

Manufacture and Discussion on Safety of High Energy Density Li-ion Batteries

Torng-Jinn Lee (李桐進)¹

¹Technical director of New Bettery Energy, Taiwan

jimlee1112@hotmail.com

Abstract

In this report, I am going to introduce high energy density pouch cells mainly with LNCM and silicon-based materials as cathode and anode, respectively. LNCM cathode materials include $\text{LiNi}_x\text{Co}_y\text{Al}_z\text{O}_2$ ($x \geq 0.8$, $z \leq 0.15$), $\text{LiNi}_5\text{Co}_2\text{Mn}_3\text{O}_{12}$, $\text{LiNi}_6\text{Co}_2\text{Mn}_2\text{O}_{12}$, and $\text{LiNi}_8\text{Co}_1\text{Mn}_1\text{O}_{12}$. The silicon-based anode contains different silicon-based sources or different percentage of silicon-based contents. 5Ah, 40Ah, and 60Ah pouch Li-ion cells were made to test the properties. By adjusting the compositions of silicon-based anode, the Li-ion battery could reach 300 Wh/kg and could sustain for 1000cycles. Also, I am going to discuss about the effect of conductive additive (including carbon black, CNT, SWCNT, porous carbon, AB...) inside the Li-ion batteries. The contribution of ionic conductivity and electrical conductivity would be mentioned in this part. Finally, I will show some results about the nail punching test on pouch cells. The results show that both energy density and different sources of cathodes may affect the safety property of the cell.

Keywords - List key keywords here. No more than 5.

Li-ion batteries, high energy density, LNCM