Supporting Information

One-pot synthesis of long-range aligned nanochannels for Li-ion transfer pathways

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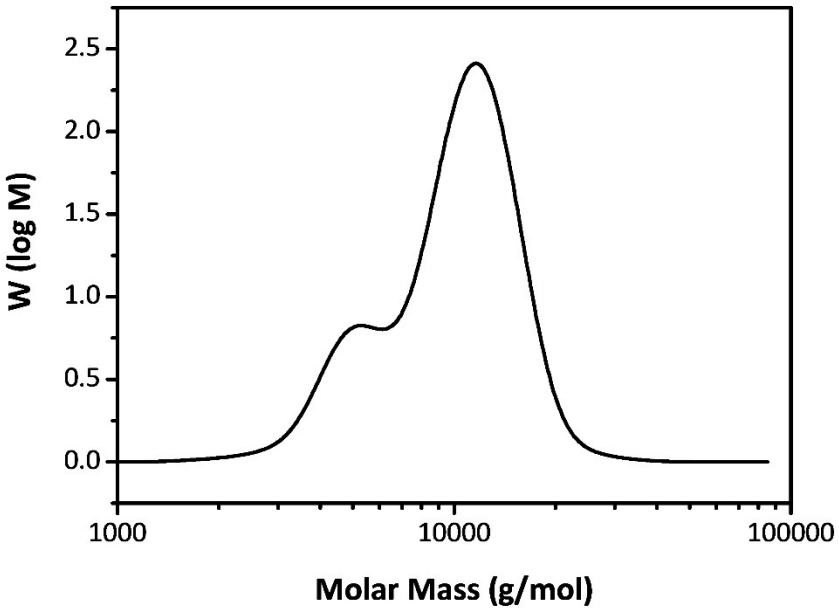

Figure S1. Molar mass distribution of Pluronic F127 as measured by gel permeation chromatography.

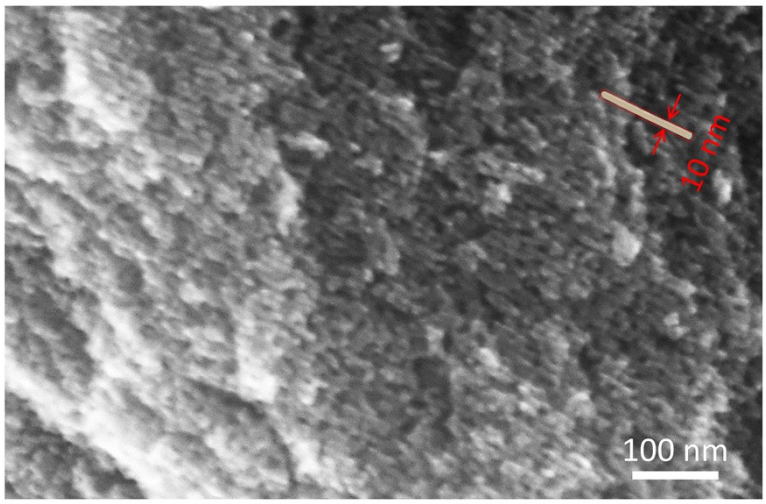

Figure S2. SEM image of calcined F127-channel-aligned-1/16DCD-1/20$LiClO_4$ sample (with an inset of structure diagram).

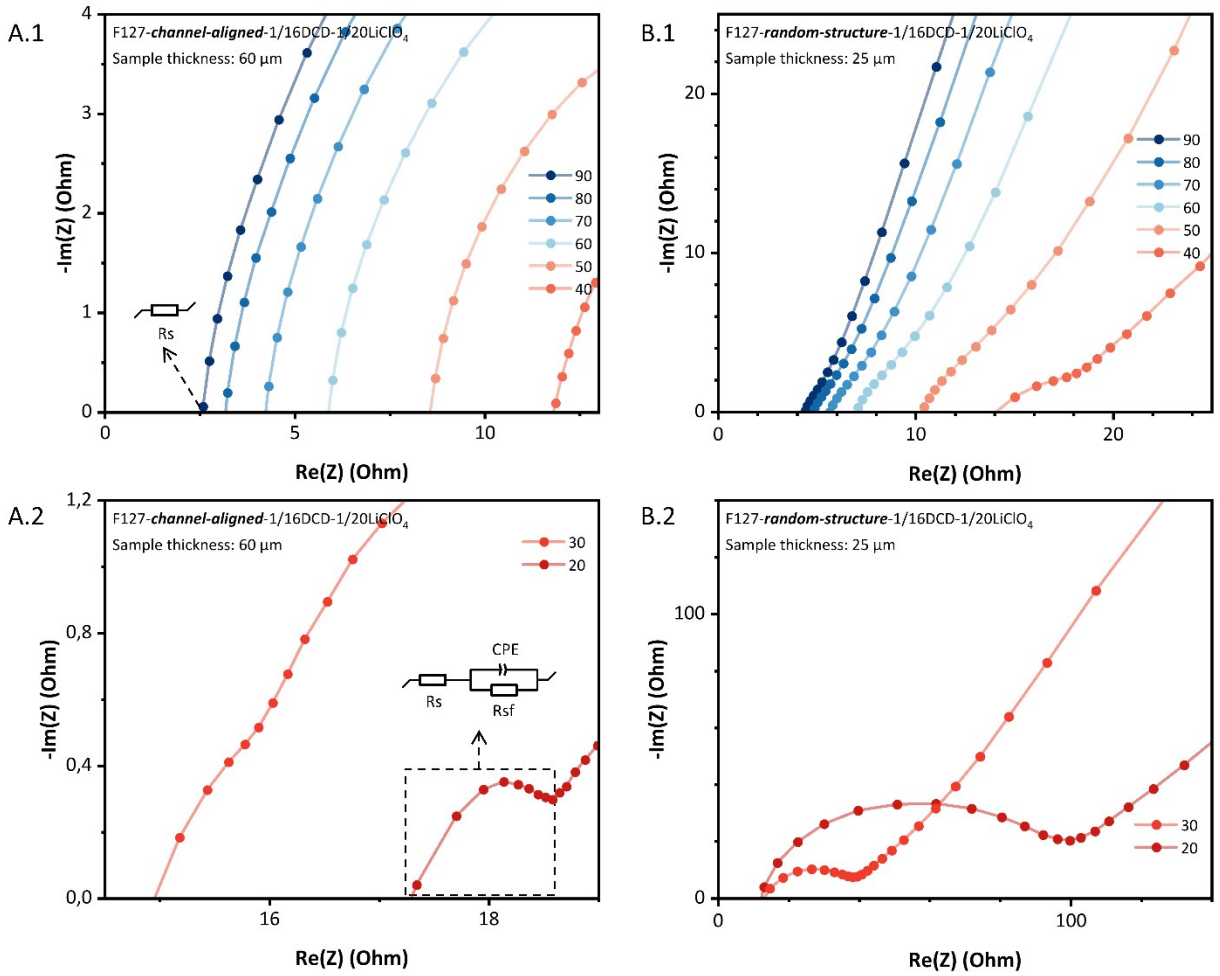

Figure S3. Electrochemical impedance spectroscopy (EIS) plots of F127-channel-aligned-1/16DCD-1/20$LiClO_4$ (A.1 and A.2) and F127-random-structure-1/16DCD-1/20$LiClO_4$ (B.1 and B.2), assembled in a symmetric stainless-steel (SS) configuration, measured in the temperature range of 90 to 20 °C. The thickness of each sample is indicated in the upper left corner, and the disc-shaped SPE sample has a constant diameter of 1.58 cm.

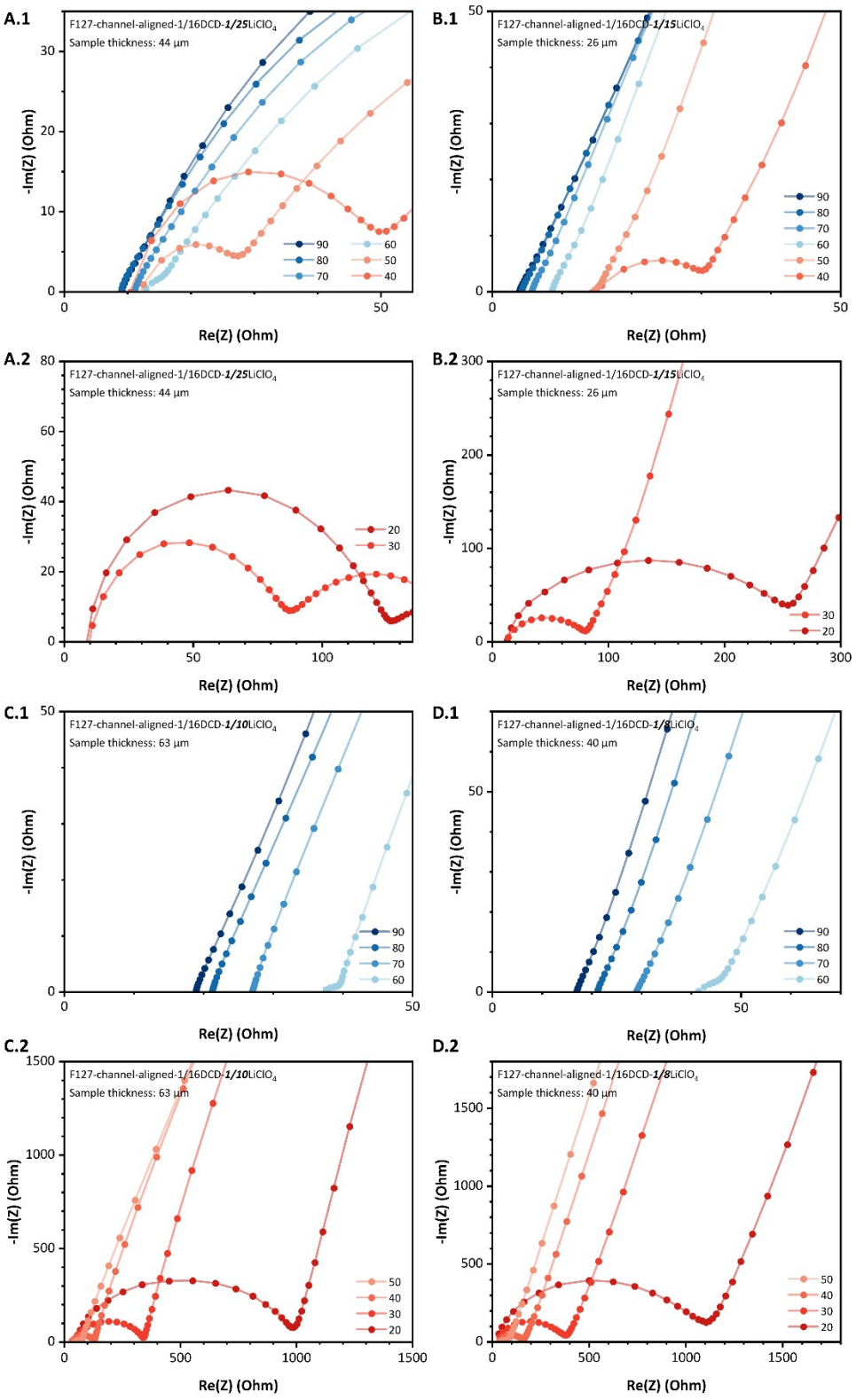

Figure S4. EIS plots of F127-channel-aligned-1/16DCD-1/25$LiClO_4$ (A.1 and A.2), F127-

channel-aligned-1/16DCD-1/15$LiClO_4$ (B.1 and B.2), F127-channel-aligned-1/16DCD-1/10$LiClO_4$ (C.1 and C.2) and F127-channel-aligned-1/16DCD-1/8$LiClO_4$ (D.1 and D.2), assembled in a symmetric SS configuration, measured in the temperature range of 90 to 20 °C. The thickness of each sample is indicated in the upper left corner, and the disc-shaped SPE sample has a constant diameter of 1.58 cm.

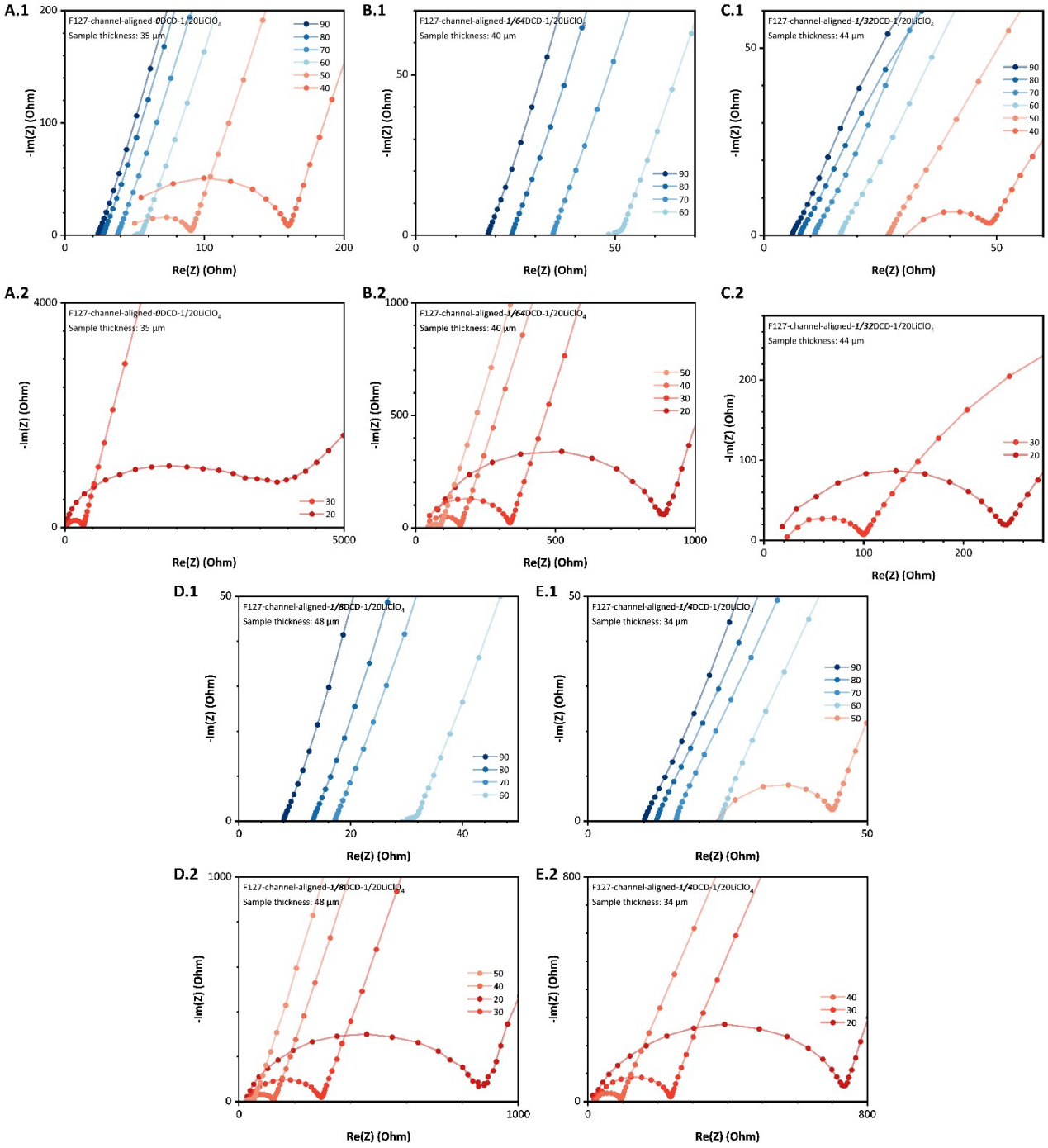

Figure S5. EIS plots of F127-channel-aligned-0DCD-1/20$LiClO_4$ (A.1 and A.2), F127-channel-aligned-1/64DCD-1/20$LiClO_4$ (B.1 and B.2), F127-channel-aligned-1/32DCD-1/20$LiClO_4$ (C.1 and C.2), F127-channel-aligned-1/8DCD-1/20$LiClO_4$ (D.1 and D.2) and F127-channel-aligned-1/4DCD-1/20$LiClO_4$ (E.1 and E.2), assembled in a symmetric SS configuration, measured in the

temperature range of 90 to 20 °C. The thickness of each sample is indicated in the upper left corner, and the disc-shaped SPE sample has a constant diameter of 1.58 cm.

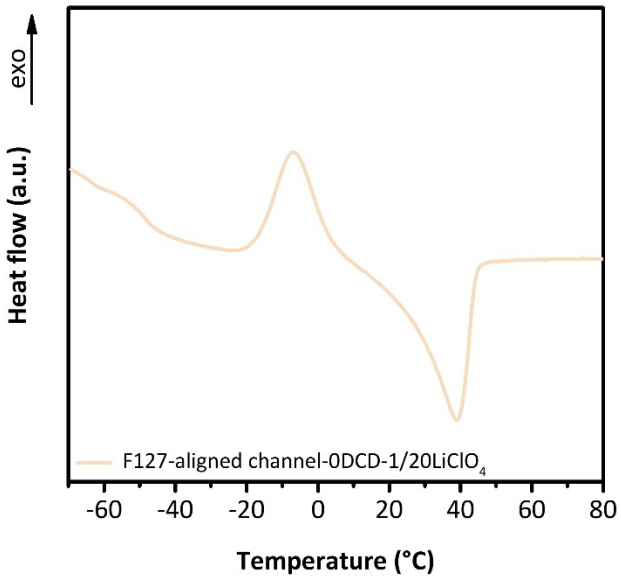

Figure S6. DSC curve of F127-aligned channel-0DCD-1/20$LiClO_4$.

2 Tables

Tables S1. Comparison of the ionic conductivity of various solid electrolytes equipped with ionic transfer pathways.

Ref	Sample	Formation of Li^+ pathway	Ionic conductivity (S/cm)	Temperature (°C)
This work	F127-aligned channel-1/16DCD-1/20$LiClO_4$ solid electrolyte	Aligned channels by F127-based micelles	1.65×10^{-4}	20
1	PEO-MUSiO_2 composite polymer electrolyte	~12 nm SiO_2	4.4×10^{-5}	30
2	Polyimide/PEO/LiTFSI solid polymer electrolyte	Nanoporous polyimide film	2.3×10^{-4}	30
3	SiO_2-PEO-LiTFSI electrolyte	SiO_2 nanofibre framework	1.3×10^{-4}	30
4	LLTO-PAN-$LiClO_4$ electrolyte	Aligned LLTO nanowires	6.05×10^{-5}	30
5	P-P-A@=SiO_2 solid polymer electrolyte	Modified nanosilica	2.6×10^{-4}	RT
6	Composite solid-state polymer electrolyte based on ceramic nanowires	Ceramic nanowires	10^{-3}-10^{-5}	RT
7	PEO-100ZrO_2@ ionic liquids	Framework of ZrO_2 loading ionic liquids	4.06×10^{-4}	60
8	LLTO nanotubes/PAN composite solid electrolyte	LLTO nanotubes	3.6×10^{-4}	RT
9	Polyamide/PEO/LiTFSI electrolyte	Porous polyamide film	2.05×10^{-4}	30

Tables S2. thermodynamic properties characterized by DSC about F127-aligned channel-0DCD-1/20$LiClO_4$.

Samples	T_g (°C)		T_m (°C)
	$T_{g,1}$	$T_{g,2}$	
F127-aligned channel-0DCD-1/20$LiClO_4$	-63.5	-49.0	39.0

3 Supporting References

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