



Postdoctoral positions available at Brown University

Research Group:

Andrew Peterson

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<http://brown.edu/go/catalyst>

Three postdoctoral positions will be available in the research group of Andrew Peterson at Brown University. The research group combines theoretical calculations with laboratory-based testing to understand reactions at materials interfaces, related to catalysis and electrochemical energy storage. Specific details of the positions are below. To apply, send CV and statement of interest to andrew_peterson@brown.edu. For further information, see <http://brown.edu/go/catalyst>.

Batteries: Understanding solid–electrolyte interphase phenomena in lithium batteries. A postdoctoral position is available to understand the reactivity of the electrolytic fluid in lithium ion batteries in the stages where the “interphase” is created between the solid and electrolyte phases, known as the solid-electrolyte interphase (SEI). This project will use atomistic and electronic structure methodologies to predict and understand the existence and function of this layer, which is crucial to the performance and safety of modern batteries. While theoretical in nature, the researcher will interact strongly with a diverse team of experimental and theoretical colleagues at multiple institutions, to understand the implications and correlations of the theoretical calculations with experimental characterizations of battery structure.

Solar fuels: Development and testing of improved electrocatalytic materials for CO₂ reduction. A postdoctoral position is available to design and test improved electrocatalytic materials for carbon dioxide reduction, with an emphasis on the electrocatalytic conversion of CO₂ to hydrocarbons (fuels) and commodity chemicals. The project will involve the development of a fundamental understanding of alternate reaction mechanisms (e.g., via Mars-van Krevelen approaches) on classes of reaction materials along with the prediction of materials properties based on electronic structure calculations. Experimental testing and characterization of candidate materials will provide feedback for the continued improvement of materials. This position will involve the application of both theory and experiment and the ideal candidate will bring experience in both areas, however, motivated individuals with expertise in only one area and a strong desire to expand their skills will also be encouraged.

Stress–controlled catalysis: Electrochemical applications. A postdoctoral position is available in the area of developing stress-controlled electrocatalysts for oxygen reduction (ORR) and CO₂ reduction reactions. The postdoc will work as part of a large multi-investigator project dealing with the effects of mechanically-induced strain on heterogeneous catalyst properties. The candidate will

have a solid background in experimental electrochemistry, and will work as part of a large multi-disciplinary team. The candidate will preferably bring experience with electrocatalysis (such as ORR, HER, CO₂ reduction, etc.) and will work with team members in solid mechanics in order to conduct electrochemical experiments in an environment where the electrocatalyst is in static or dynamic strain. Close collaboration will also be expected with colleagues in electronic structure theory to design and interpret experiments based on first-principles calculations. The position is available immediately and will be under the co-supervision of professors Pradeep Guduru and Andrew Peterson in the Brown University School of Engineering.

Brown University is located in Providence, Rhode Island, a metropolitan area of 1.6 million people located within a one-hour train ride from Boston and a three-hour train ride from New York.