Li ion battery discharge chart

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The performance of lithium batteries is critical to the operation of various electronic devices and power tools. The lithium battery discharge curve and charging curve are important means to evaluate the performance of lithium batteries. It can intuitively reflect the voltage and current changes of the battery during charging and discharging. Information on critical parameters such as battery capacity, internal resistance, and efficiency can be obtained by analyzing the discharge curve and charging curve of lithium batteries.

When a lithium battery is discharged, its operating voltage constantly changes over time. Using the battery’s operating voltage as the ordinate, discharge time, capacity, state of charge (SOC), or depth of discharge (DOD) as the abscissa, the curve drawn is called the lithium battery discharge curve.

The most basic forms of discharge curves are voltage-time and current-time curves. Common discharge curves include voltage-capacity (specific capacity) curve, voltage-energy (specific energy) curve, voltage-SOC curve, etc.

Specifically, its discharge curve shows a gradually declining characteristic when a lithium battery is operated at a lower discharge rate (such as C/2, C/3, C/5, C/10, etc.). This shows that as the discharge time increases, the capacity of the lithium battery will gradually decrease.

During the discharge process of lithium batteries, the voltage gradually decreases, and the current also decreases. The shape and slope of a lithium battery’s discharge curve can also provide important information about battery performance.

The slope of the lithium battery discharge curve can reflect the discharge performance of the battery. A flatter lithium battery discharge curve usually indicates that the lithium battery has better discharge stability and can provide stable energy output. In addition, by observing the plateau area of the lithium battery discharge curve, we can understand the battery’s voltage changes at different discharge depths. This evaluates the discharge capacity of the lithium battery.

The area of the lithium battery discharge curve is proportional to the discharge time. Therefore, the discharge capacity of lithium batteries can be evaluated by calculating the area under the curve. The discharge capacity of lithium batteries directly affects the usage time and endurance of lithium batteries.

Internal resistance is the resistance inside the lithium battery, which affects its discharge characteristics. Higher internal resistance will cause the voltage to drop faster and the discharge power to drop. Smaller internal resistance helps improve the battery’s discharge efficiency and power output.

By analyzing the lithium battery discharge curve, the internal resistance of the lithium battery can be

estimated, and its impact on battery performance can be evaluated. In addition, the size of the internal resistance is also related to the health status of the lithium battery. Therefore, internal resistance evaluation can also be used to diagnose battery faults.

The capacity of a lithium battery refers to the amount of charge the battery can store. It is usually expressed in milliamp-hours (mAh) or ampere-hours (Ah). By integrating the lithium battery charge curve and discharge curve, the actual capacity of the lithium battery can be calculated. At the same time, multiple charge and discharge cycle tests can also be performed to observe the attenuation of capacity. This can be used to evaluate the cycle life of lithium batteries.

Cycle life refers to the ability of a battery to maintain certain performance after multiple charge and discharge cycles. By observing the changes in the charge-discharge curve over multiple cycles, the battery’s cycle life can be evaluated. Suppose the shape and characteristics of the curve remain relatively stable after multiple cycles. In that case, the battery has a good cycle life. At the same time, the capacity attenuation during the cycle can also be analyzed to predict the battery’s service life.

The discharge curve and charging curve of a lithium battery are the relationship between the voltage and the discharge capacity of the lithium battery. They are also the curves of the remaining capacity SOC.

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Web: https://sumthingtasty.co.za/contact-us/
Email: energystorage2000@gmail.com
WhatsApp: 8613816583346