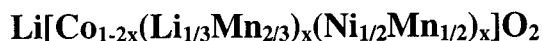


Synthesis and Structural and Electrochemical Properties of



Li[Co_{1-2x}(Li_{1/3}Mn_{2/3})_x(Ni_{1/2}Mn_{1/2})_x]O₂의 합성 및
전기적, 구조적 특성에 관한 연구

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An advanced materials of Li[Co_{1-2x}(Li_{1/3}Mn_{2/3})_y(Ni_{1/2}Mn_{1/2})_y]O₂ was developed and studied their properties of two compositions of solid solutions with layered manganese oxides. The materials were satisfied the theoretical manganese oxidation state of 4+ over that equation.

In order to confirm manganese state of 4+ in Li[Co_{1-2x}(Li_{1/3}Mn_{2/3})_y(Ni_{1/2}Mn_{1/2})_y]O₂, two compositions, Li[Li_{1/15}Ni_{1/10}Co_{3/5}Mn_{7/30}]O₂ (x=0.2) and Li[Li_{2/15}Ni_{1/5}Co_{1/5}Mn_{7/15}]O₂ (x=0.4) were synthesized using a sol-gel method. Li[Li_{1/15}Ni_{1/10}Co_{3/5}Mn_{7/30}]O₂ (x=0.2) and Li[Li_{2/15}Ni_{1/5}Co_{1/5}Mn_{7/15}]O₂ (x=0.4) were indexed typical layered structure (S. G: R $\bar{3}m$). The initial discharge capacities of samples Li[Li_{1/15}Ni_{1/10}Co_{3/5}Mn_{7/30}]O₂ (x=0.2) and Li[Li_{2/15}Ni_{1/5}Co_{1/5}Mn_{7/15}]O₂ (x = 0.4) were 178 and 185 mAh/g, respectively. The subsequent capacities of samples showed 173 and 190 mAh/g after 20 cycles. The capacity retentions (initial capacity / terminal capacity) of samples Li[Li_{1/15}Ni_{1/10}Co_{3/5}Mn_{7/30}]O₂ (x= 0.2) and Li[Li_{2/15}Ni_{1/5}Co_{1/5}Mn_{7/15}]O₂ (x=0.4) showed 97.2 and 102.7% respectively. Li ion on the transition metal layers delivered high discharge capacities and retention ratios.