A Study on the Improvement of Electrochemical Performance of Lithium-sulfur Battery through Coating Membrane

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Lithium-ion batteries played a major role in the development of portable IT equipment industry. However, due to the expansion of mid- to large-sized battery markets such as electric vehicles (EVs) and energy storage systems (ESSs), lithium-ion batteries have reached the limits of price and energy density. To overcome this are under study for lithium-sulfur or lithium-air batteries. Among them, the lithium-sulfur battery has a high energy density and a high theoretical capacity (1672 mAh / g) of about 2,600 Wh / kg, which is about four times that of a lithium ion battery. In addition, it has a great interest in recent years because it has the advantage of being economically excellent as a material having a very rich storage capacity and lowering the manufacturing cost of the battery. However, until now, lithium-sulfur battery has problems such as dissolution of lithium polysulfide produced during charging and discharging process, reduction of capacity due to shuttling phenomenon between electrodes, shortened life span and lowered output characteristic due to low conductivity of sulfur. In order to solve this problem, it has been reported that the performance of the battery is improved due to the dissolution of lithium polysulfide through the surface coating of the active material (sulfur) and the suppression of the shuttle phenomenon.

In this study, the shuttling phenomenon was effectively suppressed by chemically reactivating the lithium polysulfide eluted by coating the surface of the separator with a carbonaceous material, and the electrochemical characteristics thereof were analyzed.

References:

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