777 aircraft environmental control system; developing catalyst/adsorbent for personal protection against biological and chemical warfare, endothermic fuel processor for fighter jet and ignition catalyst for satellite positioning system. Other roles include certified Industrial Six-Sigma Black Belt and Trainer to lead the process improvement at manufacturing facilities and to teach statistical design principles in R&D organization.
- **October 1990–September 1996.** Senior Research Chemist at Allied-Signal Research and Technology Co. Research activities include developing NOx reduction catalyst for automotive emission control and developing in-situ synchrotron X-ray spectroscopic and imaging techniques for catalysis and polymer material characterization.
- **December 1987–September 1990.** Postdoctoral Fellow at The University of California at Berkeley and Postdoctoral Appointee at Chemistry Division of Argonne National Laboratory. High resolution VUV-XUV spectroscopic and dynamic studies using molecular beam and non-linear optical frequency mixing techniques.

Education

- PhD, Physical Chemistry, The University of Chicago, 1987
- BS, Chemistry, Beijing University, 1982

Awards

- Argonne National Laboratory Pacesetter Award, 2006
- Honeywell Aerospace Technology Achievement Award, 2001
- Honeywell Laboratory Special Recognition Award, 2001
- Honeywell Power Systems Achievement Award, 2000
- USA Today Quality Cup, 2000
- AlliedSignal Corporate Technical Achievement Award, 1998
- AlliedSignal Special Technical Recognition Award, 1995
- Elizabeth R. Norton Prize, The University of Chicago, 1986

Career Activities & Highlights

- Led an Argonne/University of Chicago team to develop various polymeric adsorbents which demonstrated high hydrogen storage capacity (>5 wt. %) and excellent durability, funded by DOE's Fuel Cell Technologies Program.
- Led an Argonne team to develop aligned carbon nanotube based membrane electrode assembly (MEA) for PEM fuel cell which demonstrated improved power density, mass transport and oxidative resistance over conventional MEAs, funded by DOE's Fuel Cell Technologies Program.
- Developed a microfocusing synchrotron x-ray diffraction technique through collaboration with scientist at APS which enabled the first two-dimensional phase and strain investigation inside of planar solid oxide fuel cell at micron spatial resolution.
- Developed perovskite based diesel reforming catalysts which demonstrated improved stability and sulfur resistance for hydrogen production.
- Developed a state-of-the-art ozone catalytic converter for Boeing 777 aircrafts, the first ever certified by FAA for 12,000 hour operation, generated substantial sales for Honeywell Aerospace and won 2000 USA Today Quality Cup Award.
- Developed a washcoating/catalyzing technology for the microturbine recuperator produced by Honeywell Power System which demonstrated > 98% removal of CO and hydrocarbon emission.
- Developed an in situ x-ray absorption spectroscopic method for NO_x abatement catalysis study and published a series of seminal papers on redox mechanism which received over 100 citations/per paper within only a few years.
- Implemented 6-Sigma process improvement at two AlliedSignal manufacturing facilities and achieved over \$2 million/year production cost saving.

Publications and Patents

- Patents: 8 (USP), 6 (EP)
- Journal Publications & Book Chapters: 44
- Reports: 10 (U. S. DOE)
- Conference Proceedings and Presentations: Over 100