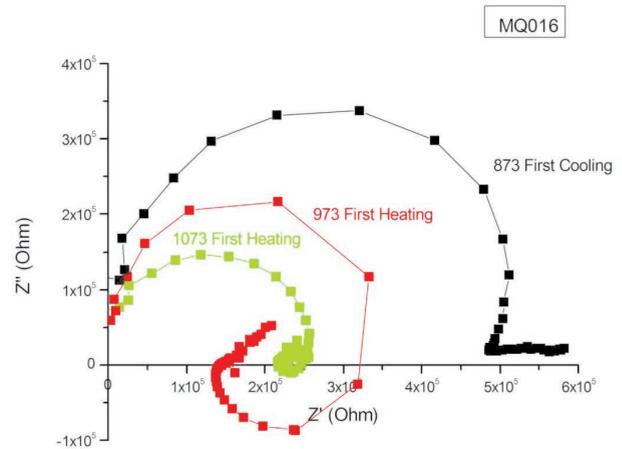


SUPPLEMENTAL FIGURE S1. Complex impedance plot of MQ011 showing the change in spectral response as a function of temperature. Note the change from the first increase in temperature (Red, Green and Black curves) and, the first decrease (Pink and Blue curves) showing a loss of the second arc at higher temperatures, which has previously been interpreted as direct measurements of cell moisture and grain boundary (Roberts and Tyburczy 1994; Dai and Karato 2009b). Importantly, the second arc at higher temperatures could be interpreted as a charge transfer, blocking (Dai and Karato 2009a, 2009b, 2014), however this is absent in our data.



SUPPLEMENTAL FIGURE S2. Complex impedance plot of MQ016 showing the change in spectral response as a function of temperature. Negative impedance curves (inductance) is commonly associated with the interaction of the current between the sample and electrode prior to development of the solid state buffer (i.e. NiO, in this case) or dehydration of hydrous phases when present (Wang and Karato 2013). However these hydrous phases are absent in this study, therefore indicating the NiO buffer was active in our experiments after the first heating cycle.