

YANG DAI

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PROFILE: RESEARCH ASSOCIATE | SCIENTIST | CHEMICAL ENGINEER

- ❖ Collaborative, cross-functional team player, at all stages of research and development, from instrument fabrication to sample analysis.
- ❖ Expert in the design, fabrication, and maintenance of a large-scale UHV surface science apparatus; successfully built this apparatus from the ground up over a 2-year timespan.
- ❖ Excellent oral and written communication skills with an extensive background authoring and reviewing research manuscripts, primary journal articles, and review articles.
- ❖ Fluent in Chinese, English, and intermediate Japanese.

CORE SKILLS

Surface Characterization • Mass Spectrometry • Data Analysis • Manuscript Writing
Thin Film Coatings using ALD/PVD/PLD • UHV Instrument Design • Fabrication • Maintenance
LabVIEW • AutoCAD • Python • Machine Tools

PROFESSIONAL EXPERIENCE

Massachusetts Institute of Technology • 2017-Present

Postdoctoral Research Fellow

Currently exploring whether modification of the Ni electronic structure by formation of a surface alloy with Au will result in un-activated dissociative adsorption of molecular hydrogen. Examining the existence of bulk hydrogen and investigating whether bulk hydrogen recombination with adsorbed surface hydrogen is operative. The results will reveal why the commercial hydrogenation catalyst, also a Ni surface alloy, is so efficient at adding hydrogen across double bonds. (June 2017 – present)

UNIVERSITY OF UTAH • 2012-2016

Research Assistant

Designed, fabricated, and maintained a UHV surface science apparatus from the ground up, consisting of a cluster deposition beamline, and various surface deposition and characterization techniques, as a result of a collaboration with 7 other research institutes. Research focused on the prevention of sub-nano platinum clusters from sintering and coking.

- Designed and built a beamline that can deposit mass-selected platinum clusters in the gas phase.
 - ✓ Provide samples for collaborators, such as Argonne National Laboratory.
- Discovered the best way to analyze samples through in-situ surface analysis made inside of the UHV.
 - ✓ In addition, utilize X-ray Photoelectron Spectroscopy (XPS), Ion Scattering Spectroscopy (ISS), and Temperature Programmed Desorption (TPD) as alternatives to analyze the sample.
- Investigated how to prevent platinum clusters from sintering and coking.
 - ✓ Built a sample stage where alumina can be deposited on the sample via Atomic Layer Deposition (ALD) and Physical Vapor Deposition (PVD).
 - ✓ Tried ALD overcoating method to evaluate if it can prevent clusters from sintering.
- Preliminary results disagreed with those documented by Argonne National Laboratories.
 - ✓ As a result, designed and conducted additional experiments under the same conditions at Argonne to compare data.
 - ✓ Upon data interpretation and literature search, concluded that the size of particles effect the X-ray Absorption Near Edge Structure (XANES).
- Developed and added several new techniques to the UHV instrument, including a heating/cooling stage, ISS, TPD, ALD, and metal evaporators to grow Al_2O_3 films.
- Served as a Presentation Judge at the Science, Engineering, and Math Symposium 2016 at Salt Lake City Community College.

UNIVERSITY OF UTAH • 2011-2012**Teaching Assistant**

Taught General Chemistry laboratories and assisted with Biophysical Chemistry help sessions.

- Coordinated materials, conducted laboratory sessions, and graded laboratory reports.

CALIFORNIA STATE UNIVERSITY – EAST BAY • 2010-2011**Teaching Assistant**

Assisted Dr. Chul Kim as a Teaching Assistant for the Instrumental Analysis course, based upon skills with GC-MS, UV-Vis, XRF, and AA.

CALIFORNIA STATE UNIVERSITY – EAST BAY • 2009-2011**Undergraduate Research Assistant**

Under the guidance of Dr. Chul Kim, used NMR to investigate the structures of viral RNA.

CALIFORNIA STATE UNIVERSITY – EAST BAY • 2008-2010**Resident Assistant**

Facilitated social, academic, and personal adjustment of students to the residence hall and university. Developed a sense of community amongst residents as members of the floor, hall, and residence life system. Served as a positive role model to residents and peer staff members.

CALIFORNIA STATE UNIVERSITY – EAST BAY • 2008-2010**Math Tutor**

Tutored undergraduate students in Calculus, Chemistry, and Physics.

EDUCATION

Postdoctoral Research Fellow, Massachusetts Institute of Technology; Present

Ph.D. in Physical Chemistry, University of Utah; September 2016

- **GPA: 3.9/4.0**

Bachelor of Science in Chemistry, California State University – East Bay; June 2011

- **GPA: 3.6/4.0**

Selected Publication and poster

- “Effect of Particle Size on the L3 X-ray Absorption Near Edge Structure of Supported Pt₂₄ Clusters”, Gordon Research Conference, South Hadley, Massachusetts; June 2016.
- “Inherent size effects on XANES of nanometer metal clusters: size-selected platinum clusters on silica.” Dai, Y.; Gorey, T.; Anderson, S. L.; Lee, S.; Lee, S.; Seifert, S.; Winans, R. E., *Journal of Physical Chemistry C*, 2017, 121 (1), pp 361–374

Activities

Implicit Bias Training at MIT. Member, American Chemical Society, 2015 – present. Interests include hiking, fishing and brewing beer.