Preparation of Lithium-ion Batteries Coupled with Lithium-iron-phosphate Cathodes

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Lithium-ion batteries have been used as a power source in many applications such as mobile electronics and electric vehicles. However, the current Li-ion battery technology does not fully satisfy the future performance goals for electric automobiles, due to its restrained charge capacity, relatively long recharging time, and accelerated aging process especially at elevated temperature. Last year I utilized half cellsand replaced graphite to enhance the performance of the Li-ion batteries. As a continuation to determine whether graphene or graphite will be the most efficient, we prepared lithium-ion anodes coupled with lithium-iron-phosphate cathodes via the Dr. Blade method, normalized the measured current with the mass of active materials, and plotted the current density vs the electric potential (E, V vs Li). To compare the graphene- and graphite-based electrodes, we selected specific capacity (mAh/g) at a current density of 37.2 mA/g. From data, we can determine that the graphene-based anode had the highest capacity, the hybrid-based anode has the second highest with a capacity in between the graphite and graphene-based anode, and the graphite-based anode has the lowest capacity.

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