

The Soret Effect in Li-Ion Battery Electrolytes

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When Li-ion batteries are charged or discharged, net heat is released or absorbed in the battery. Such heat effects are known to influence the performance of the battery and its lifetime. The most important heat effects are ohmic resistances or resistances to the electrode reactions. In addition to such irreversible effects, reversible heat effects, such as the Soret effect, may also play a role. Such reversible effects are typically neglected when describing heat effects in Li-ion batteries. In this work, we have investigated the Soret effect in Li-ion battery electrolytes and determined its size, by performing non-equilibrium molecular dynamics simulations. We put these results into an experimental context, and we use them to discuss the importance of these effects for thermal management of Li-ion batteries. Further, we discuss how these effects can be incorporated in non-equilibrium thermodynamic models for the operation of Li-ion batteries.