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### A Study on the electrochemical characteristics of LiCoO<sub>2</sub> powder prepared by mechanical alloying 기계적 합금화법으로 제조된 LiCoO<sub>2</sub> 분말의 전기화학적 특성에 관한 연구

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Owing to the high synthesizing temperature (above 800°C), the LiCoO<sub>2</sub> (so-called HT-LiCoO<sub>2</sub>) powder for lithium ion battery has some disadvantages such as broader particle size distribution and higher processing cost [1-2]. To overcome these disadvantages, there have been many researches on the method of synthesizing HT-LiCoO<sub>2</sub>. Recently, the mechanical alloying, which also referred to as high energy ball milling, reactive milling, mechanochemical synthesis etc., has also been recommended for a useful technique to synthesize transition metal oxides for lithium ion battery [3-4]. In our previous work [5], we also showed that well-ordered HT-LiCoO<sub>2</sub> could be synthesized by mechanical alloying of hydroxides (LiOH · H<sub>2</sub>O and Co(OH)<sub>2</sub>) and subsequent firing at relatively low temperature (600 °C) and times (2h). In this work, details of structural characteristics and electrochemical performances of LiCoO<sub>2</sub> powders prepared by mechanical alloying were discussed.

The LiCoO<sub>2</sub> precursors were synthesized by optimized mechanical alloying conditions using a shaker type ball miller (SPEX 8000D) from starting materials of LiOH · H<sub>2</sub>O and Co(OH)<sub>2</sub> powders. SEM, BET, XRD were used to analyze the morphology and crystalline structure of ball milled precursors and/or subsequent fired powders. The electrochemical cycling performances were evaluated at various constant current, C/x (x=2, 5, 10, 40), using a two-electrode cell with lithium metal foil as a negative electrode. To investigate the chemical diffusivity and kinetics of Li transportation, galvanostatic intermittent titration technique (GITT) and cyclic voltammetry (CV) experiments were performed using three-electrode cells.

#### References

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