Extremely-low resistance at Li_3PO_4 electrolyte and $Li(Ni_{0.5}Mn_{1.5})O_4$ electrode interfaces

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Solid-state Li batteries are promising energy-storage devices owing to their high energy densities with improved safety. Furthermore, fast-charging capabilities are expected for solid-state Li batteries. One of the major obstacles for the fast charging is the large resistance at solid-electrolyte/electrode interface. To charge batteries in short time, it is crucial to reduce the interface resistance [1].

Here, we demonstrate ultralow solid-electrolyte/electrode interface resistance of solid-state thin-film Li batteries using epitaxial films. We fabricated thin-film Li batteries with electrolyte/electrode interface resistance below ~ 5 Ωcm^2, which is almost two orders of magnitude smaller than that in previous reports. Moreover, the value is smaller than that observed in liquid-electrolyte-based Li-ion batteries.

These studies strongly encourage solid-state Li battery research, by demonstrating that interface resistance using $Li(Ni_{0.5}Mn_{1.5})O_4$ could be very low values.

References:

[1] M. Haruta, S. Shiraki, T. Suzuki, A. Kumatani, T. Ohsawa, Y. Takagi, R. Shimizu, and T. Hitosugi, Nano Lett. 15, 1498 (2015).