Comparison of the electrochemical performance of $Li_4Ti_5O_{12}$ spinel as negative electrodes for lithium-ion batteries prepared by sol gel and spray drying methods

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Energy is considered as the lifeblood of modern society. Rechargeable batteries are the most promising to meet the human needs concerning the energy storage thanks their high energy density and high energy efficiency. Most difficult challenges of the development of promising rechargeable batteries concern the electrode materials. $Li_4Ti_5O_{12}$ (LTO) is one the most promising anode materials for Li-ion batteries, as it demonstrates very stable cycling stability and excellent safety. Its high operating potential (~1.5 V) allows to avoid the formation of SEI during the first cycle. The three-dimensional structure offers LTO excellent reversibility due to the near zero volume strain during the Li+ ion intercalation and deintercalation cycling. The main objective of this study on LTO samples was to evidence the effect of synthesis method and thermal conditions on their structural, morphological and electrochemical properties [1, 2]. The results demonstrate the strong influence of the synthesis route (Sol-Gel and spray-drying methods) and the thermal treatment on the capacity, cyclability and rate capability of the LTO spinel in Li-half-cell and Li-ion full-cell (see Figure 1).

REFERENCES

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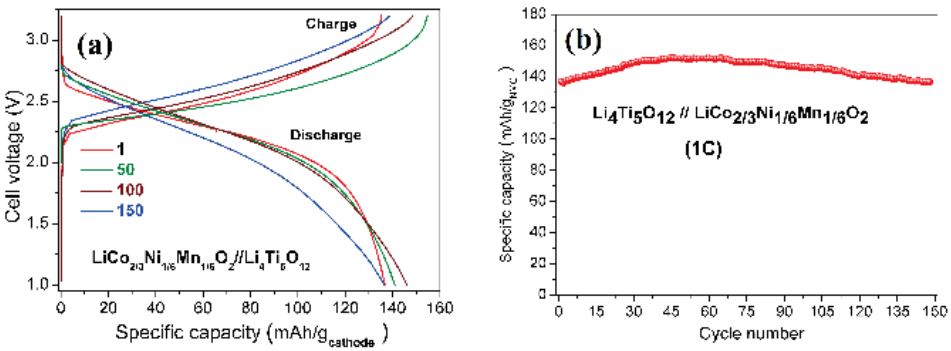

Figure 1. Electrochemical performance of $LiCo_{2/3}Ni_{1/6}Mn_{1/6}O_2//Li_4Ti_5O_{12}$ full cell at 1 C with the voltage window from 1 to 3.2 V a) Selected charge/discharge curves (cycle number = 1, 50, 100 and 150). b) Specific capacity vs. cycle number.

KEYWORDS

Sol gel-Spray drying-Lithium ion batteries-Anode material-Li4Ti5O12