Extremely-low resistance at 
Li$_3$PO$_4$ electrolyte and Li(Ni$_{0.5}$Mn$_{1.5}$)O$_4$ electrode interfaces

Taro Hitosugi $^a$, Hideyuki Kawasoko $^b$, Susumu Shiraki $^c$

$^a$ Tokyo Institute of Technology
$^b$ Tohoku University
$^c$ Nippon Institute of Technology

E-mail: hitosugi.t.aa@m.titech.ac.jp

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 $\Omega$cm$^2$, 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: