

IMPROVEMENT OF LOW TEMPERATURE RATE PERFORMANCE OF GRAPHITE ANODE OF LITHIUM ION BATTERY THROUGH THE COAL TAR DERIVED AMORPHOUS CARBON COATING

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The application markets of Li-ion battery (LIB) is rapidly increasing in the industrial areas such as energy storage system (ESS) and electric vehicle (EVs). There is still much room for improvement in the use of LIB at various environments. In previous study, we reported that coal tar derived amorphous carbon coating on the surface of graphite anode was very effective to improve the rate performance at room temperature. Also, we reported the removal of volatile matters which was determined as hexane soluble (HS) of the precursor coal tar pitch was very effective to obtain the much improved effect of rate performance. In this study, we examined the effect of coal tar derived amorphous carbon coating on the surface of graphite anode on the discharge rate performance of LIB at the relatively low temperature range of 0°C~10°C.

Amorphous carbon coating on the surface of natural graphite (NG) was carried out using simple distilled coal tar pitch (CTP, SP=150°C) and its HS removed CTP-HI. The coating amount of the amorphous carbon was controlled by adjusting CTP amounts by 5, 10 and 15 wt.%. CTP-HI was also used for examining the effect of volatile matters on the amorphous carbon composition. Amorphous carbons heat treated at 1000°C and 1600°C were examined for examining the heat treatment temperature effect on the low temperature rate performance.