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.