

## 리튬이온이차전지용 고밀도 양극활물질의 합성 및 평가

권용진<sup>1,2,a</sup>, 최병현<sup>1</sup>, 지미정<sup>1</sup>, 선양국<sup>2</sup>

<sup>1</sup>요업기술원 전자소재팀, <sup>2</sup>한양대학교 에너지 저장 및 변환 소재 연구실

### Synthesized and Characterization of high density cathode materials for Lithium Secondary Batteries.

Yong-Jin Kwon<sup>1,2,a</sup>, Byung-Hyun Choi<sup>1</sup>, Mi-Jung Ji<sup>1</sup>, Yang-Kuk Sun<sup>2</sup>

<sup>1</sup>Electronic Materials Division-KICET, <sup>2</sup>Hanyang Univ. Energy Storage&Conversion Material Lab.

**Abstract :** Li[Ni<sub>1/2</sub>Co<sub>1/2</sub>]O<sub>2</sub> powder were synthesized from co-precipitation spherical metal oxide, [Ni<sub>1/2</sub>Co<sub>1/2</sub>](OH)<sub>2</sub>. The preparation of metal hydroxide was significantly dependent on synthetic conditions, such as pH, amount of chelating agent, stirring speed, etc. The optimized condition resulted in [Ni<sub>1/2</sub>Co<sub>1/2</sub>](OH)<sub>2</sub>, of which the particle size distribution was uniform and the particle shape was spherical, as observed by scanning electron microscopy. Calcination of the uniform metal hydroxide with LiOH at higher temperature led to a well-ordered layer-structured Li[Ni<sub>1/2</sub>Co<sub>1/2</sub>]O<sub>2</sub>, as confirmed by X-ray diffraction pattern. Also these materials have  $\alpha$ -NaFeO<sub>2</sub> ( $R\bar{3}m$ ) structure. Due to the homogeneity of the metal hydroxide, [Ni<sub>1/2</sub>Co<sub>1/2</sub>](OH)<sub>2</sub>, the final product, Li[Ni<sub>1/2</sub>Co<sub>1/2</sub>]O<sub>2</sub>, was also significantly uniform, i.e., the average particle size was of about 10 to 15  $\mu\text{m}$  in diameter and the distribution was relatively narrow. As a result, the corresponding tap-density was also high approximately 2.41  $\text{gcm}^{-3}$ , of which the value is comparable to that of commercialized LiCoO<sub>2</sub>.

**Key Words :** Co-precipitation; Tap density; Lithium secondary batteries