Abstract

Developing batteries with high specific capacity and power density is essential in many applications such as electric vehicles and portable electronic devices. Li-oxygen battery has a very high theoretical energy density of 11 kWh kg\(^{-1}\) and is considered as a promising battery technology. The concentration of the lithium ion in battery electrolyte is typically 1 M in both Li-ion and Li-oxygen batteries. Considering the high cost of the lithium salt and low current rates of Li-oxygen battery, this study investigated effects of electrolyte salt concentration on battery performance through experiments and model simulations. Results showed that when the electrolyte salt concentration decreased, both the specific discharge and charge capacity decreased. A one-dimensional model was also developed to and illustrate the importance of mass transfer in the electrode and simulate the electrochemical performance of Li-oxygen battery.