High Energy Density Anode Electrode for Sodium-Ion Batteries Variability from Lithium-Ion Batteries Energy Efficiences

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Throughout the world, lithium batteries are the prevalent form of mobile energy sources for modern technological devices. Though its importance is invaluable, its deficiencies have become noticeable. In order to innovate new levels of technological advances, by introducing Sodium-ion batteries, our goal for this project is to develop a Sodium-ion battery that will surpass the electrochemical efficiencies of the average Lithium-ion battery which were an initial voltage of 2.5 Volts and a Capacitance of 150mAh g-1. In order to test this research, we built CR2032 type coin cell batteries. We began the process by creating the cathode electrodes of the battery which were then incubated in a vacuum oven for 48 hours. Then, these electrodes were transferred to an Argon-filled glove box for battery assembly. After the assembly, the batteries were then rid of any lasting impurities. These were then placed into the battery testing instrument were recorded after 50 cycles. After recording and analyzing the data, the results showed that Sodium-ion batteries with the NaFe2S cathode met our expectations for voltage, but the capacitance was below our requirements. The results from the ZnMn2O3 cathode exceeded 3.0 volts and had a capacitance level of over 200mAh g-1. Thus, our scientific goal was achieved. Sodium-ion batteries with the ZnMn2O3 cathode electrode have shown to surpass the electrochemical efficiencies of average Lithium-ion batteries

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