Effect of a flexible battery module bracing on cell aging

Lithium-ion battery cells consist either of a stacked or a wound configuration of a separator between two coated electrodes. The expansion of the graphite anode due to lithium intercalation, when charging, leads to a macroscopic expansion of the cell. State of the art rigid battery module bracing causes a periodic pressure build-up over a full charge/discharge cycle and therefore a compression of the battery separator. Furthermore, this results in a reduced diffusivity of the lithium-ions, which can cause lithium plating. Lithium plating is considered as the main cause of (premature) battery aging. In our paper, we present for the first time the investigation of a flexible spring-loaded cell bracing on cell aging by maintaining a nearly constant pressure. In comparison with the rigid bracing, a different aging speed can be observed in favour of the flexible bracing method.