

Title : Low-Cost Cathode Materials for Lithium-Ion Cell

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Special Supports : Nippon Light Metal Co., Ltd.

Research Interest

Cathode materials for lithium-ion batteries and improvement of high-temperature storage and cycle life at high-temperature

Abstract

Lithium-ion batteries have become indispensable with the spread of IT devices. Furthermore, as a measure against global warming, attention is being paid to green energy to reduce CO₂ emissions, and large batteries for EV and ESS are beginning to become more common. Although the price of batteries is still high, researches and developments are still focusing on improving performance. But in order to spread them widely, it is essential to reduce the price.

Amaz Techno-consultant, LLC. has started development for mass production of batteries with low CFP, low cost and excellent low-temperature characteristics in cooperation with Nippon Light Metal Co., Ltd., with the aim of further popularizing lithium-ion batteries.

This time, we will announce the development status of the cathode material relating low cost. We focused on Manganese, which is an abundant resource, low cost and a familiar material in batteries that has been used in dry batteries for a long time. Spinel LiMn₂O₄ has been considering as a cathode for lithium-ion batteries, but it has not been actively adopted due to its low specific capacity and deterioration at 40 to 50°C. On the other hand, it also has advantages such as high discharge voltage and highly safety. It can be said that it has great potential as a cathode material for low-cost batteries. Although it is theoretically difficult to improve the low specific capacity, but there is room for improvement in terms of high-temperature stability.

We made batteries using different cathode materials such as LMO, LCO, NCM, LFP and LMO+X, and then compared their storage and cycle characteristics at 45°C. It has been found that sufficient degradation suppression effect can be obtained at high temperature by adding another cathode active material to LiMn₂O₄.

Those efforts will be presented.

Keywords:

Lithium ion battery, Cathode material, LiMn₂O₄, High temperature characteristics and Cycle life

Biography

Dr. Toru Amazutsumi had joined Sanyo Electric Co., Ltd. after graduating from Okayama University Graduate School, and had been engaged in the battery business for nearly 30 years. During that time, he was deeply involved in the development and mass production of lithium-ion batteries and adopted Aluminum alloy can for prismatic cell it was the first in the world. And he had involved in the battery supply to Tesla Motor.

He left SANYO then established Amaz Techno-consulting LLC. He had selected as one of the four advisory team members who were supporting to analyze the Galaxy Note 7 incident, and while continuing to provide technical support and evaluation of batteries for many clients. He has also continued to focus on original and unique battery development. He has a track record of over 45 years in the field of battery research and development.