Supplementary Information

An Artificial TiO_2/Lithium n-Butoxide Hybrids SEI Layer with Facilitated Lithium-ion Transportation Ability for Stable Lithium Anode

*Yang Nan, Songmei Li**, *Bin Li**, *Shubin Yang*
Dr. Y. Nan, Prof. S. M. Li, Dr. B. Li, Prof. S. B. Yang
Key Laboratory of Aerospace Advanced Materials and Performance of Ministry of Education, School of Materials Science & Engineering
Beihang University
Beijing, 100191, China
*E-mail: Songmei_li@buaa.edu.cn, li_bin@buaa.edu.cn

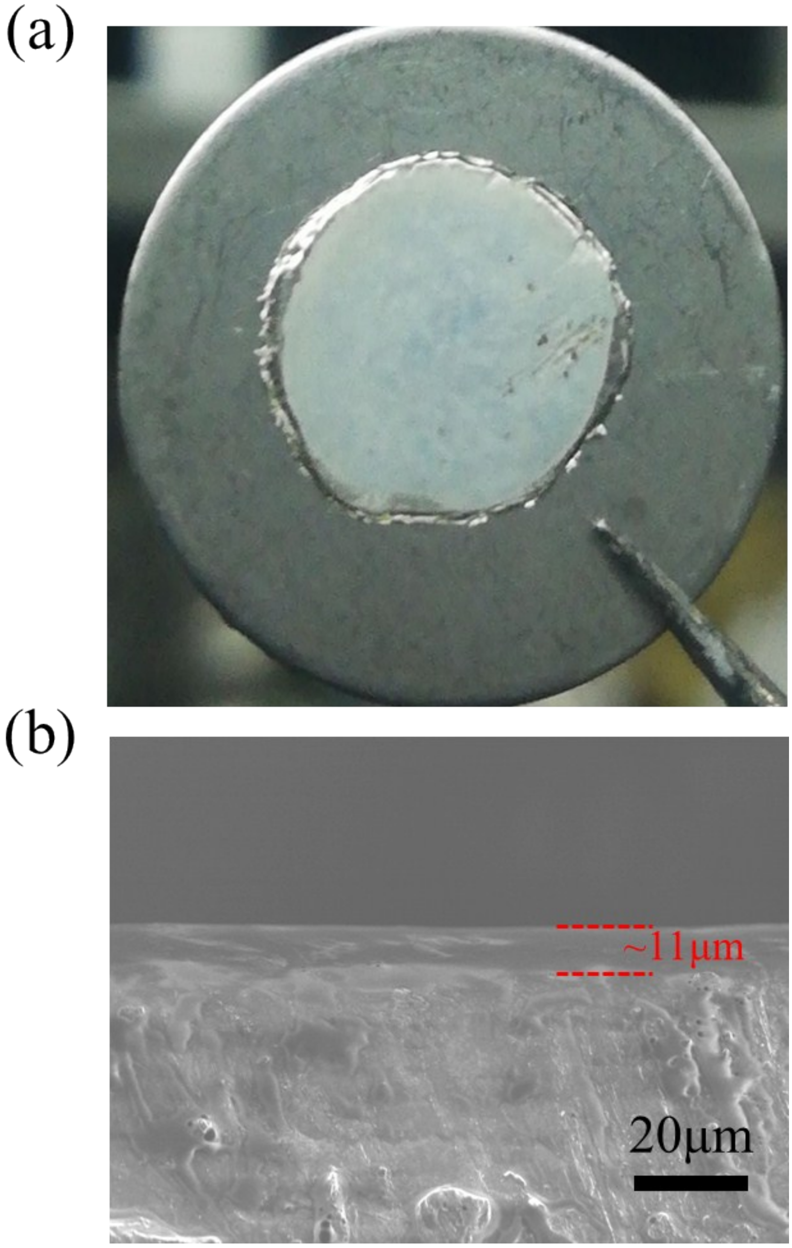

Fig. S1 (a) Photograph of TiO_2/ROLi-Li electrode on top view. (b) Cross-sectional SEM image of the TiO_2/ROLi-Li electrode.

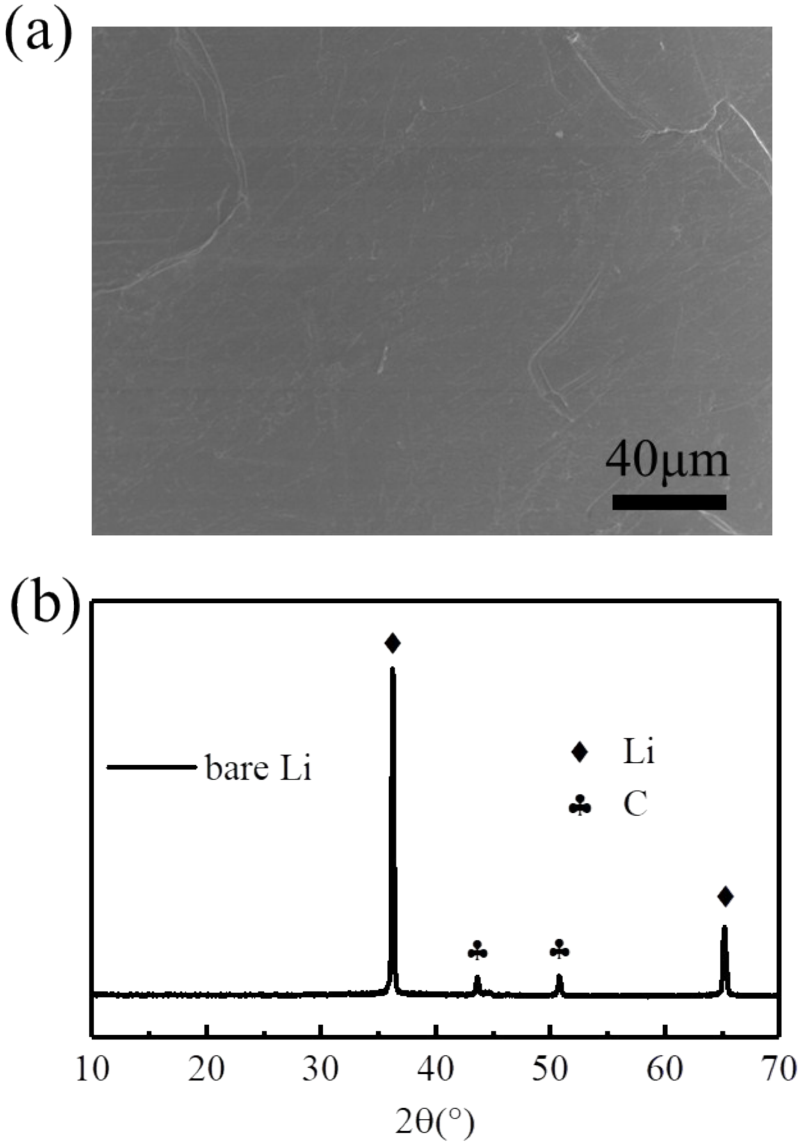

Fig. S2 (a) Top view of the bare Li electrode. (b) XRD pattern of the bare Li electrode.

Fig. S3 Phenomenons of the chemical reactions between lithium and TBOT. Bubbles were hydrogen generated from the reaction between H_2O and lithium.

Fig. S4 Hardness measurement results of the TiO_2/ROLi-Li and bare Li electrode with a Shore A durometer.

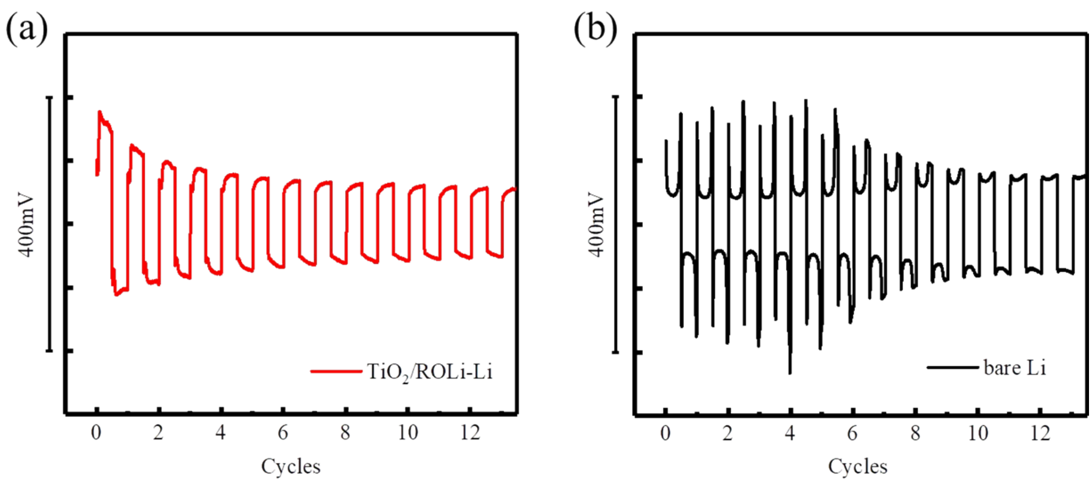

Fig. S5 Electrochemical performances of symmetric cells with (a) TiO_2/ROLi-Li and (b) bare Li electrodes achieved at initial state.

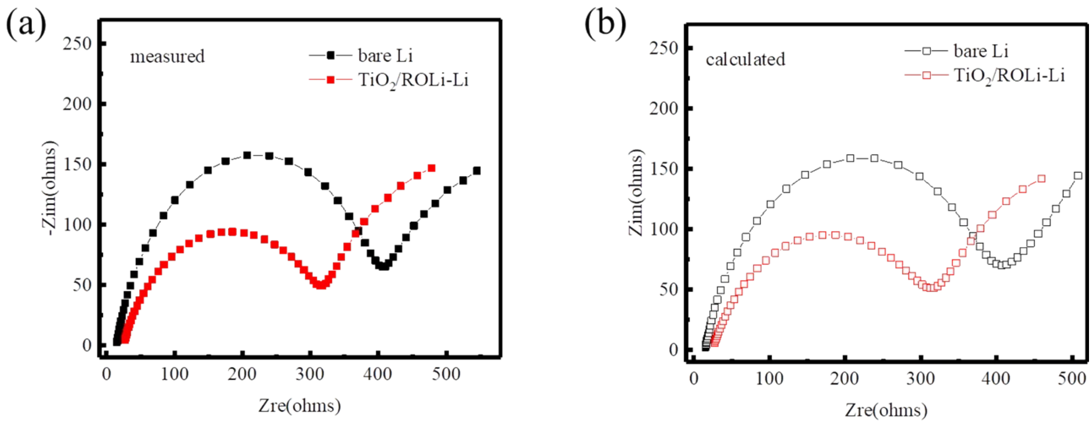

Fig. S6 Nyquist plots (a) measured and (b) calculated of the TiO_2/ROLi-Li and bare Li electrode symmetric cells without cycling.

Tab. S1 EIS calculation results for the TiO_2/ROLi-Li and bare Li electrode symmetric cells without cycling.

(Ω)	R_L	R_{SEI}	R_{ct}	$R_e=R_{SEI}+R_{ct}$
bare Li	14.27	162.40	190.00	352.40
TiO_2/ROLi -Li	24.16	95.20	170.30	265.50

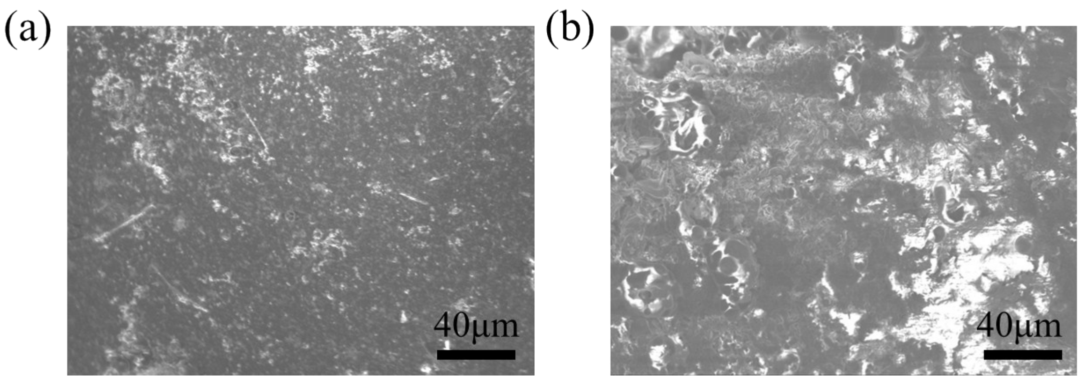

Fig. S7 Surface images of (a) the TiO_2/ROLi-Li and (b) the bare Li electrodes after 30 cycles.

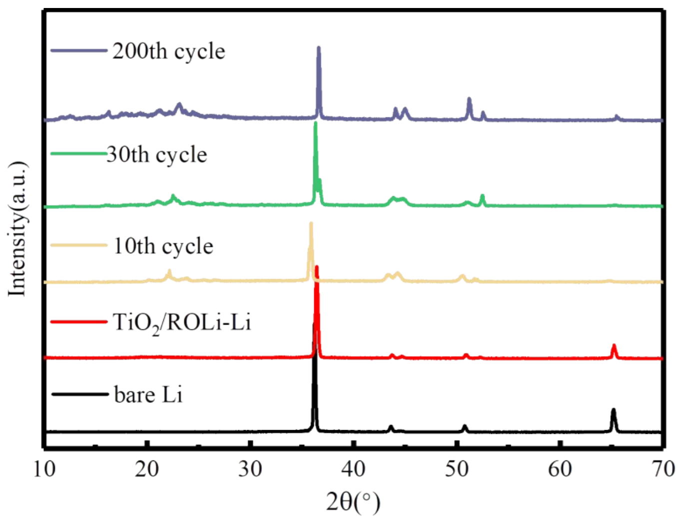

Fig. S8 XRD patterns of the bare Li electrode and the symmetrical cells with the TiO_2/ROLi-Li electrode after 0, 10, 30, 300 cycles at a current density of 1 mA cm^{-2} and a capacity of 1 mA h cm^{-2}.

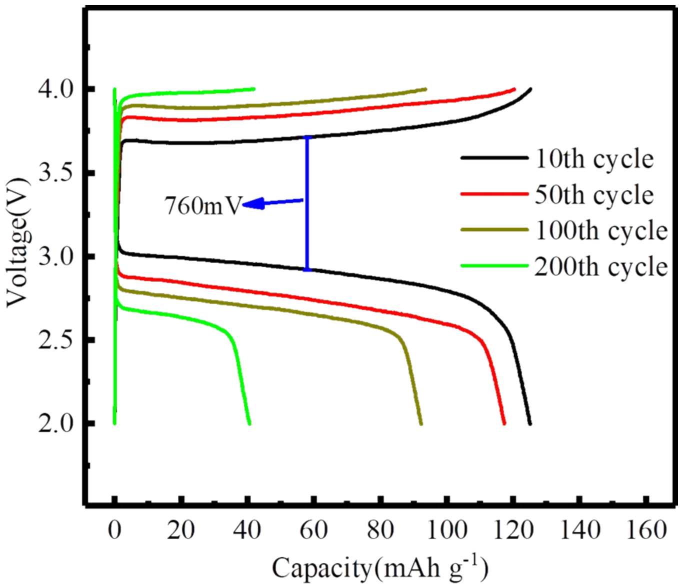

Fig. S9 Discharge/charge curves of bare Li-$LiFePO_4$ full cell at 0.5C.