The Role of Silicon in Silicon-Graphite Composite Electrodes Regarding Specific Capacity, Cycle Stability, and Expansion

• The electrochemical performance and thickness change behavior of porous SiG anode compositions with silicon contents ranging from 0 wt% to 20 wt% are investigated using two methods: in situ dilatometry and conventional coin cells

• The initial thickness change of SiG electrodes increased significantly with the silicon content, but it leveled off during cycling for all compositions

• There exists a correlation between silicon content and capacity loss

• It is concluded that silicon predominantly lithiated before graphite, and delithiated after graphite

• It is not the macroscopic structural changes of the electrode matrix which determine the capacity evolution, but rather the repeated microscopic expansion, cracking, and SEI formation on the particle-level