Supplementary Materials: Effects of Li Salt and Additive Content on the Electrochemical Performance of [C_4C_1mim]-Based Ionic Liquid Electrolytes

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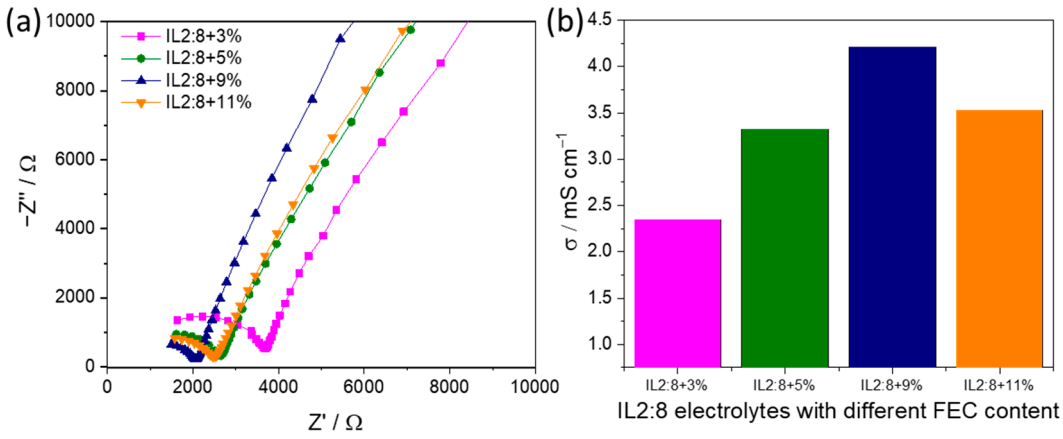


Figure S1. (**a**) Nyquist plots of IL2:8 electrolytes with different FEC content. (**b**) The calculated ionic conductivities of these IL electrolytes at 25 °C based on (**a**).

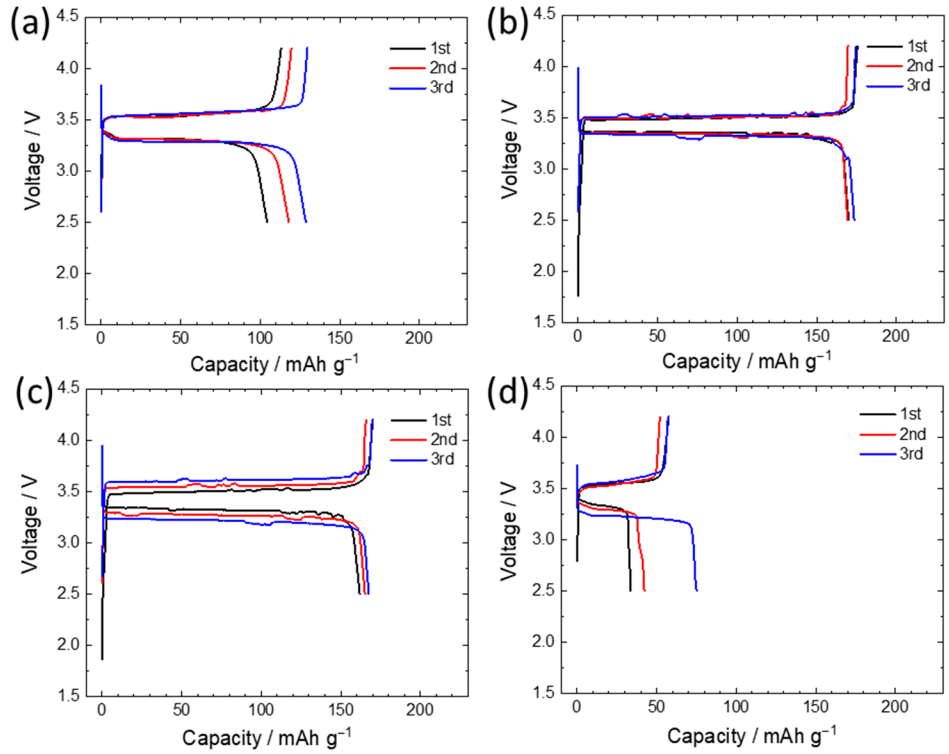


Figure S2. The first three charge–discharge curves of IL electrolytes with four different Li[TFSA] salt concentrations. (**a**) IL1:9 electrolyte. (**b**) IL2:8 electrolyte. (**c**) IL3:7 electrolyte. (**d**) IL4:6 electrolyte.

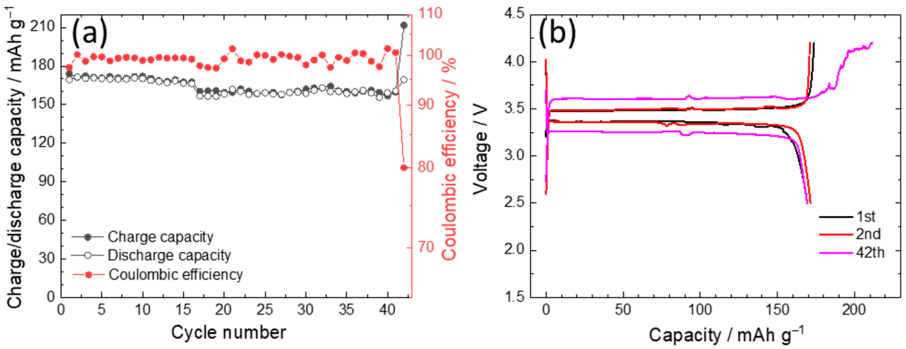


Figure S3. The cycling performance of Li/$LiFePO_4$ in IL2:8+5% electrolyte for 42 cycles. (**a**) Cycle number. (**b**) Capacity.

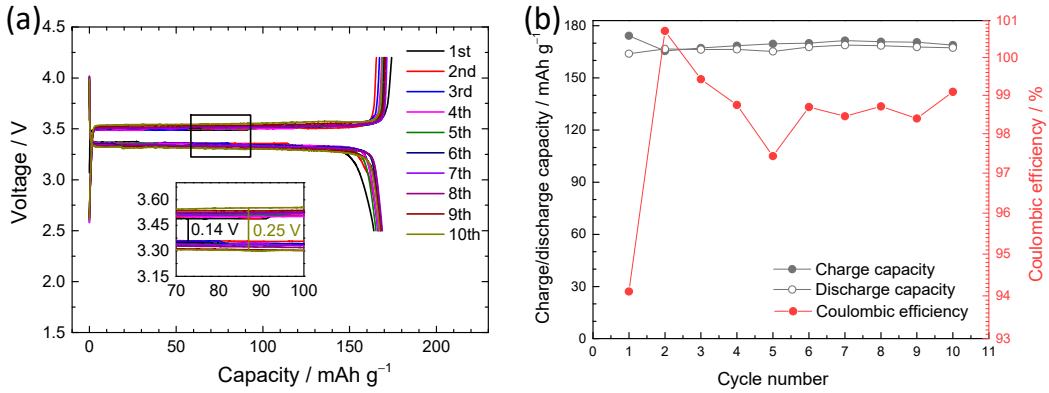


Figure S4. Charge–discharge curves and the corresponding capacity and Coulombic efficiency as a function of cycle number of Li/$LiFePO_4$ with IL3:7+5% electrolyte. (**a**) Capacity. (**b**) Cycle number.

Table S1. Comparison of the performance between the studied electrolytes and typical electrolytes.

Parameter	Our Electrolyte	Carbonate-Based	Advanced ILs
Ionic conductivity	3.32 mS cm^{-1}	10–12 mS cm^{-1}	2.1–8.5 mS cm^{-1}
Electrochemical window	5.21 V	~4.5 V	4.3–5.0 V
Thermal stability	Up to 489 °C	<80 °C	300–400°C
Safety	Non-flammable	Flammable	Non-flammable
Li/$LiFePO_4$ ΔV (10 cycles)	0.12→0.25 V	0.1→0.5 V [1–3]	0.15→0.6 V [4–5]

References

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