

Study on the Technology of Fast Charging Lithium ion Battery

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Li-ion battery has become the most widely used battery with the advantages of high energy density, good cycling performance and no memory effect. The charging rate of Li-ion battery is relatively low (generally within 1C). In order to shorten the charging time and improve the efficiency of battery, fast charging lithium ion battery has been studied at home and abroad, which were mainly used in new energy vehicles and 3C electronics and other areas.

This study prepared a kind of fast charging lithium ion battery, with NCM as the cathode, fast Li⁺ insertion and extraction of graphite as anode, ceramic film with the matrix of PE/PP/PP and highly conductive electrolyte. The capacity of fast charging lithium ion battery was 1Ah. The research has found that the continuously charge and discharge rate of the battery was over 3C (with the cut off voltage of 2.75V-4.2V, shown as figure 1). And after 500 cycles of fast charging and discharging (3C, 100% SOC), the capacity retention was over 90% (shown as figure 2). The surface of negative electrode after fast charge is shown in figure 3. It was found that interface of negative electrode is smooth and neat, no deposition of lithium metal was produced.

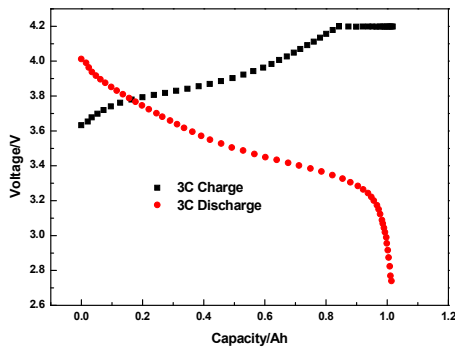


Fig. 1 3C charge-discharge curves

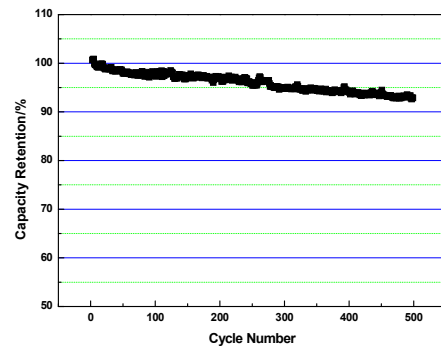


Fig. 2 Curve of capacity retention of 3C charge and discharge cycles

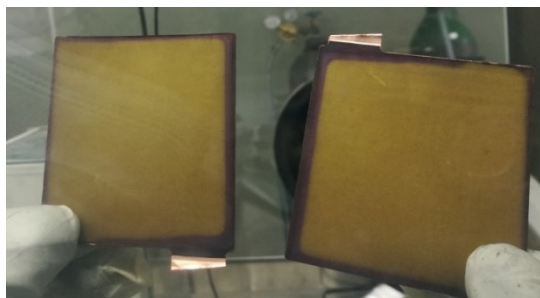


Fig. 3 The surface of negative electrode