

Abstract

Li-ion batteries offer great promise for the future of energy storage due to their superior gravimetric and volumetric energy density. One of the challenges in promoting their expanded use is to improve the cycle life of Li-ion batteries. This requires detailed understanding of the aging phenomenon. The aging mechanism of Li-ion batteries can have both chemical and mechanical origins. While the chemical degradation mechanisms have been studied extensively, mechanical degradation mechanisms have received little attention so far. In this study, we probe the changes in mechanical properties of a LiFePO_4 cathode in a large format prismatic cell. Results indicate that mechanical degradation increases by aging; in addition, local degradation is observed in the composite cathode. Implications of the degradation in mechanical properties on binder degradation are discussed in detail.

Citation

DE Demirocak & B Bhushan. Probing the aging effects on nanomechanical properties of a LiFePO_4 cathode in a large format prismatic cell. *Journal of Power Sources*, 2015, 280, 256-62.