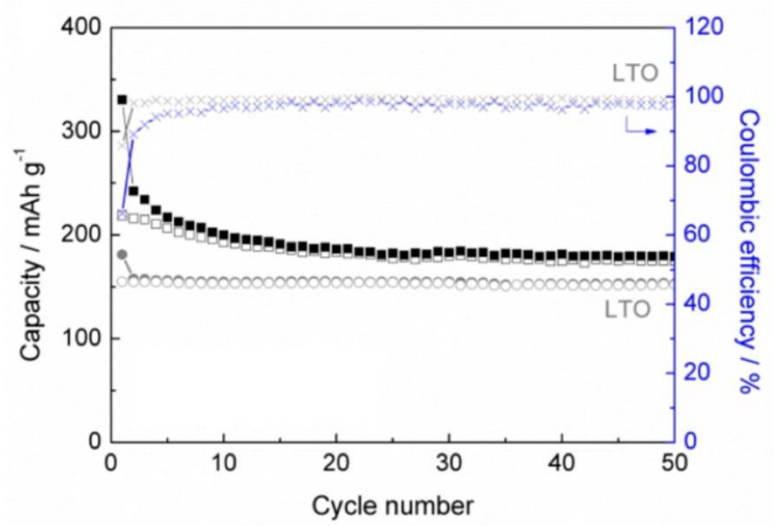
CHEMISTRY / MATERIALS

Ref : MA00284

New anode materials based on amorphous Titanate



MARKET CHALLENGES

Lithium batteries are being used as energy storage systems in electric and hybrid products (transportation, batteries industry…)

One of the market challenges is to offer products with a more competitive price and always more powerful.

In order to address these issues, industrials focus their work on the anode and especially the nature of the material, its lifetime and its stability.

Many materials for anode are already on the market: graphite, amorphous carbon, Silicium composite and LTO (Lithium Titanate Oxide, $Li_4Ti_5O_{12}$). Graphite leads the market with 60% of the global demand due to its lower price but its application is limited to lower power system with a short lifetime. LTO anode is an emerging material on the market. It has a higher lifetime, can be used for higher power systems but is a lot more expensive due to lithium price and required high temperature synthesis.

SUGGESTED APPLICATIONS

Anode materials used for renewable energy storage :

- Transport industry
- E-Bikes
- Power Tools
- Industrial batteries

DEVELOPMENT STATUS

The new product has been prepared at laboratory level (100g) in a reproducible way. Synthesis parameters have been optimized. It remains to industrialize this product within existing battery solution.

INNOVATIVE SOLUTION

The present invention offers an alternative to LTO. This new material is made from hydrated titanate oxide, it is cheaper and with higher electrochemical properties than LTO.

This new anode compound is synthesized at a temperature below 100°C compared to at least 600°C necessary for LTO. Moreover it does not contain lithium.

Electrochemical measurements were carried out with CR2032-type coin cells wherein the copper was used as the current collector and LIFP6 was the electrolyte.

As is shown in the figure, the charge capacity reached 207 $mAh.g^{-1}$ after three cycles with an operating voltage of 1.55 V which is similar to the working potential of LTO. After 50 cycles, the discharge capacity stabilized to 180 $mAh.g^{-1}$ with a 97.6 % coulombic efficiency despite a gradual loss upon cycling, the reversible capacity is higher than the 150 $mAh.g^{-1}$ obtained with LTO.

COMPETITIVE ADVANTAGES

- Cost reduction
- High battery efficiency
- Longer lifetime

IP RIGHTS

Patent application filed PCT (January 2016)

LITHIUM BATTERIES | LTO SUBSTITUTION | ELECTRO-CHEMISTRY | ELECTRICITY STORAGE | ANODE | ANODE MATERIALS

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