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The role of nickel-iron based layered double hydroxide on crystallinity, ion conductivity, thermal and mechanical properties on poly(ethylene-oxide) solid electrolyte

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Synthesis of lithium montmorillonite (LM)

The montmorillonite and lithium chloride were added to distilled water at a mass ratio of 1: 2 to form a suspension by stirring. The ion exchange between the montmorillonite layers was performed by stirring at 60 ℃ for 24 h. After that, the suspension was centrifuged and the upper liquid was removed. Then, the precipitate was dried at 80 ℃ for 24 h after washing precipitate for 5 times. The LM powder was obtained after grinding and screening the dry precipitation with a 200 mesh sieve.

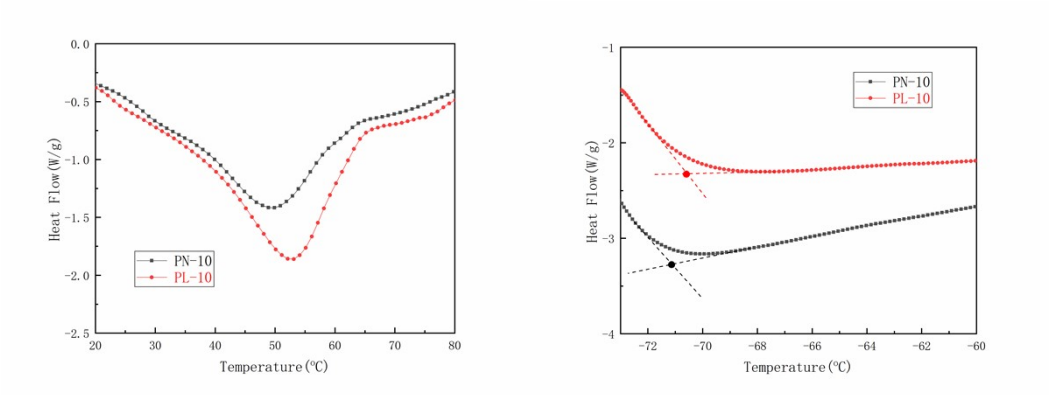

Fig. S1. DSC thermograms of PN-10 and PL-10

Table S1. Zeta potential of NILDH and lithium montmorillonite

Sample	ZP (mV)
NILDH	9.89
lithium montmorillonite	-14.6

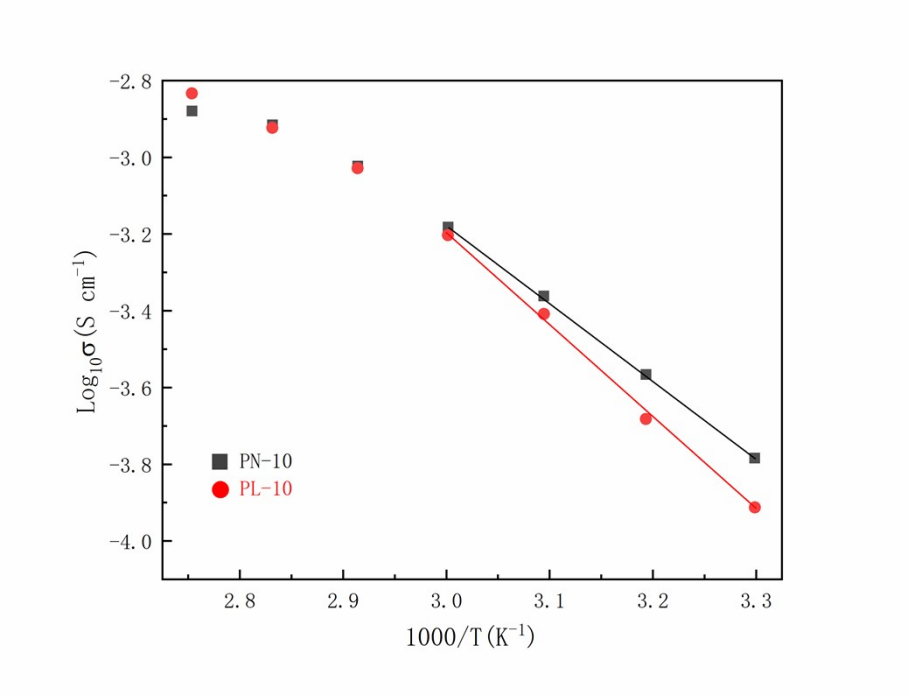

Fig. S2. The influence of temperature on ionic conductivity of PN-10 and PL-10

Table S2. The values of parameters for Equation S1 and the corresponding calculated values of lithium-ion transference number (t_{Li}^{+}).

Samples	I_0 (μA)	I_s (μA)	R_i (kΩ)	R_f (kΩ)	R_0 (kΩ)	R_s (kΩ)	⊿V (mV)	t_{Li}^{+}
PEO/LiTFSI	2.263	1.524	4.728	5.189	19.965	21.212	50	0.20
PN-10	4.910	3.725	0.874	0.978	9.757	11.630	50	0.27

$$t_{Li}{}^{+} = \frac{I_s R_f [\Delta V - I_0 R_0]}{I_0 R_i [\Delta V - I_s R_s]} \qquad (S1)$$

where I_0 and I_s are the initial and steady-state current determined by the DC polarization, respectively; R_f and R_i are the initial and final resistances of the electrolytes; R_0 and R_s are the interface resistance measured by AC impedance before

and after polarization; $\measuredangle V$ is the DC potential applied on the cell.