Study on the Property of LiFePO4 Battery and Extending Its Life Span Through DMSO-SnF2 Protection Methods

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Lithium ion batteries (LIBs) have become an important energy storage power system in the world due to their safety, high heat resistance, environmental-friendliness and limited memory effect. However, their negative electrode, graphite, has a relatively low capacity. I studied liquid metal batteries (LMBs), whose lithium sheets have high capacity but potential safety hazards. I researched protecting the anode to achieve larger scale availability. The traditional lithium iron phosphate battery is limited by short life span, and thousands of discarded lithium batteries each year have caused great damage to soil. In this study, the lithium iron phosphate battery is modified by coating with tin fluoride (SnF2) on its lithium sheets to inhibit the growth of lithium dendrite, thereby prolonging its service life and performance. In addition, this study also compares the performance changes of the unprotected lithium iron phosphate battery and the modified lithium iron phosphate battery by cyclic voltammetry (CV), cycle-efficiency and specific capacity, charge and discharge long cycle tests, and capacitor contribution calculation. Results show that the efficiency and capacity of the protected LMBs decay more slowly than the high current charging, which is of great significance for the development of fast rechargeable batteries.