Supporting Information

Distribution and Transport of Lithium Ions at Interfaces between Graphite and Carboxymethyl Celluloses

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Conditions I-II are defined in the main text.

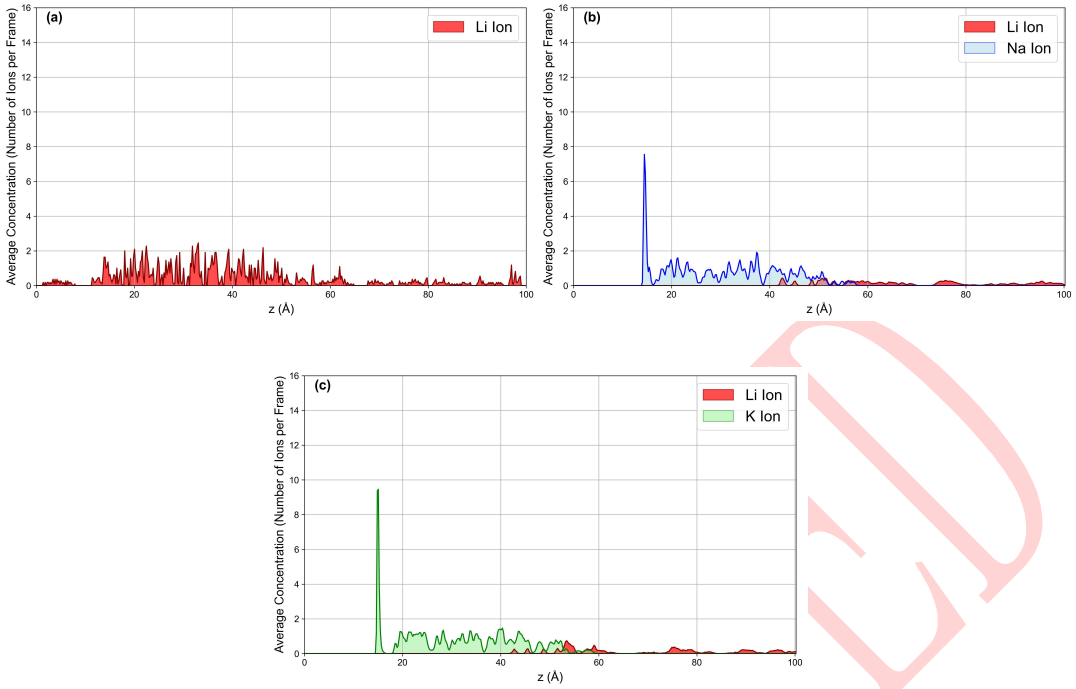

Figure S1. Under Condition II, z-resolved average ion number-density profiles for (a) CMC-Li, (b) CMC-Na, and (c) CMC-K.

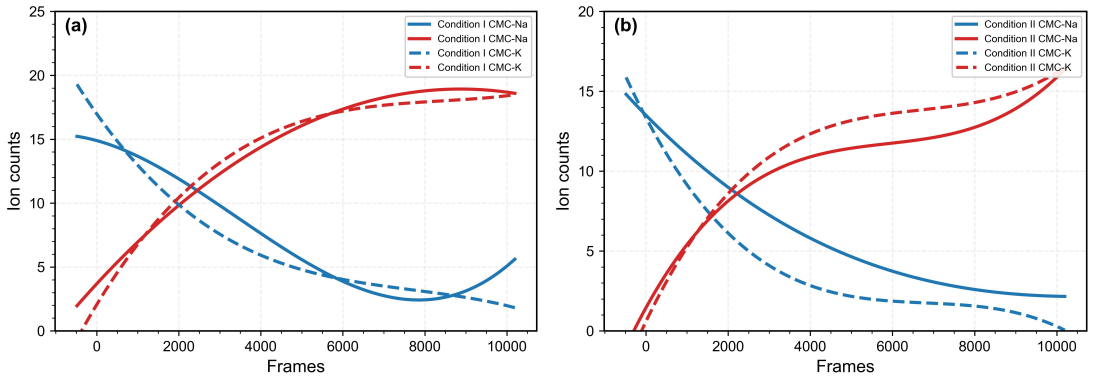

Figure S2. Time evolution of interfacial barrier buildup and Li^+ access to graphite in Na^+/K^+-deficient mixed systems. Shown are trajectories under (a) Condition I and (b) Condition II for CMC-Li/Na-12.5% and CMC-Li/K-12.5%. The red curve denotes the number of Na^+ (or K^+) ions within the graphite-side interfacial barrier zone, and the blue curve denotes the instantaneous number of Li^+ ions residing within graphite (i.e., Li^+ ions that have crossed the interfacial layer under the exchange protocol).

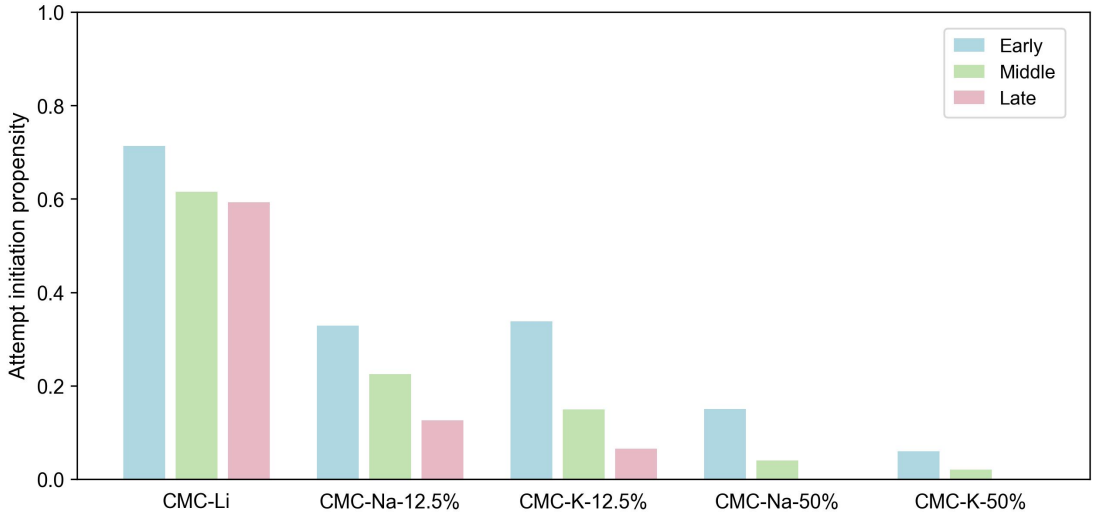

Figure S3. Under Condition II, stage-resolved attempt initiation propensity of Li^+ transport toward graphite in CMC-Li and mixed-counterion CMC systems, calculated using the same definition as in Figure 5.

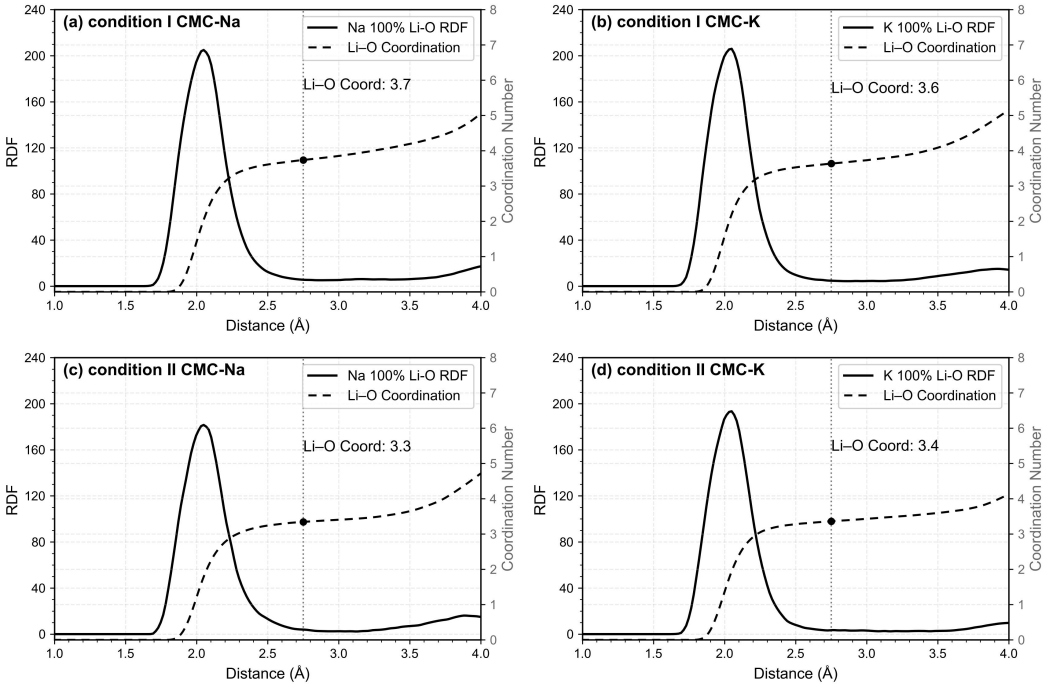

Figure S4. Li-O_{carb} RDFs and the corresponding CNs for Li^+ ions sampled in the binder interior (central region) of the pure-counterion systems. Results are shown for (a) CMC-Na and (b) CMC-K under Condition I, and for (c) CMC-Na and (d) CMC-K under Condition II.

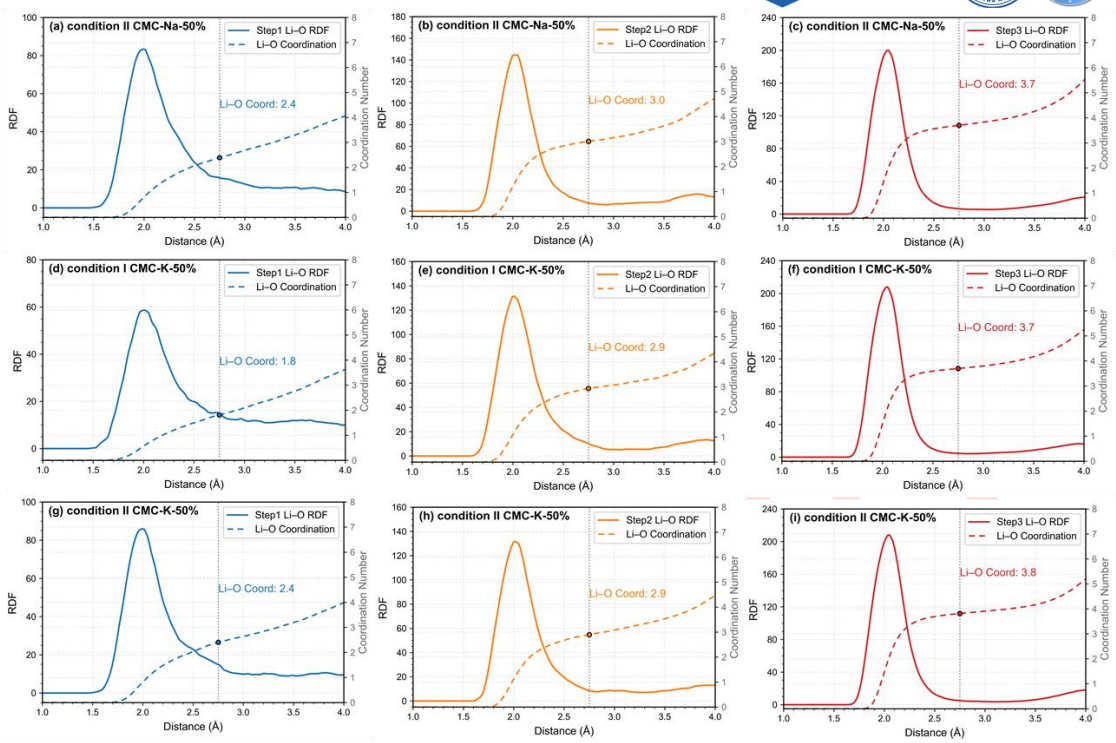

Figure S5. Binder-center Li^+-O_{carb} RDFs and CNs for time-segmented stages (initial, deceleration, and steady) in Na^+/K^+-rich mixed systems. For CMC-Li/Na-50%, results under Condition II are shown in (a-c). For CMC-Li/K-50%, results under Condition I and Condition II are shown in (d-f) and (g-i), respectively.

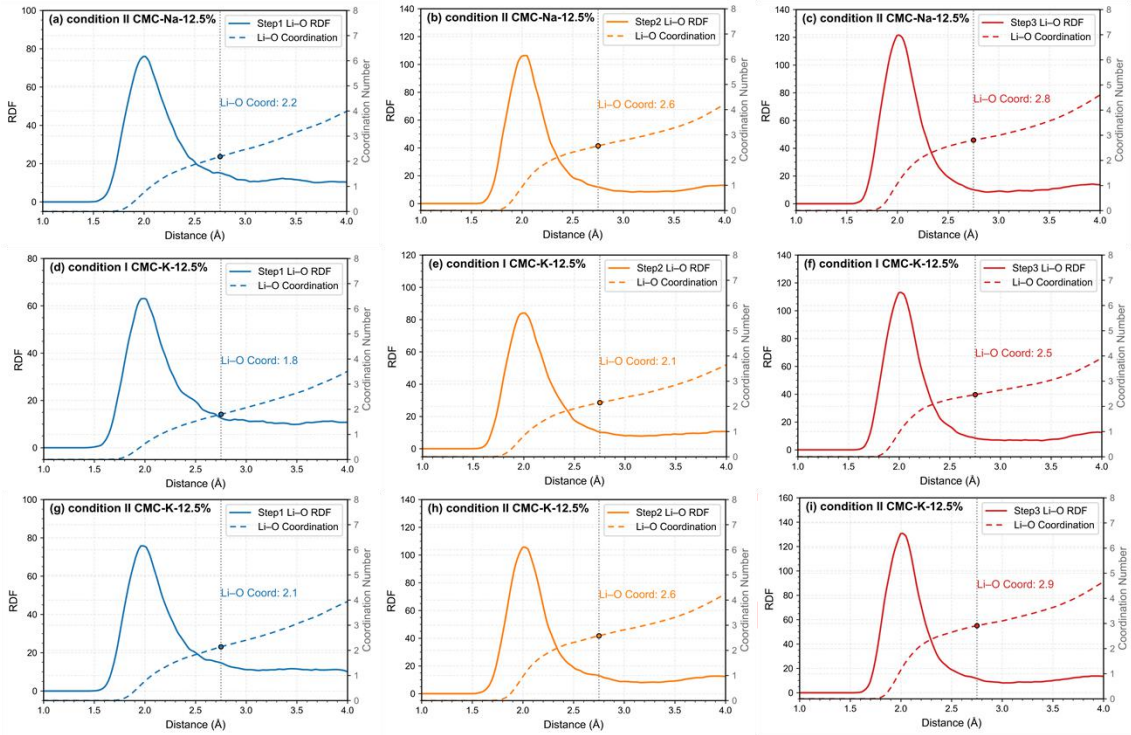

Figure S6. Binder-center Li^+-O_{carb} RDFs and CNs for time-segmented stages (initial, deceleration, and steady) in Na^+/K^+-deficient mixed systems. For CMC-Li/Na-12.5%, results under Condition II are shown in (a-c). For CMC-Li/K-12.5%, results under Condition I and Condition II are shown in (d-f) and (g-i), respectively.