Title: Porous silicon nanowires for lithium-ion battery anodes with long cycle life

Silicon shows great promise as a high-capacity anode material (~ 4200 mAh g^{-1}) for lithium-ion batteries. However, the widespread application of silicon anode is impeded by huge volume variation during the repeated cycling processes results in poor cycling performance and low reversible capacity, as well as inferior rate performance. To enhance the structural stability and cycling performance of silicon materials, recent studies have made great effort by nanosizing silicon particles and optimizing the morphology of silicon materials. Nanosizing silicon particles can mitigate the expansion stress during electro-chemical process to reduce the collapse of the structure of silicon. Specifically, 1D Si nanowires, not only alleviate the stress caused by volume expansion, but also reduce the diffusion pathway of electron and lithium-ion. In this context, this project envisages the fabrication of fiber-shaped silicon-based anode material for lithium-ion battery anodes with long cycle life.

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