Comparative Study of the Electrochemical Behaviors for LiCoO₂ Electrode Coated with Two Different Al₂O₃ Coating Layer

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doi: 10.20964/2017.06.70

Received: 22 December 2016 / Accepted: 17 April 2017 / Published: 12 May 2017

The two samples of coated LiCoO₂ electrode with different microstructures of Al₂O₃ coating layer are prepared. The XRD, SEM and TEM results reveal that both Al₂O₃ coating layers attached on the surface of LiCoO₂ have different uniformity, thickness, morphology and crystallinity. The charge-discharge cycling results show different initial discharge capacity and cycle ability for both Al₂O₃-coated LiCoO₂ samples. The reasons causing electrochemical performance difference are ascribed to some following aspects: the different microstructure of both Al₂O₃ coating layer poses to the distinct interface resistance, which may lead to the different transport ability of Li ions as well as electrons through Al₂O₃ coating layer. And meantime, the electrolyte penetration to the Al₂O₃ coating is also different, which pose to different side reaction on the interface between cathode and electrolyte for both samples.

Keywords: Lithium ion battery, Lithium cobalt oxide, Microstructure of Al₂O₃ layer, Electrochemical performance

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