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**Structural investigation of Si nanoparticles-carbon nanofiber composite as flexible anode for high-rate lithium-ion batteries****Vahide Ghanooni Ahmadabadi, Kamyar Shirvanimoghadam, Nibin Showkath, Robert Kerr, Mino Naebe and Ying Chen**  
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Self-standing, binder-free and flexible anodes of silicon-carbon nanofiber composite are fabricated via electrospinning. The rate capability of the anodes of different fibers diameter are investigated for lithium-ion batteries. The embedded silicon nanoparticles inside carbon fibers are effectively protected from direct exposure to the electrolyte. This structure leads to vastly improved capacity retention during galvanostatic half-cell cycling. Cycling results showed that an electrode with 230 nm fiber diameter has enhanced cyclability and rate capability when compared to one with 620 nm diameter. Post-cycling investigations of the electrodes via SEM (Scanning Electron Microscopy) and EIS (Electrochemical Impedance Spectroscopy) reveals a better structural stability and less electrical impedance build-up with cycling for the electrode with thinner CNFs. This behavior is a result of a lower linear density of the SiNPs along the thin CNFs which avoids the formation of SiNPs clusters in the CNFs. Accumulated stress-strain over lithiation/de-lithiation is created in the thicker CNFs due to the volume change of Si which leads to breakage of the CNFs.

**Biography**

Vahide Ghanooni Ahmadabadi has received her MSc in Materials Science and Engineering from Ferdowsi University of Mashhad, Iran. She is currently a PhD candidate at Institute for Frontier Materials, Deakin University since 2015. Her research interest is focused on nanomaterials and metal-ion batteries.

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