Supplementary Material

Lithium Ion Transport in Solid Polymer Electrolyte Filled with Alumina Nanoparticles

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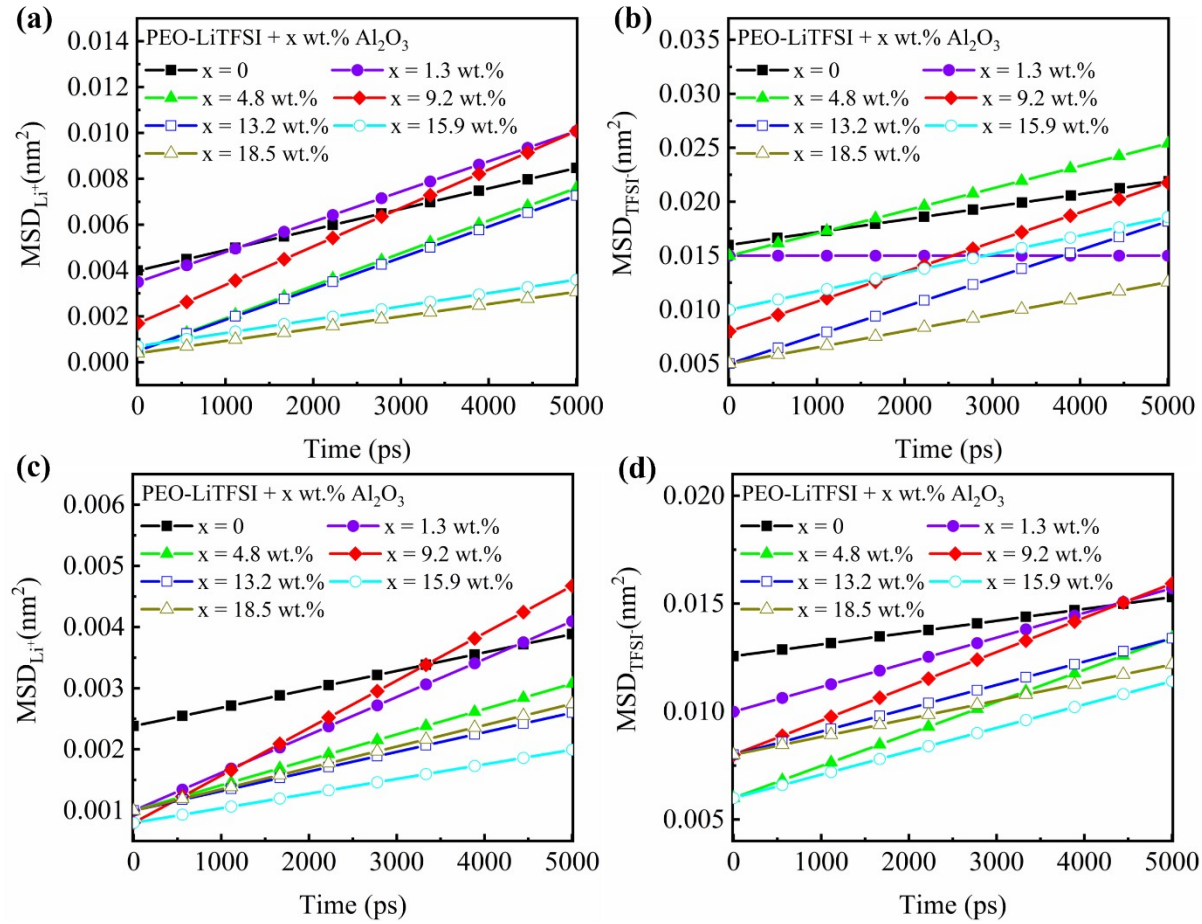

Figure S1. Mean square displacement (MSD) functions of (a) Li^+ at 333 K, (b) $TFSI^-$ at 333 K, (c) Li^+ cations at 300 K, and (d) $TFSI^-$ at 300 K in the SC system. PEO-LiTFSI + x wt.% Al_2O_3 represents PEO-LiTFSI with x wt.% Al_2O_3. x is the mass fraction of Al_2O_3.

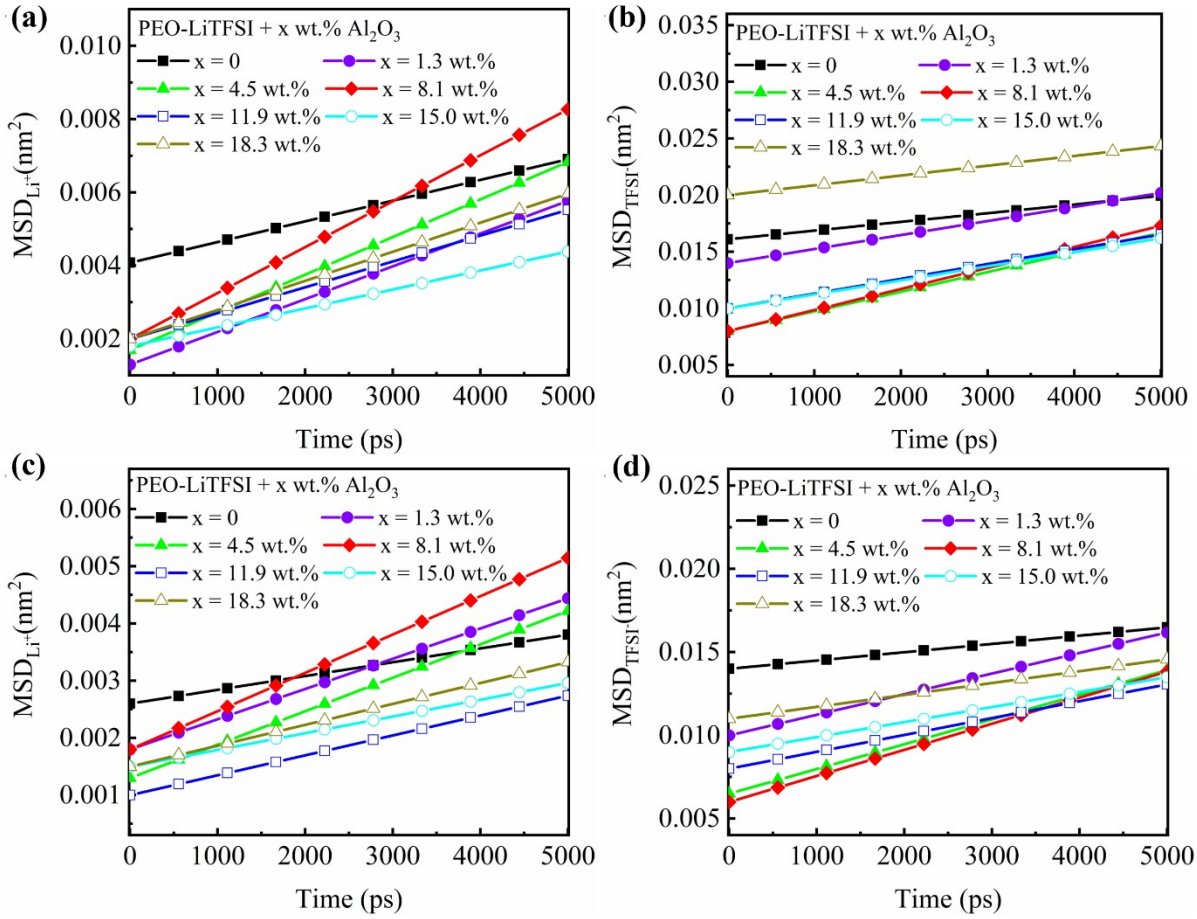

Figure S2. Mean square displacement (MSD) functions of (a) Li^+ at 333 K, (b) $TFSI^-$ at 333 K, (c) Li^+ cations at 300 K, and (d) $TFSI^-$ at 300 K in the LC system.

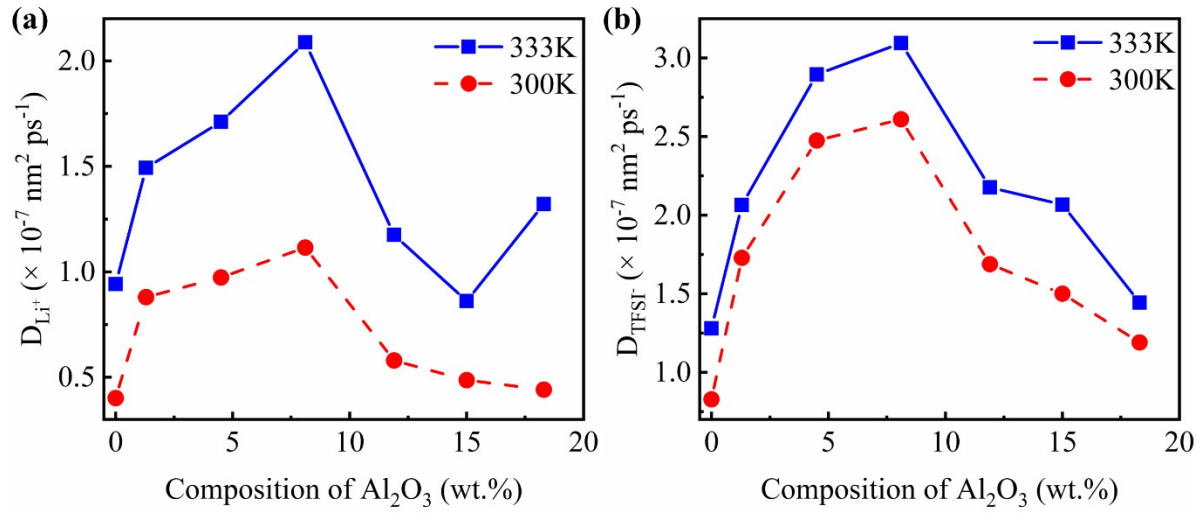

Figure S3. Diffusivities of (a) Li^+ and (b) $TFSI^-$ at different temperatures in the LC system.

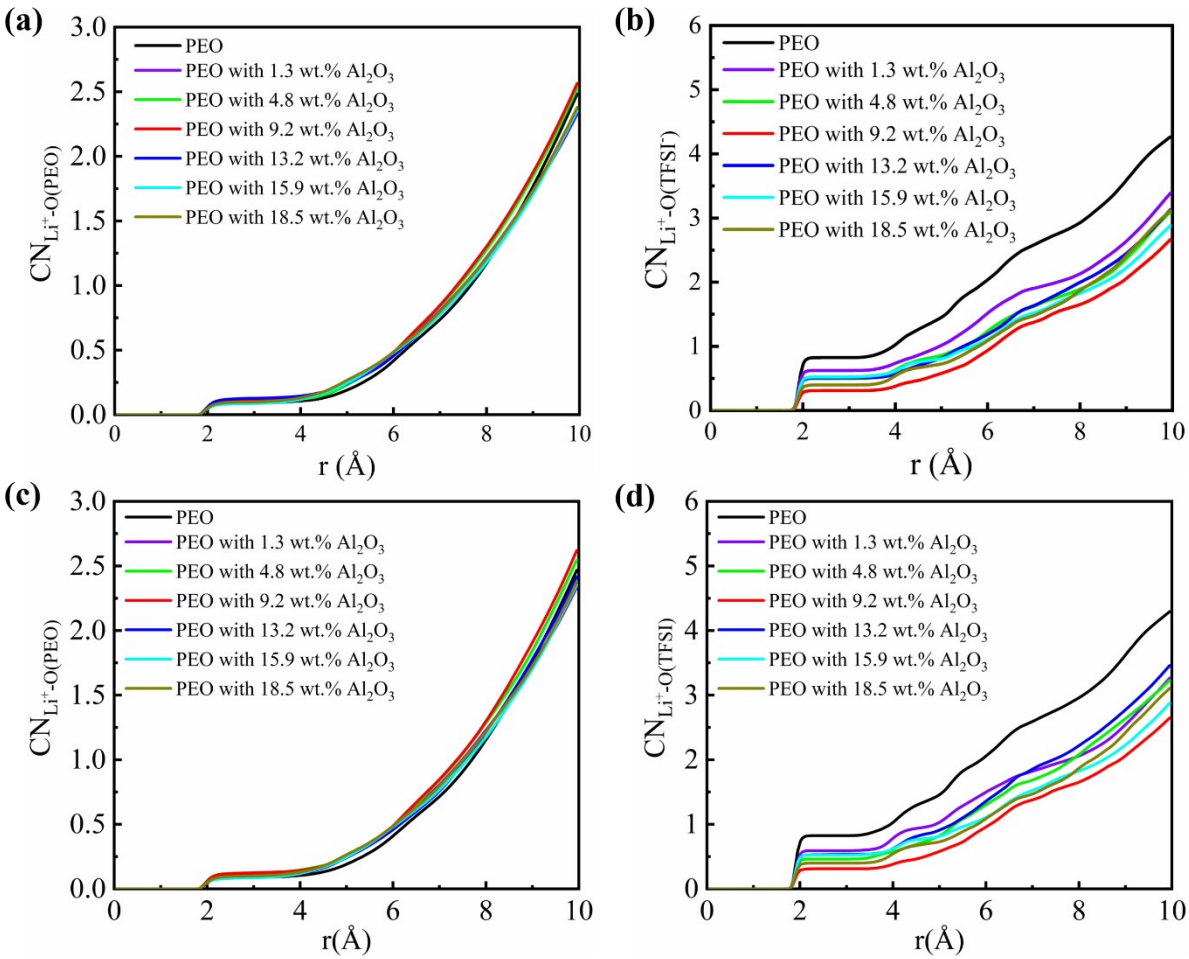

Figure S4. Coordination number (CN) for (a) Li^+-O(PEO) at 333 K, (b) Li^+- O(TFSI) at 333 K, (c) Li^+-O(PEO) at 300 K, and (d) Li^+-O(TFSI) at 300 K in the SC systems.

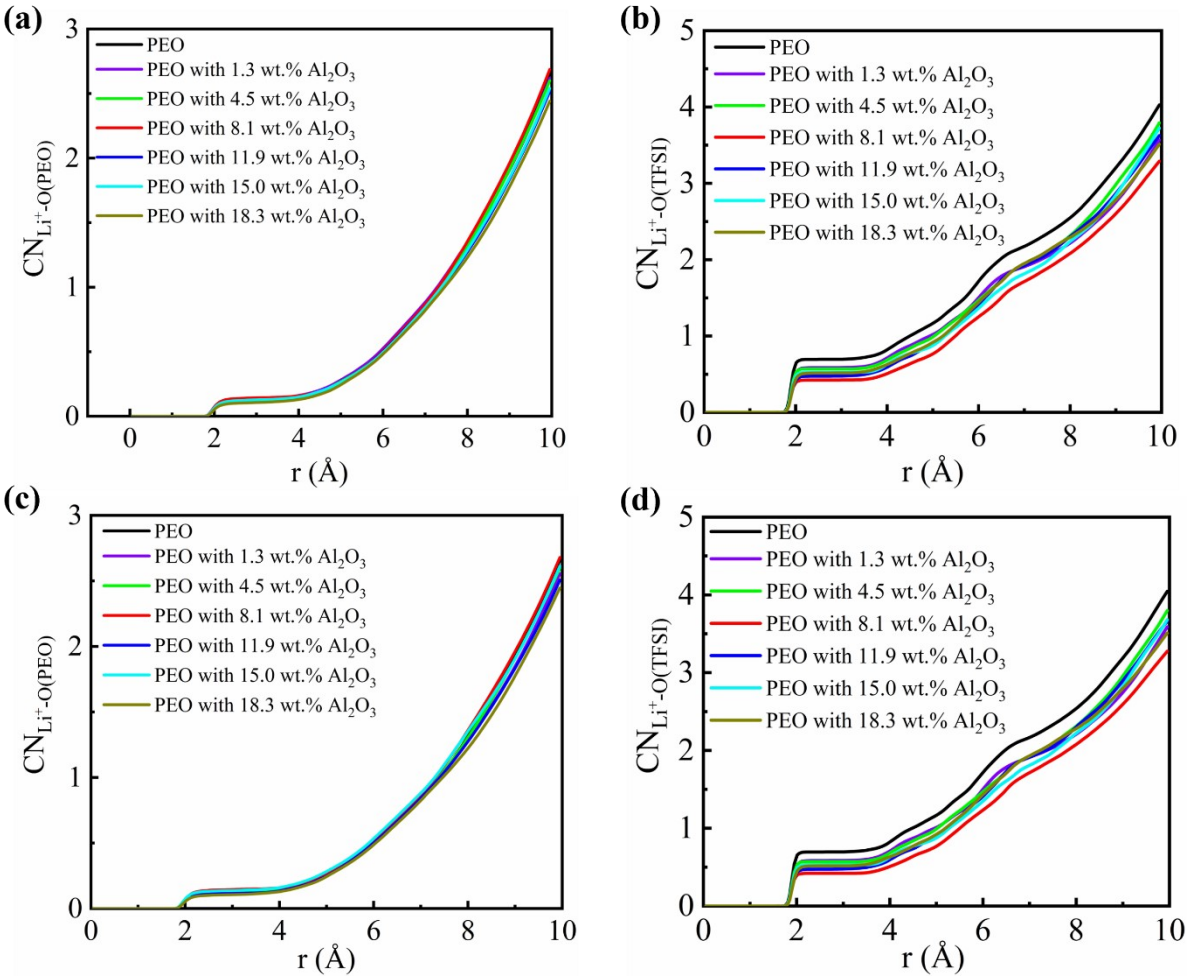

Figure S5. Coordination number (CN) for (a) Li^+-O(PEO) at 333 K, (b) Li^+- O(TFSI) at 333 K, (c) Li^+-O(PEO) at 300 K, and (d) Li^+-O(TFSI) at 300 K in the LC systems.

The CN of Li+-O (PEO) increases from 2.48 to 2.57 at 333 K and increases from 2.46 to 2.62 at 300 K in the SC system, which can explain the larger increase in the conductivity of SPE at 300 K than that at 333 K. The CN of Li+-O (PEO) increases from 2.61 to 2.67 at 333 K and increases from 2.60 to 2.72 at 300 K in the LC system.