

# AGEP-T Project Descriptions

## Brookhaven National Laboratory Global and Regional Solutions Directorate

### **Project Title:     Advanced Materials for Energy Systems**

This document describes the work on materials science research including radiation damage and new materials development for nuclear applications in requesting applications from science or engineering post docs for the Stony Brook University – Brookhaven National Laboratory AGEPT Program.

#### **Project Description**

This project constitutes designing and building portable sample environments suitable for in-situ investigation of interfacial interactions under high-temperature and high-pressure conditions. This new capability will be utilized to investigate reaction processes and kinetics at interfaces in order to address materials degradation under extreme environments. The capability will be demonstrated in two high impact research areas: elucidate reactions at zircaloy-steam interface for nuclear reactors and investigate cement-rock interface for enhanced geothermal systems. The candidate will help develop the sample environment and utilize it using beamlines at existing synchrotron facilities (Argonne and Brookhaven National Laboratories) to benchmark the technique in a number of real-case studies. In long-term the research and development involved in building of the sample environment will be implemented on the XPD and SRX beamlines at National Synchrotron Light Source II when it becomes operational.

The ability to set up, manipulate, and learn novel instrumentation techniques and effectively collaborate with other team members of diverse intellectual backgrounds is expected. Responsibilities include interacting with the beamline and materials scientist to build the sample environment, supporting all aspects of design, development and demonstrating the capabilities of the sample environment by doing measurements at synchrotron beamlines.

#### **Qualifications of Ideal Candidate**

Post Doc:           Ph.D. in material science, chemistry, experimental physics or related field  
Experience and a demonstrated record in experimental x-ray diffraction and x-ray fluorescence at Synchrotron preferably with in-situ synchrotron data collection. Experience with diffraction and fluorescence data computation and modeling methods. Strong written and oral communications skills. Candidate with strong initiative and self-motivation is highly desirable. Preferably experience with one or several computer programming languages such as C/C++/Python/Igor/Matlab or equivalent.

**For More Information contact:**

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