

**CALORIMETRY EXPERIMENTS TO DETERMINE
LITHIUM-ION BATTERY HEAT GENERATION RATES**

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ABSTRACT

As more intermittent power sources are added to electrical grids around the world, the benefits of systems that can store energy during peak generation times and release it during peak consumption times become greater. One option for Electrical Energy Storage (EES) systems is to store energy in lithium-ion (Li-ion) batteries. The electrical performance of Li-ion batteries is strongly correlated to temperature, and if allowed to get too hot Li-ion batteries can combust in a process called thermal runaway. Thus, thermal management would be an extremely important part of any Li-ion battery EES system. To efficiently design such a system, it is necessary to know the thermal properties—heat generation rate and heat capacity—of the batteries that will make up the system. A set of experiments to determine these properties for the common 18650—18 mm diameter and 65 mm long—Li-ion battery geometry using a simple calorimeter was designed. These experiments were performed on two batteries of different types, and they produced results that could be used to guide the design of a thermal management system for a Li-ion battery EES system.