

Evaluating the Durability and Safety of Lithium-Ion Batteries in High-Temperature Desert Climates

Authors : Kenza Maher, Yahya Zakaria, Noora S. Al-Jaidah

Abstract : Temperature is a critical parameter for lithium-ion battery performance, life, and safety. In this study, four commercially available 18650 lithium-ion cells from four different manufacturers are subjected to accelerated cycle aging for up to 500 cycles at two different temperatures (25°C and 45°C). The cells are also calendar-aged at the same temperatures in both charged and discharged states for 6 months to investigate the effect of aging and temperature on capacity fade and state of health. The results showed that all battery cells demonstrated good cyclability and had a good state of health at both temperatures. However, the capacity loss and state of health of these cells are found to be dependent on the cell chemistry and aging conditions, including temperature. Specifically, the capacity loss is found to be higher at the higher aging temperature, indicating the significant impact of temperature on the aging of lithium-ion batteries.

Keywords : lithium-ion battery, aging mechanisms, cycle aging, calendar aging.

Conference Title : ICESST 2023 : International Conference on Energy Storage Science and Technology

Conference Location : New York, United States

Conference Dates : April 24-25, 2023