

Advanced Germanium Nanoparticle Composite Anodes using Single Wall Carbon Nanotube Conductive Additives

M. W. Forney,^a M. J. Dzara,^b A. L. Doucett,^b M. J. Ganter,^a J. W. Staub,^a R. D. Ridgley,^c and B. J. Landi^{a,b}

^a NanoPower Research Laboratories, Rochester Institute of Technology, Rochester, NY 14623, USA.

^b Chemical & Biomedical Engineering, Rochester Institute of Technology, Rochester, NY 14623, USA.

^c United States Government, Washington, DC, United States

Electrochemical Impedance Spectroscopy (EIS)

Representative EIS spectra have been plotted in **Figure 1** to demonstrate the dramatic reduction in charge transfer (CT) impedance when 5% Super C65 is replaced with just 1% SWCNT conductive additives. These data are for 100% lithiation of the Ge-NP electrode, corresponding to the data points at the right of Figure 5 in the manuscript, and the fitting model has been inset.

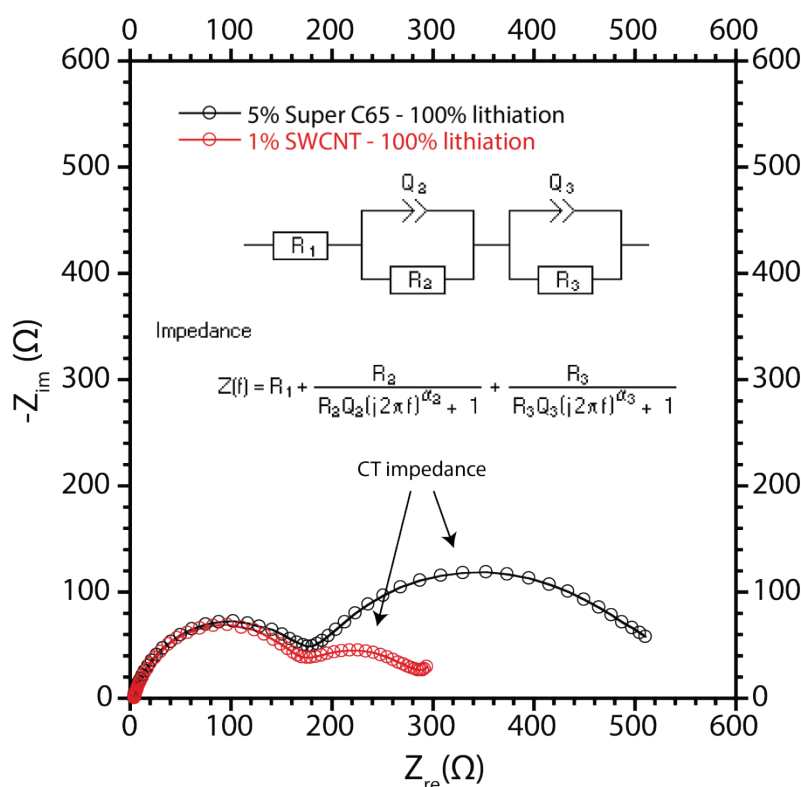


Figure 1: Representative EIS spectra for 5% Super C65 (black) and 1% SWCNT (red) at 100% lithiation.

Scanning Electron Microscopy (SEM)

Original SEM images from Figure 3 in the manuscript, without highlighted conductive additives, are shown in **Figure 2**.

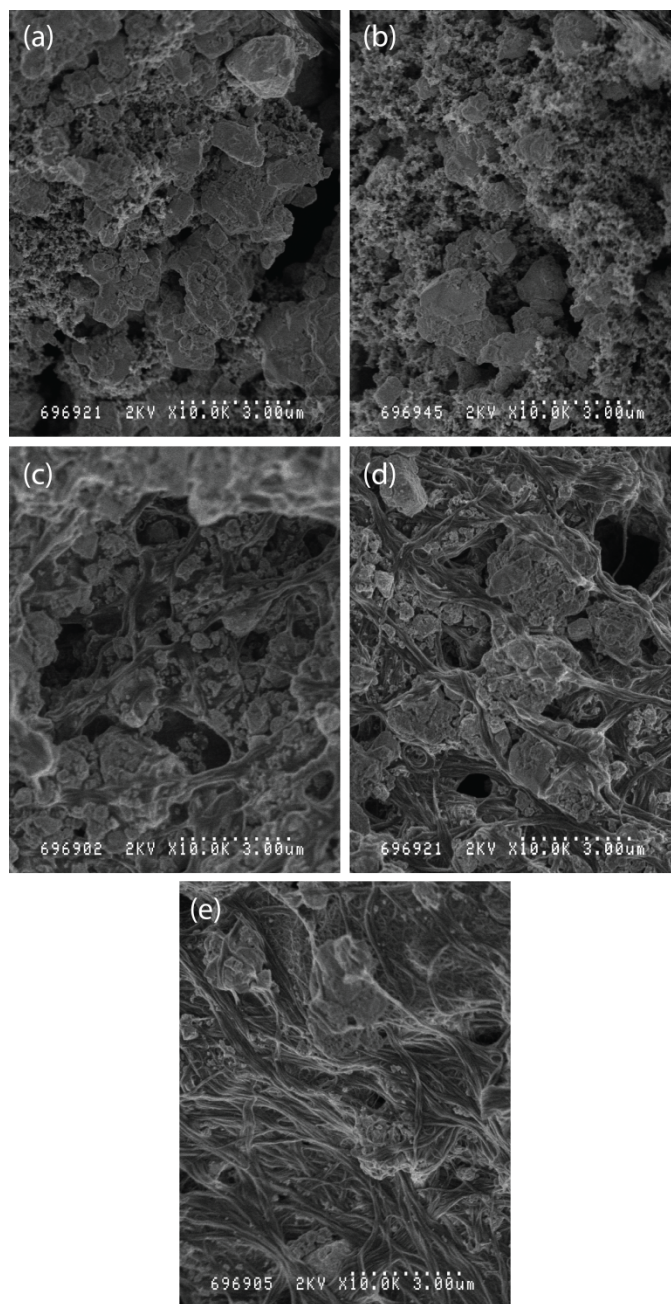


Figure 2: SEM images of Ge-NP anode with (a) 5% Super C-65, (b) 10% Super C-65, (c) 1% SWCNT, (d) 2% SWCNT, and (e) 3% SWCNT.