Supplementary Materials

Correlating Thermal History to Structural Integrity and Cycling Stability in NMC 111 Cathodes

Jeffrey S. Ovens[1], *Rex Chen*[1], *Yingzi Feng*[2], *Majid Talebiesfandarani*[2], *Stephen A. Campbell*[2], *and Byron D. Gates*[1] *

[1] Department of Chemistry, Simon Fraser University, 8888 University Drive, Burnaby, BC V5A 1S6 (Canada)

[2] Nano One Materials Corporation, 8575 Government St, Burnaby, BC, V3N 4V1 (Canada)

* Corresponding author: bgates@sfu.ca

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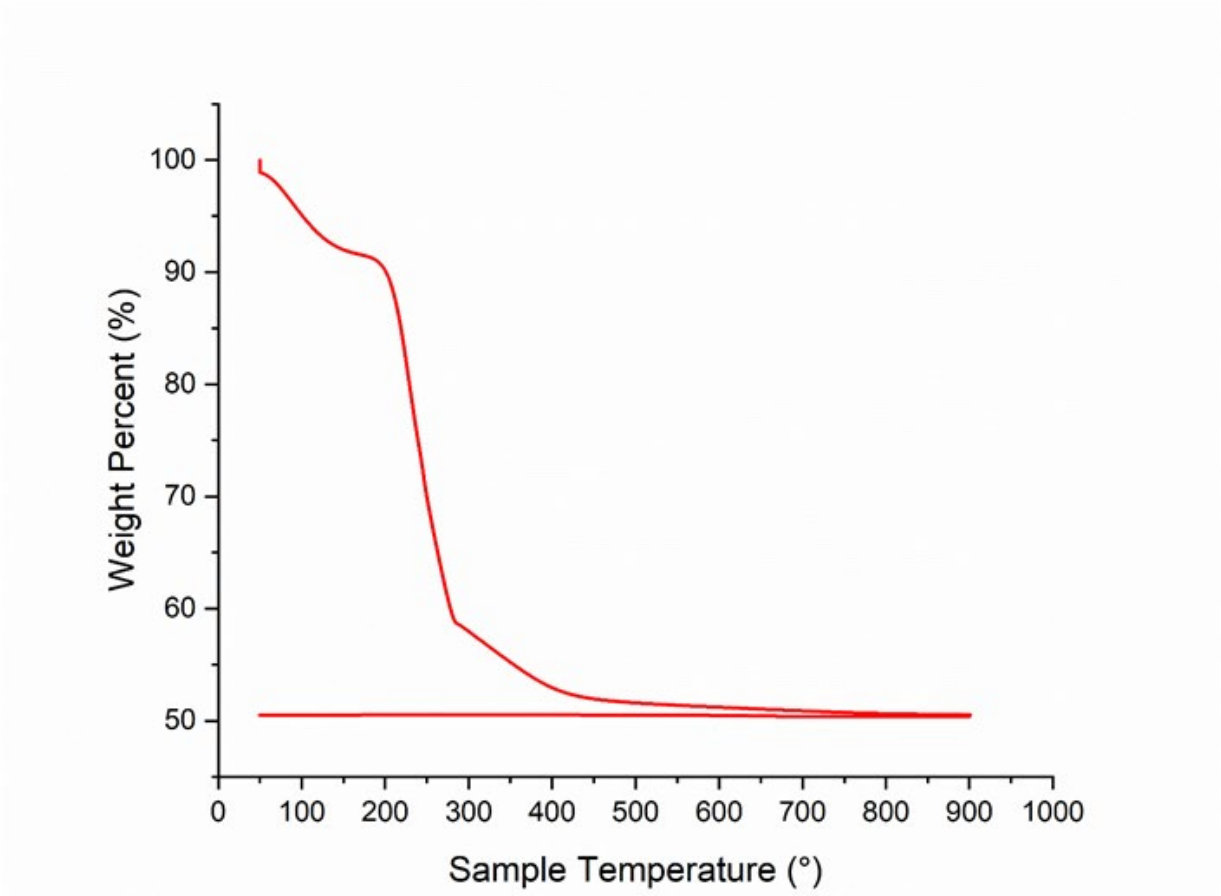

Figure S1. Representative results from the thermogravimetric analysis (TGA) of the as-synthesized precursor material to lithium nickel manganese cobalt oxide with an equimolar composition of transition metals (i.e., NMC 111) under an air atmosphere.

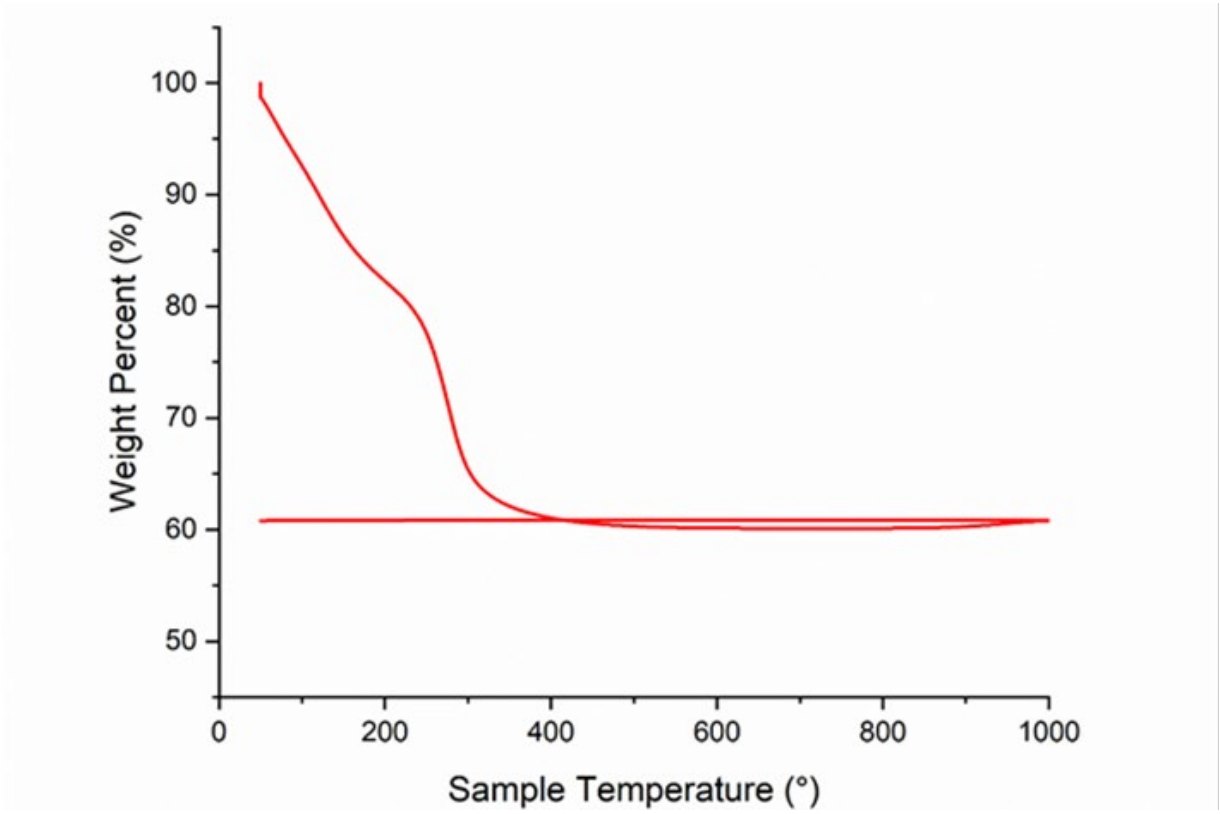

Figure S2. Representative results from the TGA of nickel carbonate ($NiCO_3$) under an air atmosphere.

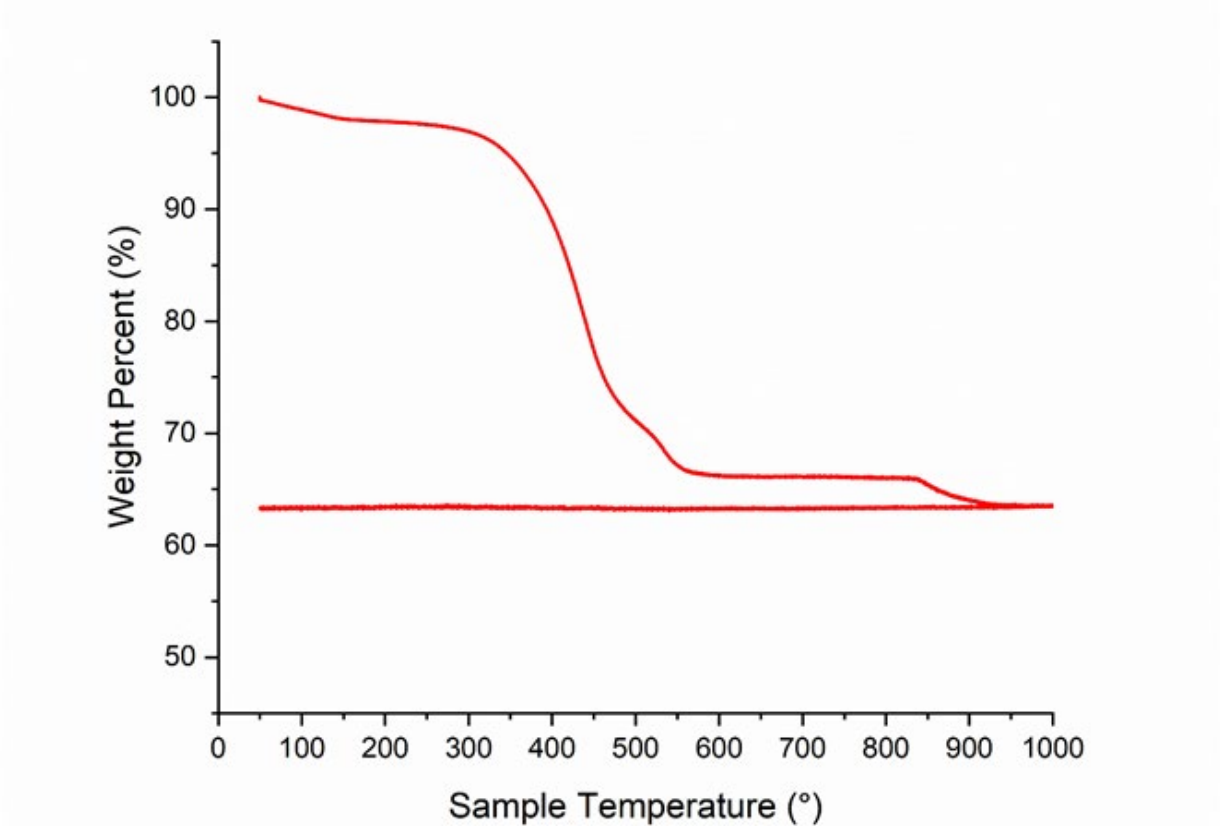

Figure S3. Representative results from the TGA of manganese carbonate ($MnCO_3$) under an air atmosphere.

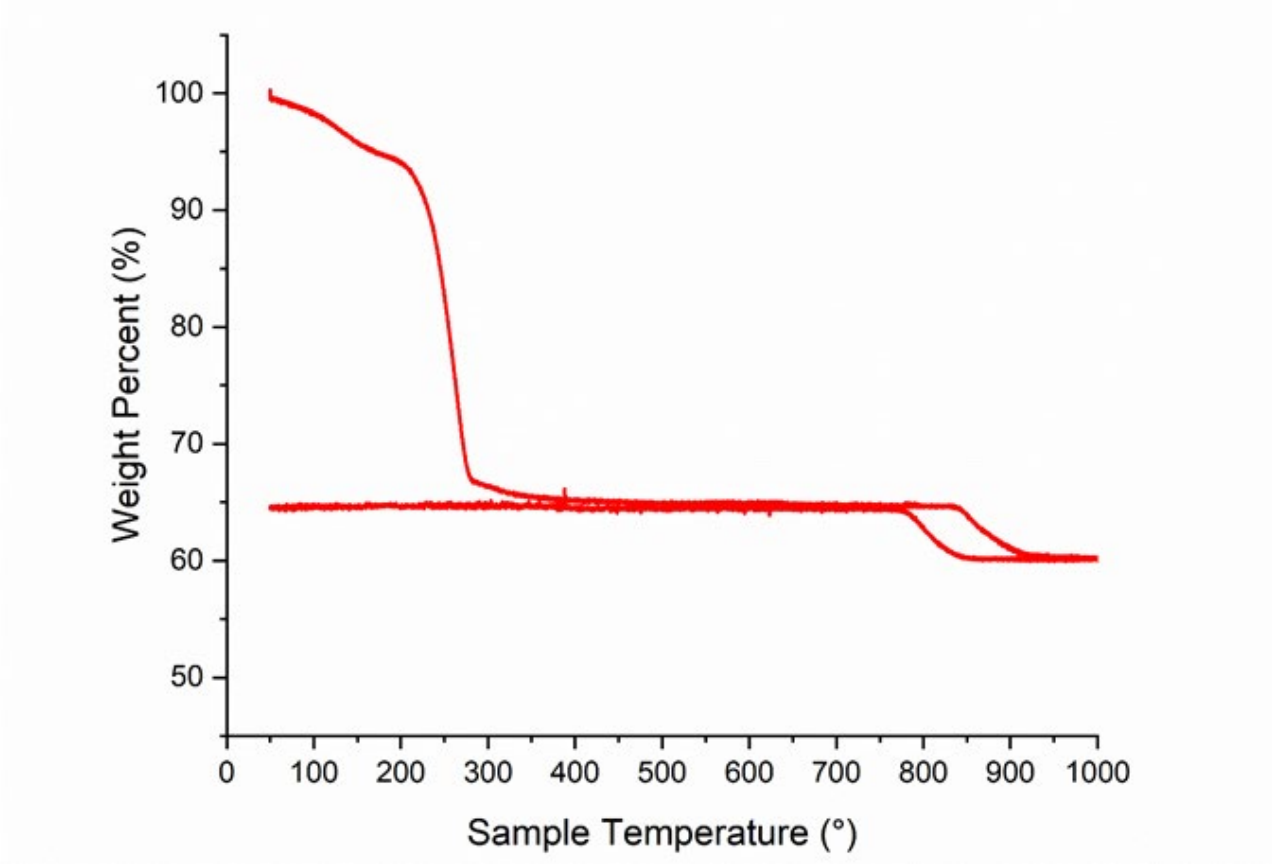

Figure S4. Representative results from the TGA of cobalt carbonate ($CoCO_3$) under an air atmosphere.

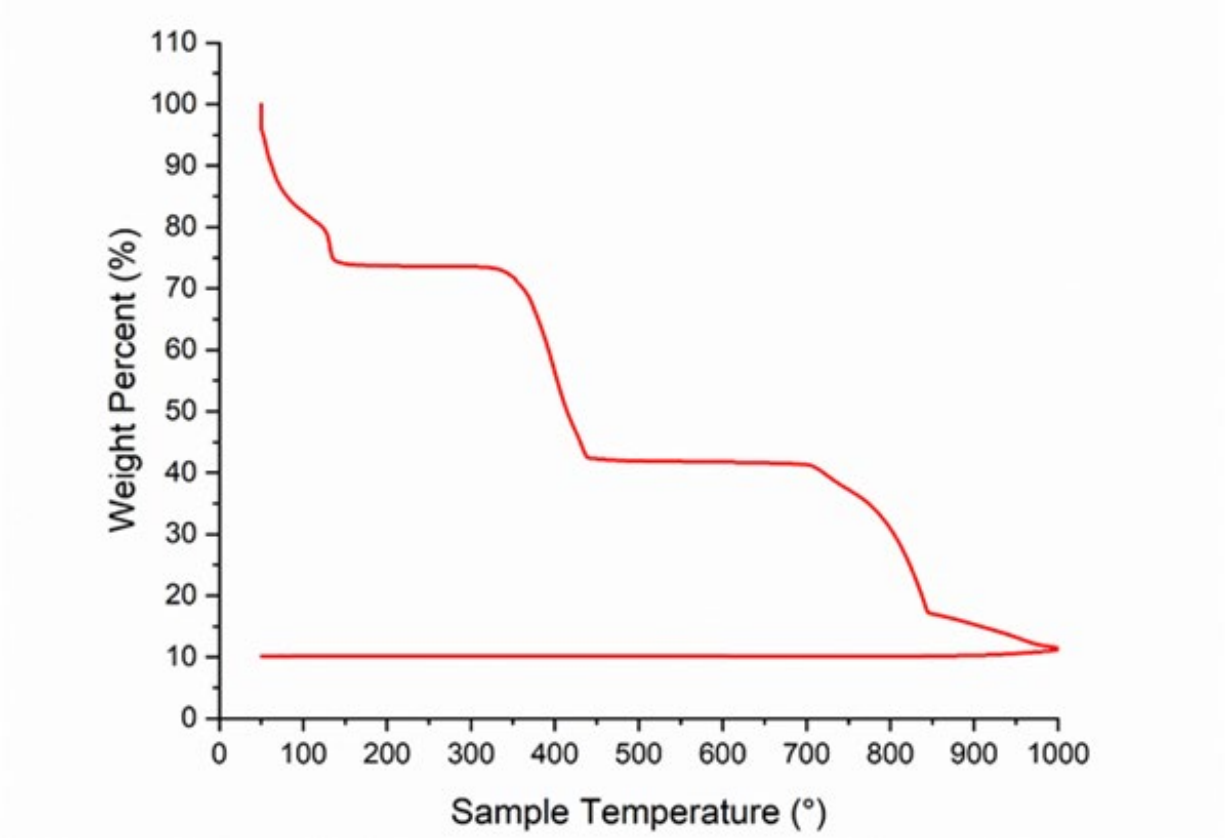

Figure S5. Representative results from the TGA of lithium acetate (LiOAc) under an air atmosphere.

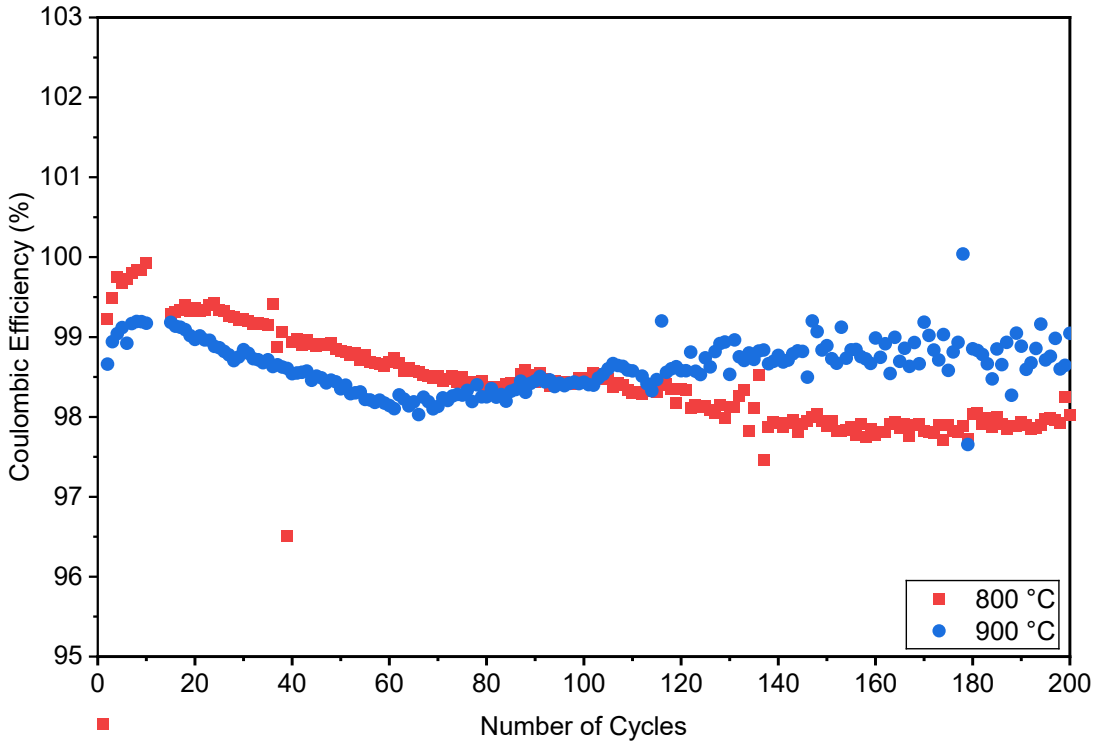

Figure S6. Coulombic efficiency of NMC 111 cathode materials synthesized with a thermal soak at 800 °C and 900 °C. The cells were cycled at a rate of 1C over a voltage range of 2.5 to 4.2 V (vs. Li/Li^+) for 200 cycles at 25 °C following initial conditioning.

Table S1. Elemental composition of the synthesized NMC 111 cathode materials treated at varying soak temperatures, quantified via flame atomic absorption spectroscopy (FAAS). The reported mole ratios are normalized such that the total moles of the transition metals equal 1 ($Ni + Mn + Co = 1$).

soak temperature (°C)	Li	Ni	Mn	Co
900	0.9399	0.3258	0.3372	0.3370
800	0.9675	0.3337	0.3309	0.3355