

# Study of gas analysis depend on sintering conditions of Ni-rich( $\geq 60\%$ ) precursor on Li ion battery

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The performance of a lithium ion battery is determined by four major materials. The four major materials are cathode, anode, separator and electrolyte. Especially, cathode is important element due to affects different performance such as capacity, power, cycle life, battery safety depend on the crystal structure to battery. The degree of crystallization differ the type of material and the conditions used to synthesise.

In this study, we investigated the crystallization of the mechanism of the cathode active material according to sintering condition by GC(gas chromatography, GC) analysis.

We experiment with  $\text{LiNi}_{0.6}\text{Co}_{0.2}\text{Mn}_{0.2}\text{O}_2$  (NCM622) made by co-precipitation. Co-precipitation has more uniform spherical shape, higher density of particle distribution, and less Ni and Co loss than another method. We controlled synthesis conditions such as sintering temperature( $700\text{ }^\circ\text{C} \sim 1000\text{ }^\circ\text{C}$ ) and sintering time(8h  $\sim$  15h). Furthermore, we compared bare NMC 622 and doped or coated NMC 622.

The particle of active material is confirm by SEM(scanning electron microscope, SEM). Gas produced during sintering is analyzed by GC and GC-MS. Gas analysis results depend on the sintering conditions. We analyze crystallization mechanisms with GC and XRD (X-Ray Diffraction, XRD). Through electrochemical analysis confirm difference of battery performance.

## References:

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