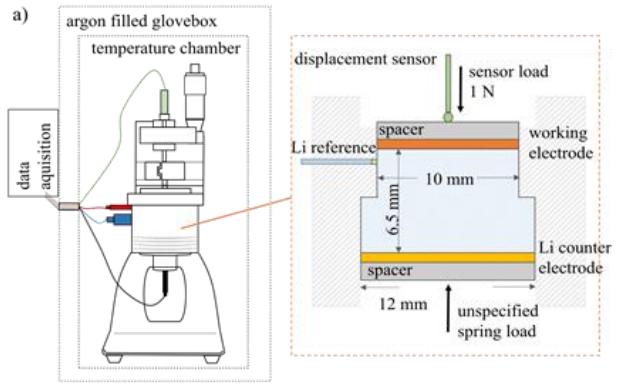
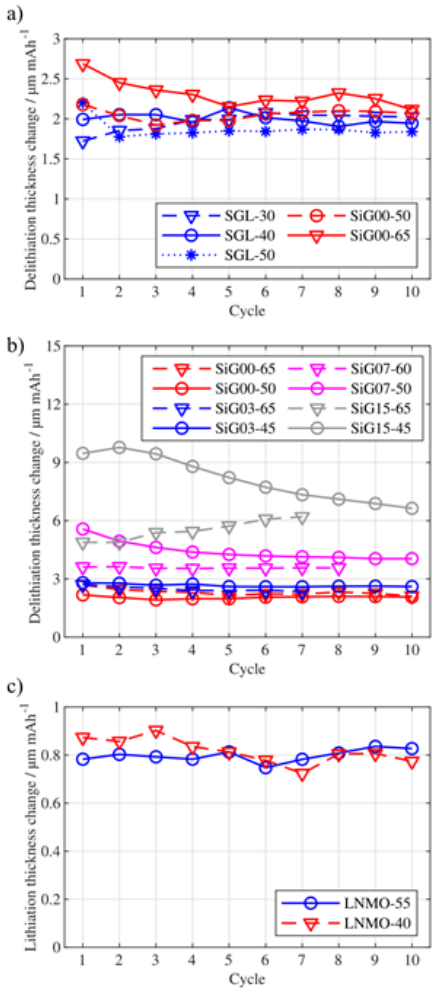
# Influence of Initial Porosity on the Expansion Behavior of Electrodes in Lithium-Ion Batteries

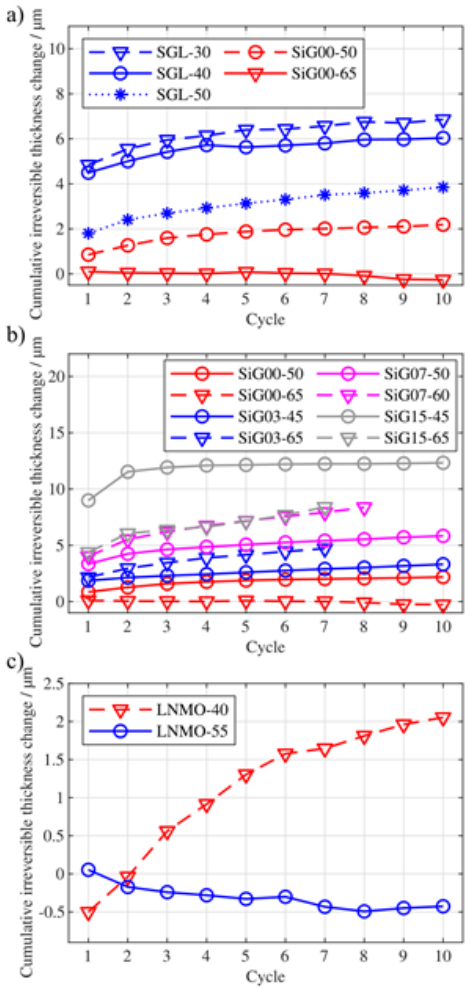
- Utilization of electrochemical dilatometry to determine changes in the structure of electrode active materials having different initial porosities
- For graphite electrodes the initial porosity mainly influences the irreversible thickness change of the electrodes, especially during the formation cycles
- Spherical particles in graphite resulted in slightly higher thickness changes than flake-type particles over all cycles
- SiG electrodes demonstrated an increase in delithiation and irreversible thickness changes due to the larger expansion of the silicon particles
- The results of this research demonstrated that the initial porosities mainly affected the irreversible thickness change of anodes and cathodes
- The thickness change for anodes and cathodes was mostly influenced by the initial porosity during the formation cycles




Schematic representation of ECD-3-Nano dilatometer placed in a climate chamber inside the glovebox.




Normalized delithiation thickness change of: a) Graphites with different initial porosities and particle forms, b) SiGs with different initial porosities and silicon ratios, and normalized lithiation thickness change c) LNMOs with different initial porosities.




Cumulative irreversible thickness change of: a) Graphites with different initial porosities and particle forms, b) SiGs with different initial porosities and silicon ratios, and c) LNMOs with different initial porosities.

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