Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics.
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Received 00th January 20xx,
Accepted 00th January 20xx

DOI: 10.1039/x0xx00000x

Supporting Information: Softening by charging: how collective modes of ionic association in concentrated redoxmer/electrolyte solutions define the structural and dynamic properties in different states of charge

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Molarity Corrections for different %SOC solutions

As mentioned in the main text, during charging of the cell, Li^+ ions migrate across the cell membrane, leaving behind un-occupied volume, which virtually increases the molarity of the corresponding charged solution. Such effect is very small across the majority of considered molarities, but becomes more prominent in the supersaturated regime, and in other cases where the salt cation is larger than Li^+. For completeness we have computed the corrections that should be made for such effect. The results are shown in the following figures.

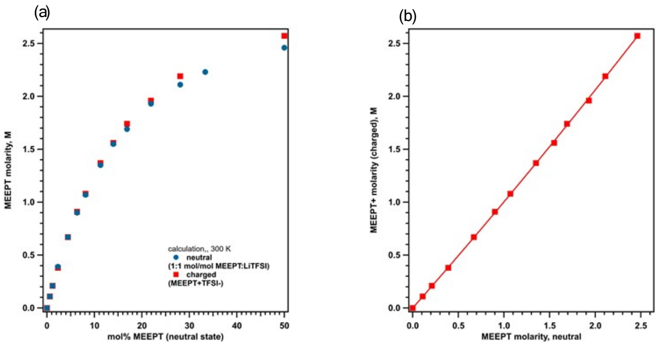

Figure 1. (a) 0% SOC and 100% SOC molarities for chosen mol% MEEPT in the neutral state. (b) Regression line for 0% SOC and 100% SOC molarities for the same chosen mol% MEEPT in the neutral state. The slope of the regression line is approximately 1.0 across all molarities.

Reduced Viscosity and Huggins Equation

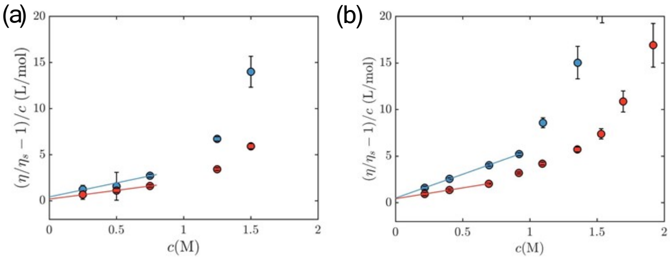

Figure 2. The reduced viscosity of neutral and charged systems as a function of concentration; (a) the measured viscosity; (b) the simulated viscosity. The solid lines represent the most credible fits to the rearranged Huggins equation.

MEEPT: Li^+ pair distribution function (PDF) and potential of mean force (PMF)

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Electronic Supplementary Information (ESI) available: [details of any supplementary information available should be included here]. See DOI: 10.1039/x0xx00000x

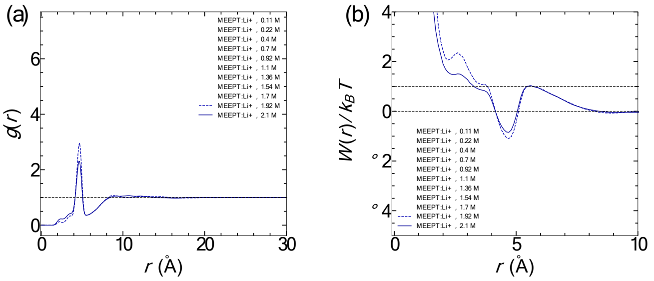

Figure 3. (a) MEEPT: Li^+ pair distribution function (PDF) g(r) at different solute. (b) Corresponding solution-averaged potential of mean force (PMF). The Li^+ interaction with two oxygens in the ether chain of MEEPT becomes less prominent as salt concentration increases and is dominant at lesser concentrations.