Claims

1. A capacity grading method for a sodium ion battery for use as an energy storage module, the method comprising:

S1, activating the sodium ion battery in an environment of 40-50 ℃;

S2, then charging and discharging the sodium ion battery between 0.3-1.6V for capacity calibration by 0.1C, and determining whether the sodium ion battery is qualified based on a rated capacity of the sodium ion battery;

S3, if the sodium ion battery is determined to be qualified, charging the sodium ion battery to 1.3V at a current of 0.1C, and then switching to constant voltage charging, with a constant voltage charging time of 40 hours;

S4, after the sodium ion battery enters the constant voltage charging, take any 2-hour period from a period starting from the 30th hour to the 40th hour of the constant voltage charging, capacity grading the sodium ion battery based on R, wherein R is a ratio of average hourly capacity during constant voltage charging to a total capacity of the sodium ion battery, if R<0.2 ‰ the sodium ion battery is classified as Class A, if R=0.2-0.4 ‰ the sodium ion battery is classified as Class B, if R>0.4 ‰ the sodium ion battery is classified as Class C.

2. The capacity grading method for a sodium ion battery according to claim 1, characterized in that the sodium ion battery classified as Class A is applied for an energy storage module in a backup power system; the battery classified as Class B is used as an energy storage module in industrial and commercial energy storage systems; the sodium ion battery classified as Class B can also be used as an energy storage module in a small-scale energy storage system.

3. The capacity grading method for a sodium ion battery according to claim 1, characterized in that the sodium ion battery comprises a positive electrode, a negative electrode, and an electrolyte; the positive electrode and the negative electrode are both composed of active materials, conductive agents, and binders, wherein the active materials of the positive electrode and the negative electrode are both made of polyanionic materials, and no interface reaction happens

between the electrolyte and the active materials used in the positive and negative electrodes.

4. The capacity grading method for a sodium ion battery according to claim 3, characterized in that the active materials of the positive and negative electrodes are both phosphate compounds with a fast conduction structure of sodium ions.

5. The capacity grading method for a sodium ion battery according to claim 4, characterized in that the active material of the positive electrode is selected from at least one of $Na_4Fe_3(PO_4)_2(P_2O_7)$, $Na_4Fe_{2.5}Ti_{0.5}(PO_4)_2(P_2O_7)$, $Na_4Fe_{3-x}Mn_x(PO_4)_2(P_2O_7)$, $Na_4Mn_3(PO_4)_2(P_2O_7)$, and $Na_3MnTi(PO_4)_3$, wherein $0<X<3$;

the active material of the negative electrode is selected from at least one of $NaTi_2(PO_4)_3$, $Na_3Fe_2(PO_4)_3$, and $Na_3MnTi(PO_4)_3$.

6. The capacity grading method for a sodium ion battery according to claim 5, characterized in that there is no solid electrolyte phase generated during the battery performance, and an interface between the positive electrode and the electrolyte does not generate an electrochemical boundary facial phase.

7. The capacity grading method for a sodium ion battery according to claim 3, characterized in that the electrolyte uses at least one of methyl carbonate, diethyl carbonate, propylene carbonate, ethylene carbonate, dimethyl carbonate, and diethylene glycol dimethyl ether as an organic solvent.

8. The capacity grading method for a sodium ion battery according to claim 3, characterized in that the electrolyte uses at least one of sodium perchlorate, sodium bis (oxalate) borate, sodium bis (salicylic acid) borate, and sodium tetraphenylborate as electrolyte salt.

9. The capacity grading method for a sodium ion battery according to claim 3, characterized in that an individual battery capacity of the sodium ion battery is 100-350Ah.