

DOE Energy EarthShot™ Research Center (ERRC) - Non-Equilibrium Energy Transfer for Efficient Reactions (NEETER) Postdoctoral Position at SSRL for *in-situ/operando* Characterization

The Stanford Synchrotron Radiation Lightsource (SSRL), a Directorate of the SLAC National Accelerator Laboratory, Stanford University, and a national user facility, seeks a Postdoctoral Scholar who will focus on characterization of catalysts for catalytic studies of natural gas conversion and plastic deconstruction via electrified approaches.

This position is funded by a DOE Energy EarthShot™ Research Center (ERRC) - Non-Equilibrium Energy Transfer for Efficient Reactions (NEETER). The goal of this Center is to leverage transient temperature and pressure conditions in non-equilibrium (NE) chemical processes to allow unconventional reaction pathways with high energy and atom efficiency, allowing electrification of processes that currently generate large GHG emissions due to heating. This EERC center will focus on two rapidly emerging NE approaches to achieving electrified heterogeneous catalysis, namely, programmable Joule heating and mechanochemistry. To advance these non-traditional heating approaches, NEETER will study carefully selected prototypical endothermic reactions involving cleavage of C-H and C-C bonds in hydrocarbons including natural gas and polymers. Approaches include both experimental and computational studies of kinetics and reactivity, spectroscopic identification of gas, surface reactants and mechanisms under *in situ* and *operando* conditions. Under general supervision, the Postdoctoral Research Associate will conduct research in the catalytic dehydrogenation of propane and deconstruction of polyolefins under both Joule heating and mechanocatalytic conditions. The incumbent will work in close collaboration with the EERC team members at ORNL and other EERC PIs at university partners and have opportunities to visit members of other EERC institutions including Georgia Tech, Princeton University, University of Houston, University of Delaware State, University of Maryland, and SLAC.

Major Duties/Responsibilities:

- Perform *in situ/operando* studies including IR, X-ray and neutron spectroscopy of reaction mechanisms and catalyst structural evolution, including the design and fabrication of the specialized reactor cells.
- Perform reaction kinetics measurement using Joule heater and mechanocatalysis systems for gas phase and melt phase heterogeneous catalytic reactions including propane dehydrogenation, polyolefin deconstruction.
- Responsible for presenting and reporting research results and publishing scientific results in peer-reviewed journals in a timely manner.
- Participate in user proposal development.

Qualifications:

- Ph.D. in physics, chemistry, materials sciences, engineering, or related fields.
- Background in heterogeneous catalysis, including catalyst synthesis, testing and characterization.

- Experience with X-ray absorption spectroscopy (XAS), including demonstrated ability in data analysis and modeling of XAFS data. Use of Athena/Artemis and/or Larch strongly preferred.
- Willingness to learn and bridge knowledge/experience gaps.
- Ability to work independently and in a team environment.
- Strong organizational skills a must.

Preferred Qualifications:

- Demonstrated knowledge of heterogeneous catalysis, and expertise in studying reaction kinetics and mechanisms of heterogeneous catalytic reactions.
- Experience in performing in situ/operando spectroscopic study of catalysis including but not limited to IR, Raman, X-ray absorption spectroscopy.
- Excellent written and oral communication skills.
- Motivated self-starter with the ability to work independently and to participate creatively in collaborative teams across the laboratory.
- Ability to function well in a fast-paced research environment, set priorities to accomplish multiple tasks within deadlines, and adapt to ever changing needs.

Special Requirements:

Postdocs: Applicants cannot have received their Ph.D. more than five years prior to the date of application and must complete all degree requirements before starting their appointment. The appointment length will be up to 24 months with the potential for extension. Initial appointments and extensions are subject to performance and availability of funding.

Preview of applications begins immediately. Applications are accepted until the position is filled.

Please include a letter of motivation, C.V. with list of publications, and the contact information for two to three academic references.

CONTACTS: Please send application to Simon R Bare, email: srbare@slac.stanford.edu and Dimosthenis Sokaras (dsokaras@slac.stanford.edu) or contact for further details on the position.