Lithium storage battery dynamic consistency characteristic parameter analysis and extraction of strategy research

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Abstract

With the increasing range of renewable energy applications, renewable energy grid generation will become the future trend of development. Because of the characteristic of the randomness of the output of renewable energy, lead to forms of renewable energy based distributed generation has the characteristics of the instability. Energy storage system in power supply side the renewable energy of the active power can be effectively controlled, so as to enhance the certainty of power generation, The lithium battery has been widely used in energy storage applications, can be achieved by series or parallel large capacity and high voltage.

Large-scale battery charge and discharge cycle several times, the life of the battery pack and capacity are less than the utilization rate of monomer battery, this is due to the inconsistency of battery, in series with the battery can not reach the charging and discharging at the same time as the voltage, and parallel battery can not reach the charging and discharging cut-off current at the same time, it will exist part of the battery has failed to make full use of the available capacity, resulting in loss of capacity; At the same time, there are part of the battery charge discharge, excessive use of this part of the battery capacity, makes its life greatly reduced, eventually lead to the battery pack is lower than the life of a single cell.

Dynamic consistency problem, this paper mainly studies the battery by electrochemical impedance spectroscopy method to measure the dynamic impedance of the battery, and on the relationship between the dynamic consistency and battery performance to do in-depth research. Electrochemical impedance spectroscopy method is through a small amplitude of the sine wave signal to disturbance of system, through the response of the system to obtain the ratio of voltage and current, by changing the frequency of the signal, to obtain the frequency response of equivalent circuit. Some electrical components built by the equivalent circuit is used to simulate the dynamic process of the original system of equivalent circuit of the impedance spectrum with the original system impedance spectrum fitting together, can reveal the change of battery internal resistance, thus the battery dynamic consistency can be further judgment and analysis.