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Supporting Information

$Li_{0.33}La_{0.557}TiO_3$ ceramic nanofiber-enhanced polyethylene oxide-based composite polymer electrolyte for all-solid-state lithium batteries

*Pei Zhu [a], Chaoyi Yan [a], Mahmut Dirican [a], Jiadeng Zhu [a], Jun Zang [a], R. Kalai Selvan [a], Ching-Chang Chung [b], Hao Jia [a], Ya Li [a], Yasar Kiyak [a], Nianqiang Wu [c], Xiangwu Zhang [a]**

[a] Fiber and Polymer Science Program, Department of Textile Engineering, Chemistry and Science, North Carolina State University, Raleigh, NC 27695-8301, United States

[b] Department of Materials Science and Engineering, North Carolina State University, Raleigh, NC 27695-7909, United States

[c] Department of Mechanical & Aerospace Engineering, West Virginia University, Morgantown, WV 26506, United States

*Email: xiangwu_zhang@ncsu.edu

Table S1. Comparasion between our research and the reported work in literature.

	Crystallinity of polymer matrix after adding of fillers	**Concentration of nanofiber fillers in the polymer matrix**	**Proposed main conduction mechanism**	**Ionic conductivity (S cm^{-1})**	**Stability and voltage window of Li/composite electrolyte/Li cell**
LLTO nanofiber + PAN (Ref 14)	Not changed	Compared 5 LLTO concentrations (0%, 5%, 10%, 15% and 20%)	1. Fast ion transport on LLTO nanofiber surface; 2. 3D ion-conducting network	2.4×10^{-4}	No information
LLZO nanofiber + PEO (Ref 15)	No information	One LLZO/PEO ratio (1:4)	3D structure provides long-range ion transfer	2.5×10^{-4}	Voltage value of around ± 300 mV at 0.5 mA cm^{-2} over 1000 h
LLZO nanofiber + PAN (Ref 27)	Not changed	Compared 6 LLZO concentrations (0%, 1%, 2.5%, 5%, 10% and 15%)	1. Increased Li^+ dissociation from the ClO_4^- anion; 2. Preferred Li^+ diffusion at the LLZO/polymer interface	1.31×10^{-4}	Voltage value of around ± 400 mV at 50 µA cm^{-2} over 89 h
Our work	The crystallinity of PEO was lowered.	Compared 4 LLTO concentrations (0%, 5%, 10%, 15% and 20%)	1.Creation of more amorphous region in the PEO matrix 2.Continuous ionic conductive pathways provided by 1D LLTO nanofibers	2.4×10^{-4}	Voltage value of around ± 115mV at 0.5 mA cm^{-2} over 720 h

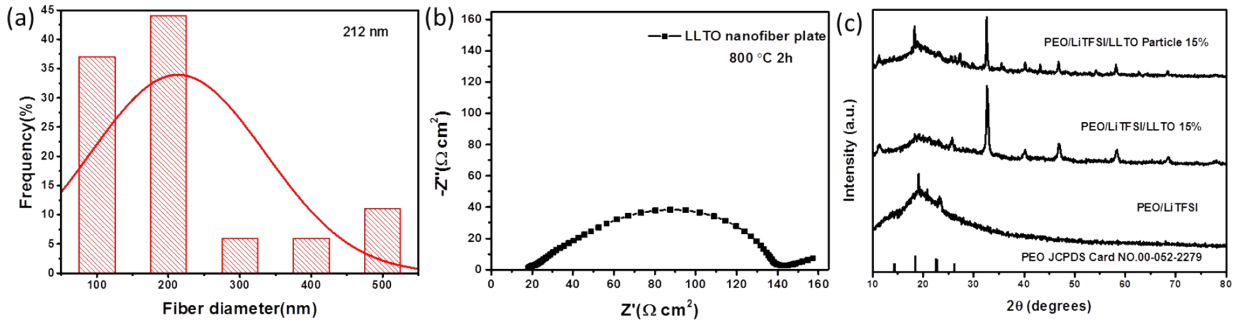

Figure S1. (a) Diameter distributions and average diameters of LLTO nanofibers calcined at 900 °C for 2 h. (b) EIS curve of LLTO plate at room temperature. (c) XRD patterns of the PEO/LiTFSI/LLTO solid composite electrolytes without and with 15% LLTO nanofiber/particle, showing the influence of LLTO morphology on the crystalline phase of PEO.

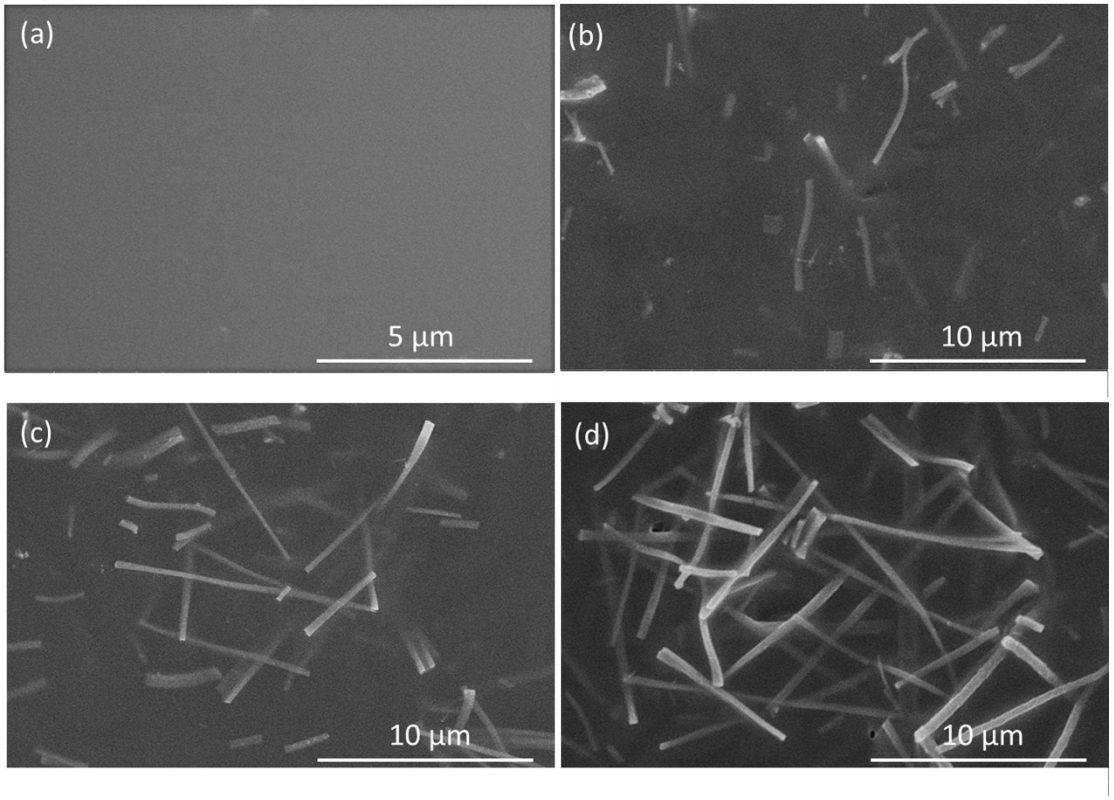

Figure S2. SEM images of (a) PEO/LiTFSI, (b) PEO/LiTFSI/LLTO 10 wt.%, (c) PEO/LiTFSI/LLTO 15 wt.%, and (d) PEO/LiTFSI/LLTO 20 wt.% solid electrolytes.

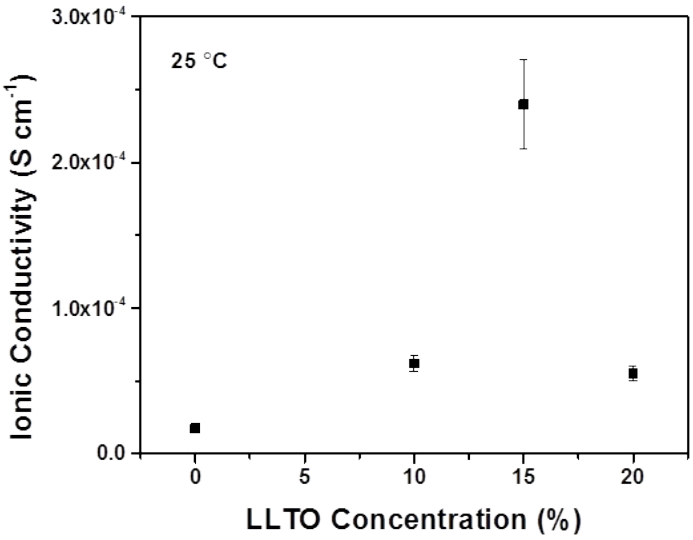

Figure S3. Ionic conductivities of the PEO/LiTFSI/LLTO solid composite electrolytes with different LLTO nanofiber contents at room temperature.

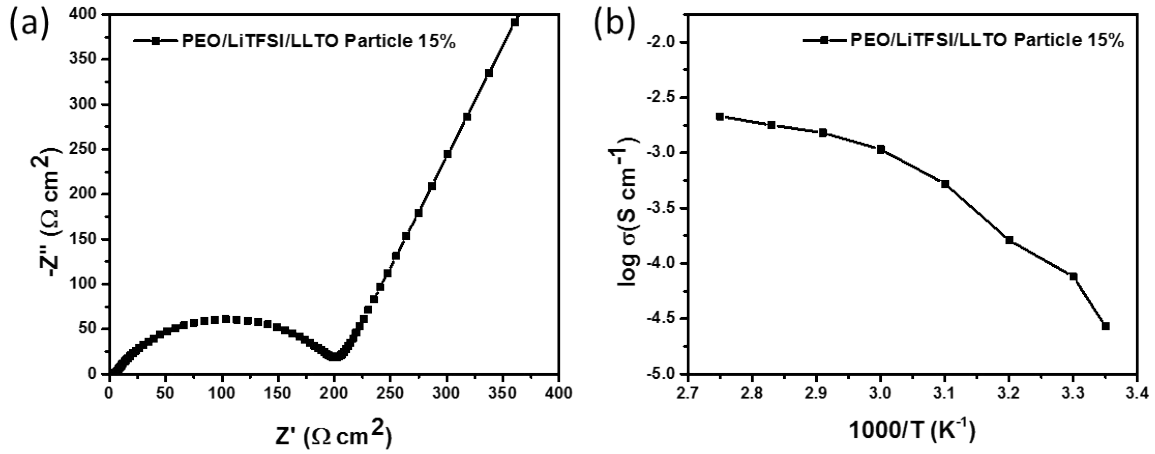

Figure S4. (a) EIS result of the PEO/LiTFSI/LLTO particle solid composite electrolyte with 15% LLTO particles at room temperature. (b) Arrhenius plot of the PEO/LiTFSI/LLTO particle solid composite electrolyte with 15% LLTO particles.