Supporting Information

Role of a Solid-Electrolyte Interphase in the Dendritic Electrodeposition of Lithium: a Brownian Dynamics Simulation Study

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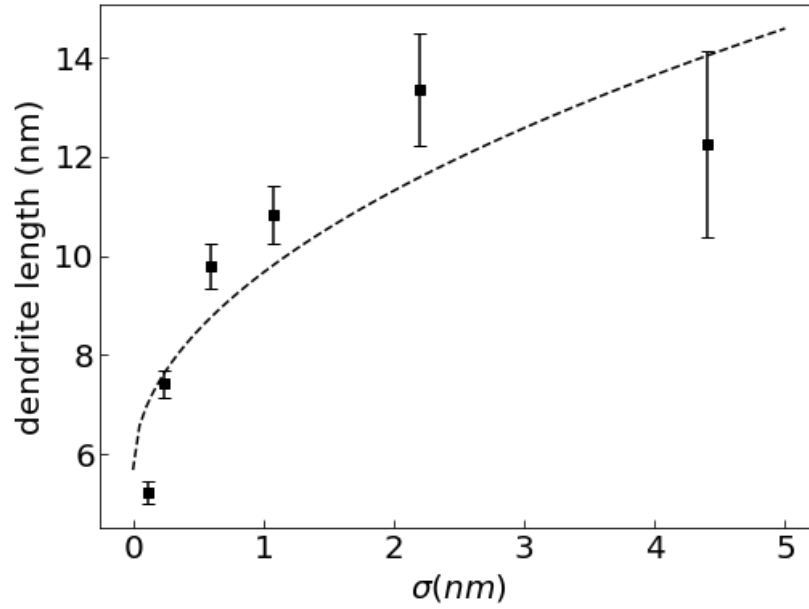[2]Department of Chemistry, Jagannath University, Dhaka-1100, Bangladesh

Figure S1: Limiting behavior of the dendrite length with decreasing the thickness of the SEI layer, σ. Shown is the dendrite length at t=0.5 s vs. σ. With the current density fixed to J=2.0 mA/cm^2, σ is reduced from 4.4 to 0.119 nm, the smallest thickness possible in the present simulation. We averaged over 10 independent simulations and the error bars represent the standard deviations. The broken line represents the fit function, $3.98\sqrt{\sigma} + 5.6778$ (nm).
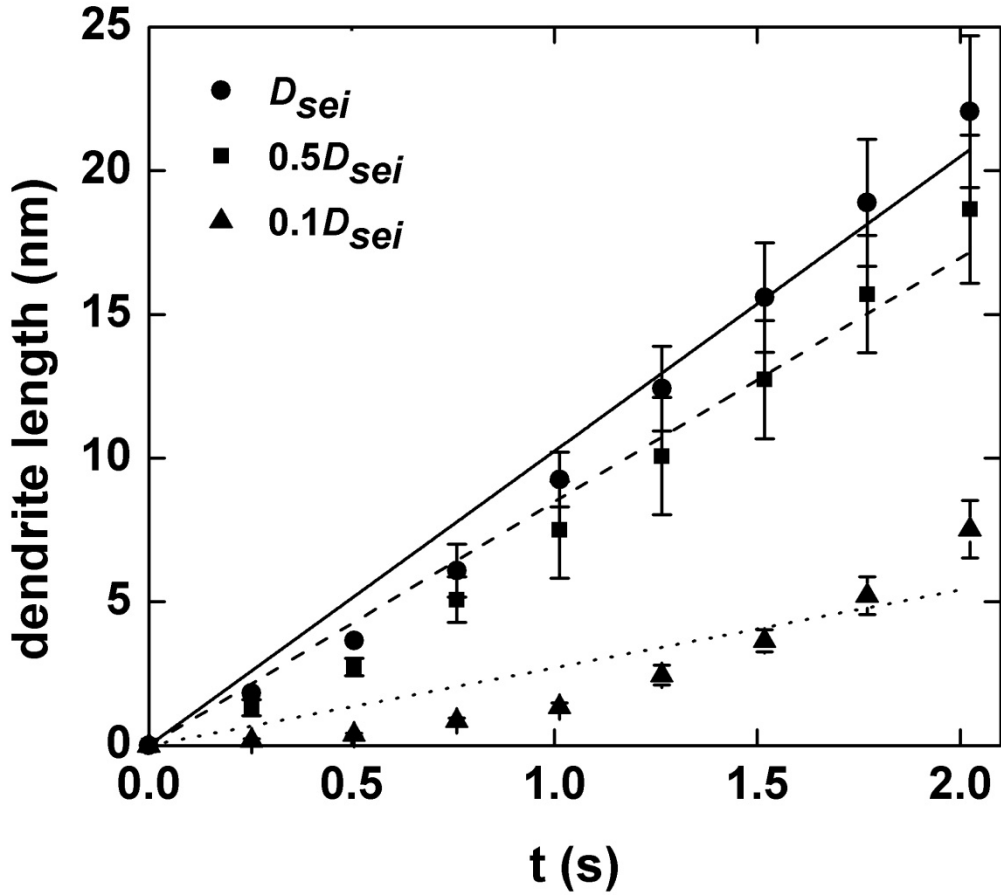
Figure S2: Dependence of the dendritic growth on the diffusivity of Li^+ in the SEI layer. By reducing the diffusivity D_{sei} (=1.4×10^{-10} cm^2/s) five and ten times, we examined the dendrite length vs. time by averaging over ten independent simulations. Shown as circles, squares and triangles are the dendrite lengths obtained by using the diffusivities of D_{sei}, $0.5D_{sei}$ and $0.1D_{sei}$, respectively (for σ=8.8 nm and J=0.7 mA/cm^2). The lines represent the linear fits to the simulation data. Error bars depict the standard deviations.