

The application of an ultrathin, uniform coating layer on lithium manganese oxide and its effect on electrochemical performance in lithium ion batteries

신재호, 김병곤, 최장욱, 박승빈†

KAIST

(sbpark7@kaist.ac.kr†)

Among the numerous cathode materials for lithium ion batteries, LiMn_2O_4 (LMO) is of particular interest. In addition to its low cost and abundance, LMO is known to possess a three-dimensional framework in which Li ions migrate during charge/discharge. Thus, it has proven advantageous with respect to fast charging. Unfortunately, it has the critical drawback of Mn dissolution, a process that results from a disproportionation reaction ($2\text{Mn}^{3+} \rightarrow \text{Mn}^{2+} + \text{Mn}^{4+}$). Various efforts to address this inherent problem include coating particles with inactive material, but most approaches result in significantly compromised capacity. Here, we attempt to apply an ultrathin, uniform coating layer that simultaneously prevents this process while having minimal impact on the capacity of the electrode in the long term. It is expected that electrochemical performance will improve in terms of capacity fading, the results of which will be presented along with SEM and TEM images to confirm the presence of the desired coating layer.