

# **On the Role of a Solid-Electrolyte Interface in the Dendritic Electrodeposition of Lithium**

Joonkyung Jang<sup>a</sup>, Gerbrand Ceder<sup>b</sup>

<sup>a</sup>*Department of Nanoenergy Engineering, Pusan National University, Busan 46241 South Korea*

<sup>b</sup>*Department of Materials Science and Engineering, University of California, Berkeley, Berkeley California 94720 USA*

E-mail: [jkjang@pusan.ac.kr](mailto:jkjang@pusan.ac.kr)

A robust, flexible, and uniform layer of solid-electrolyte interface (SEI) is known to regulate the dendritic growth of a lithium metal anode during electrodeposition. The underlying mechanism and extent of such regulation are largely unknown. The present Brownian dynamics simulation elucidates the suppressive role of an SEI layer in the dendritic electrodeposition. By thinning out an SEI layer to a sub-nm scale, a dendrite with long arms becomes dense and mossy, and it grows much slower in time. The radial diffusion of lithium ions through a thin SEI layer gives an isotropic growth of a round tip, instead of a dendritic ramification along a particular direction.