Lithium titanate battery temperature

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,,? 3C,,i-MiEV,EV-neoFit EV? Tosa?,? 3C,...

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In this work, the cells were heated to fire by an electric heater. The combustion processes are shown in Figure 1. From the Figure 1, it can be seen that at different states, the lithium ion battery shows the similar combustion behavior, however, there are some differences as well. The combustion behavior can be divided into igniting, stable combusting and extinguishing stages.

Combustion behaviors of 0%, 50% and 100% SOC batteries.

(a), (d), (g) and (h) are combustion behaviors of 100% SOC battery; (b), (e) and (i) are combustion behaviors of 50% SOC battery; (c), (f) and (j) are combustion behaviors of 0% SOC battery.

Stage III (extinguishing): The flame region was reduced gradually and extinguished at the end as shown in Figure 1(i) and 1(j). In this stage, the reaction between electrolyte and electrode materials is weakened as the residual quantity of electrolyte is decreased. The combustion times are about 2160 s and 790 s for 0% SOC and 50% SOC cells respectively. For the 100% SOC cell, it was extinguished with the ejection of the strong smoke flow at 1990 s.

Mass loss ratio of batteries in 0%, 50% and 100% SOC during combustion.

Four thermocouples were set on the surface and six thermocouples were set beside the electrodes to detect the surface and flame temperature as shown in Figure 3. The nonuniform reactions in the battery may influence the distribution of surface temperature. The variation of surface and flame temperatures during combustion was analyzed in the following to discover the rules of occurring and developing of battery fire.

Surface and flame temperature curve of 0% SOC battery during the whole progress.

(a) is the surface temperature, (b) is the flame temperature.

Surface and flame temperature curve of 50%SOC battery during the whole progress.

Surface and flame temperature curve of 100%SOC battery.

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