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Report Title

Education and URTLAM Progress Report

ABSTRACT

A report on the undergraduate STEM education, community service and research infrastructure improvement

Theoretical Design and Experimental Evaluation of Molten Carbonate Modified LSM Cathode for Low Temperature Solid Oxide Fuel Cells

[Education and URTLAM Progress Report]

Changyong Qin, Benedict College

Education Progress

During the two years of 2012-2014 funding period, four undergraduate students from Benedict College and one graduate student from University of South Carolina have been supported to participate in the funded projects. Students were trained in both modeling and experimental techniques. Their hard work led to several publications and conference presentations. One graduate student from University of South Carolina (the Co-PI institute) completed her PhD degree with the support from this grant. Four undergraduate STEM students from Benedict College participated the Summer Undergraduate Research Institute at Benedict College for the summer of 2013 and 2014.

The student names are listed below.

Juan Medina, Chemistry, Class of 2017, Benedict College

Susan Njoki, Chemistry, Class of 2016, Benedict College

Kahla Haines, Chemistry, Class of 2015, Benedict College

Xuan Zhao, Mechanical Engineering, Completed PhD in 2014, University of South Carolina

(Now Postdoc at University of Texas, Austin)

URLTAM Progress

Undergraduate Research and Teaching Laboratory for Advanced Materials (URLTAM) has been successfully built up. It is located in Room 213, Alumina Hall on the main campus of Benedict College. The lab occupies about 1500 sf² and is equipped with state-of-art instruments purchased mainly by supports from the current grant and partially from other DOD grants to the PI and another DOE grant awarded to Dr. Samuel Darko at Benedict College.

Equipments from this Grant (Installed and Tested)

High-Speed Rotor Mixer and Dispersing Ball Mill

TGA/DSC (Shimadzu)

High-Temperature Muffle Box Furnaces (1700°C and 1200°C grade)

High-Temperature Tube Furnace (1200°C grade)

Ultrasonic High-Pressure Chemical Reactor for Material Synthesis

AMD 4-Way Opteron Computing Server (Six Purchased and Installed)

NVidia Fermi Quad-GPU Computing Server (Two Purchased and Installed)

MedeA VASP DFT Package by Materials Design (Installed and Tested)

Solartron Electrochemistry Station 8 Channel
Princeton Electrochemistry Work Station (Single Channel)
High-Temperature Working Stage for Raman Spectroscopy

Community Service

Undergraduate Research and Teaching Laboratory for Advanced Materials (URLAM) has actively participated the 9th and 10th Xtreme Technology event, held on the campus of Benedict College. Eighteen high school teams came to the event and participated in competitions in the STEM fields of Biology, Chemistry, Engineering, Mathematics, Physics, Computer Science and Environmental Science. Some activities was financially supported by the current grant. This annual event provides local high school students and teachers exposure to cutting-edge STEM research and attracts them to pursue degrees in STEM.

A Summer Fuel Cell Camp was offered in the Co-PI lab at The Center of Excellence of Solid Oxide Fuel Cells at the University of South Carolina in the summer of 2013. This camp was only opened to African American middle and high school students. Five students were able to successfully complete this one-week program and received their certificates at the end.

A joint Fuel Cell Summer Camp was also held by the University of South Carolina and Benedict College in the summer of 2014. About 20 undergraduate and graduate students from two institutions have participated in this full-day camp. Four technical oral reports were delivered by invited speakers. Some pictures of the event was attached here.

ATTACHMENT: SELECTED PICTURES FORM THE FUEL CELL SUMMER CAMP





