Boron Nitride Nanotube-based Separators for High-Performance Lithium-Sulfur Batteries

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In order to prevent global warming, development of energy storage system is in progress along with the development of electric vehicles and new and renewable energy. However, the currently commercialized lithium-ion batteries have limitations, and the need for high-performance next-generation batteries is increasing. Lithium-sulfur batteries are a next-generation battery that uses sulfur as an cathode and lithium metal as an anode. They are attracting attention because of its high capacity. However, the biggest problems are the formation of dendrite on anode and the shuttle effect of Lithium-sulfur batteries. In order to solve this problem and commercialize a high-performance lithium-sulfur battery, boron nitride nanotube-based separator is fabricated. Performance of lithium-sulfur batteries can be improved by using the properties of BNNT. As a result of comparing the conventional PP separator and the fabricated BNNT separator, 1 mg/cm2 of purified BNNT showed the highest performance. It was confirmed that purified BNNT had higher ionic conductivity than PP separator, stabilized the anode and alleviated the shuttle effect.