

AIAD #10860

Research Opportunity for USMA Faculty and Cadets

ORGANIZATION/PROJECT SPONSOR

Organization: US Army Research Laboratory, Sensors and Electron Devices Directorate, Electrochemistry Branch

Organization POC: Kang Xu

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Location: Adelphi, Maryland 20783-1197

USMA Faculty Member: LTC F. John Burpo, Academy Professor, Department of Chemistry & Life Science, USMA; fred.john.burpo@us.army.mil

PROJECT

Title: 3-Dimensional Virus Ordering for Bio-templating Electrode Materials

Description: Lithium rechargeable battery performance is critically dependent on the nanoscale synthesis of electrode materials. The M13 bacteriophage provides a high aspect ratio biotemplate for synthesizing high surface area to volume inorganic particles used for both cathode and anode materials. The ability to array viruses in 3-dimensions offers a route to developing electrodes that do not require additional inactive conductive and binding materials, and thus increase the specific capacity of the electrodes. Such 3-dimensional ordering is also seen as a means to creating thin film, flexible, and conformable electrodes.

ARL/Army Benefit: Lighter weight, flexible, and conformable electrode materials benefit ARL/Army by reducing Soldier load and decreasing the mass of larger system rechargeable power supplies. This project builds on pre-existing collaborations between Kang Xu, Angela Belcher (MIT, Biomolecular Materials Laboratory), and LTC John Burpo (MIT/USMA).

Background Required: Cadets and faculty from the USMA Department of Chemistry and Life Science are specifically targeted for this project with the intent that summer research continues as a collaboration in conjunction with cadet senior research projects under the local mentorship/collaboration with the USMA faculty member (LTC Burpo).

Security clearance required: None

Capacity: 1 USMA faculty member and 2 cadets

Duration: 3 weeks but flexible

Block Preference: Please specify what timeframes DO NOT WORK for the organization:
No Known Conflicts

