



Minority University Research and Education Project (MUREP)

Institution: Hampton University

City/State: Hampton, VA

Award Name: MUREP Partnership Learning Annual Notification (MPLAN)

Award Number: N/A

Title: Sustained Approach for Energetic Lunar Operation/ STTR: T3.04 Advanced Low-Temperature Secondary Batteries

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Award Fiscal Year: FY2024

Summary:

The widespread adoption of battery-powered devices has led to a growing need for reliable energy storage solutions in various applications, including space applications. However, the extreme cold poses significant challenges for providing a reliable source of power, but by developing advanced cells with lower temperature capabilities, we can reduce the need for cumbersome thermal management systems and enhance our capabilities for sustained human exploration and discovery on the Moon. Additionally, these cutting-edge technologies will have far-reaching benefits for NASA's broader Moon to Mars initiative and planetary science missions to the outer solar system. The primary objective of this endeavor is to develop and implement robust and high-performing secondary battery technologies that can withstand the harsh, low-temperature conditions on the lunar surface. The performance of lithium-ion batteries in cool conditions indeed hinges on the electrolyte's proficiency in facilitating the smooth desolvation of lithium ions at the interface between the electrode and the electrolyte.