

Idaho Incubation Fund Program

Final Report Form

Proposal No. 6698 (award #:IGEM15-003)
Name: Claire Xiong
Name of Institution: Boise State University
Project Title: Statewide Collaboration to Develop Energy Storage
Technology for Extreme Environments

Information to be reported in your final report is as follows:

1. Provide a summary of overall project accomplishments to include goals/milestones met, any barriers encountered, and how the barriers were overcome:

This project will support collaborations between Boise State University (BSU), the Center for Advanced Energy Studies (CAES), University of Idaho (UI), Idaho National Laboratory (INL) and a number of collaborators in and outside the state of Idaho. The objective of this proposal is to enhance critical capabilities among CAES partners for energy applications subjected to extreme environments. In order to achieve this goal, the purchase orders of capital equipment such as environmental chambers and electrochemical workstation were placed.

2. Describe the current state of the technology and related product/service:

The proposed battery technology under extreme environments and related product will be investigated when the proposed equipment arrive on campus.

3. List the number of faculty and student participants as a result of funding:

Faculty: 2

Student participants: 2

4. What are the potential economic benefits:

To ensure accurate and sound analysis of battery materials for extreme environments, environmental chambers and a corresponding electrochemical testing station are requested to support the proposed work. The need for precise temperature control capabilities among CAES partners for a variety of new energy research programs has grown substantially. Establishing improved capabilities for handling materials under extreme environments will aid a large number of existing research projects funded by DOE, NRC, NSF, BEA, NASA and industry, and will make possible the submission of new projects currently under development. In addition, this testing capability will be accessible to other industry, university, and national laboratory partners for new program and product development. As the CAES research capability coordinator for energy storage, the PI has extensive collaborations with CAES partners from INL, UI and University of Wyoming (new addition to CAES) through an existing project funded by NSF. In addition, the PI is currently working with CAES partners from UI and INL on a NASA EPSCoR proposal (selected to address material and device issues for space power generation and storage). The proposed new capability will expedite these projects and the success of the projects will ensure the leadership and competitiveness of BSU/CAES in materials development for extreme environments as well as enhance the economic growth of the State. While the capability will be initially applied to energy storage materials, the capabilities will also have great value to local industries, made available through the CAES industrial portal, as well as other CAES related research including sensor development and monitoring of the nation's spent nuclear fuel.

5. Description future plans for project continuation or expansion:

Through this IGEM Special Allocation grant, BSU will establish a unique battery material testing capability for extreme environments. Specifically, the system will be used to measure the electrochemical properties of novel nanostructured battery materials developed by BSU and INL. Because the scientific knowledge behind low temperature and high radiation performance of batteries and the interaction between electrode and electrolyte is largely unknown, such work would be of interest for the DOE Office of Science, Basic Energy Science, and NSF Energy for Sustainability program. DOE-EERE/VTP, DOE-OE, DOE-ARPA-E, NASA's Game Changing Development and SBIR/STTR programs, and private sector companies could provide potential funding support for facilitating and accelerating the transfer of technology out of our research lab. Funding opportunities will also be sought within DoD sectors, since resolving low temperature battery performance issues would enable soldiers to carry less battery weight in the field during winter conditions.

6. Please provide a final expenditure report (attached) and include any comments here:

7. List invention disclosures, patent, copyright and PVP applications filed, technology licenses/options signed, start-up businesses created, and industry involvement:

N/A

8. Any other pertinent information:

FINAL EXPENDITURE REPORT

A. FACULTY AND STAFF		
Name/Title	\$ Amount Requested	Actual \$ Spent
B. VISITING PROFESSORS		
Name/Title	\$ Amount Requested	Actual \$ Spent
C. POST DOCTORAL ASSOCIATES/OTHER PROFESSIONALS		
Name/Title	\$ Amount Requested	Actual \$ Spent
D. GRADUATE/UNDERGRADUATE STUDENTS		
Name/Title	\$ Amount Requested	Actual \$ Spent
E. FRINGE BENEFITS		
Rate of Fringe (%)	\$ Amount Requested	Actual \$ Spent
PERSONNEL SUBTOTAL:		
F. EQUIPMENT: (List each item with a cost in excess of \$1000)		
Item/Description	\$ Amount Requested	Actual \$ Spent
1. Environmental Chambers (BTU-133, BTZ-133)	15,615	16,365
2. Electrochemical Workstation	19,413.75	7,646 (partial payment)
3.		
EQUIPMENT SUBTOTAL:		
G. TRAVEL		
Description	\$ Amount Requested	Actual \$ Spent
1.		
TRAVEL SUBTOTAL:		
H. PARTICIPANT SUPPORT COSTS:		
Description	\$ Amount Requested	Actual \$ Spent
1.		
2.		
PARTICIPANT SUPPORT COSTS SUBTOTAL:		
I. OTHER DIRECT COSTS:		
Description	\$ Amount Requested	Actual \$ Spent
1.		
OTHER DIRECT COSTS SUBTOTAL:		
TOTAL COSTS (Add Subtotals):		
TOTAL AMOUNT REQUESTED:		35,028.75
TOTAL AMOUNT SPENT:		24,011