Reliability of Lithium-ion Cells using Lithium Iron Phosphate as Cathode Material

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Olivine lithium iron phosphate (LiFePO₄) is a very attractive electrode material because of its high potential (3.4V) and high density (3.6g/cc). Compared with other iron based positive electrode materials, it is much safer than usual positive electrode materials.

A big problem of LiFePO₄ is low electronic conductivity. Various methods, however, have overcome this problem in recent years. The methods are (i) nano-powder [1], (ii) nano-composite with carbon [2], (iii) metal additive [3], and (iv) partial substitution of metal element for Li [4]. Despite the low electronic conductivity, one of excellent advantages is that LiFePO₄ is much safer than usual positive electrode materials.

Even after 85 degrees C storage, the reliability of LiFePO₄ as positive electrode material for lithium-ion battery has not well reported yet. Therefore, cell performances on cycle life and storage after 85 degrees C storage as compared with other iron based electrode materials were extensively studied by many researchers.

Here, we will discuss the reliability of the Li-ion battery using LiFePO₄ as positive electrode material.

References:

![Fig. 1 Voltage Profiles for the cell of (a) LiFePO₄/Graphite and (b) LiMn₂O₄/Graphite before and after storage at 85 degrees C for 24 hours at 0.2C-Rate in room temperature](image)

![Fig. 2 The amount of deposited metal (Fe or Mn) on anode electrode after 85 degrees C/24 hours storage](image)