

Supporting Information-

Materials & Methods-

Custom-made ultrapure samples of 1-hexyl-3-methylimidazolium tris(pentafluoroethyl)-trifluorophosphate ([HMIm]FAP) was purchased from Merck KGaA (EMD), with all detectable impurities are below 10 ppm. Analytical grade Lithium Chloride was purchased from Sigma-Aldrich. Prior to use, the IL and LiCl samples were separately dried under vacuum for 48 hours at 100 °C. This led to water contents in the electrolyte solutions undetectable by Karl Fischer titration. 0.05 wt% LiCl solutions were prepared using an analytical balance, with the resultant solution heated at ~60°C and sonicated for several hours in a sealed vial to ensure complete dissolution. A concentration of 0.05 wt% was chosen as it represents approximately half the saturation concentration (0.93 wt %) of this salt in [HMIm]FAP. AFM force measurements were conducted exactly as described previously.[32,35]