

Predicting the Effect of Silicon Electrode Design Parameters on Thermal Performance of a Lithium-Ion Battery

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Abstract : The present study models the role of electrode structural characteristics on the thermal behavior of lithium-ion batteries. Preliminary modeling runs have employed a 1D lithium-ion battery coupled to a two-dimensional axisymmetric model using silicon as the battery anode material. The two models are coupled by the heat generated and the average temperature. Our study is focused on the silicon anode particle sizes and it is observed that silicon anodes with nano-sized particles reduced the temperature of the battery in comparison to anodes with larger particles. These results are discussed in the context of the relationship between particle size and thermal transport properties in the electrode.

Keywords : particle size, NMC, silicon, heat generation, separator

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