

Fabrication and Characterization of Plasma Sprayed TiO<sub>2</sub> and Li<sub>4</sub>Ti<sub>5</sub>O<sub>12</sub> materials as All Active Material Lithium-Ion Battery Electrodes

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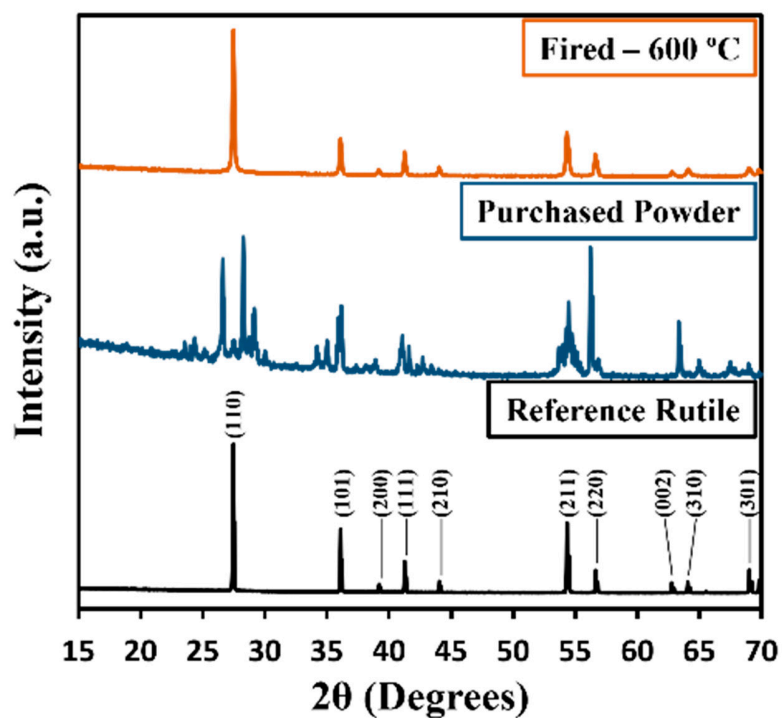
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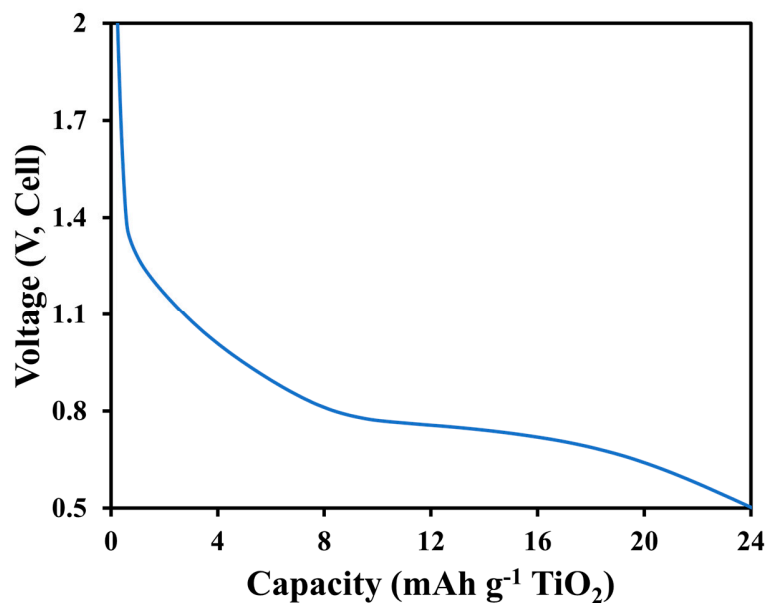
## Supporting Information

S.I: 1



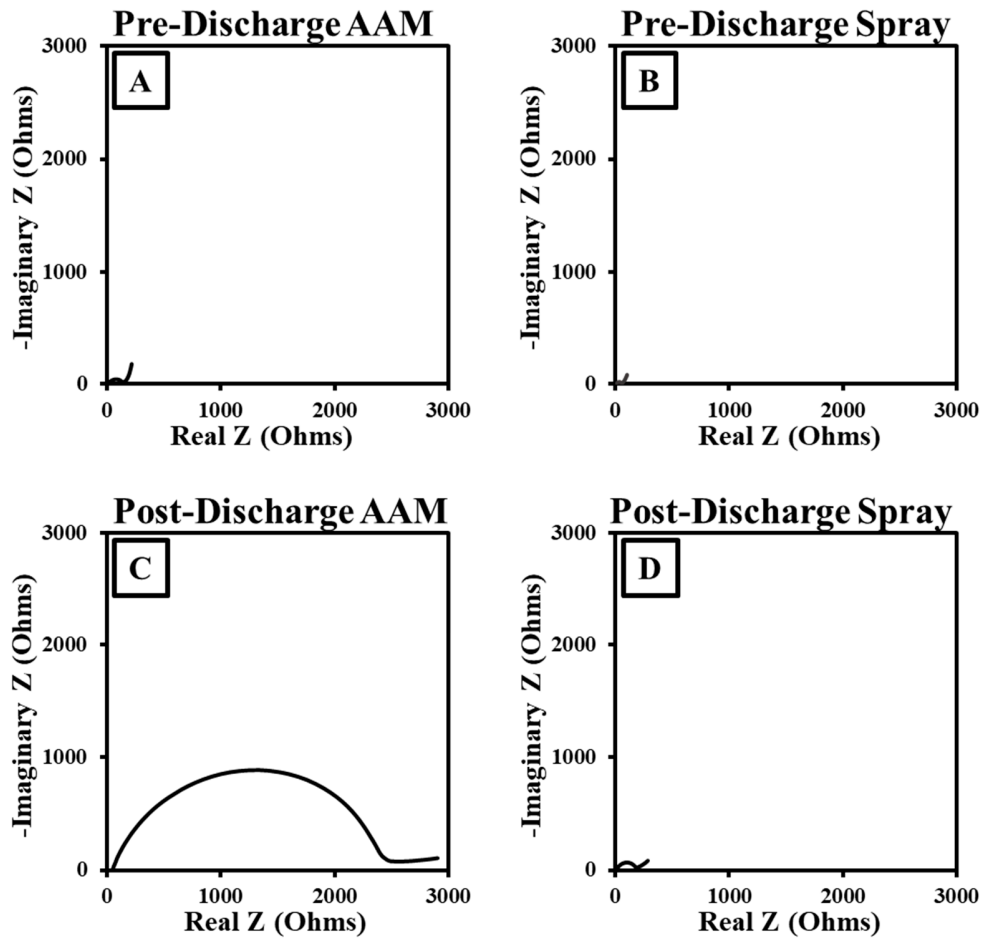
**Figure S1:** X-ray diffraction patterns for purchased  $\text{TiO}_2$  powder (blue) and after heating the powder to  $600^\circ\text{C}$  as was done during AAM electrode processing. Bottom pattern shows reference for rutile phase  $\text{TiO}_2$  (JCPDS 88-1175)

S.I: 2



**Figure S2:** Discharge profile at a current density of  $64 \mu\text{A cm}^{-2}$  (corresponding to  $\sim C/20$ ) for the  $\text{TiO}_2$  powder after heating to  $600^\circ\text{C}$  and processing into a composite electrode paired with a Li metal anode.

S.I: 3

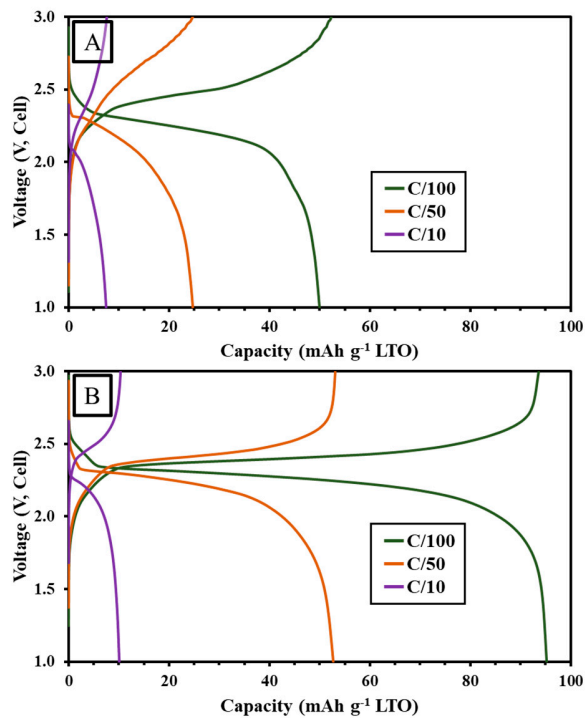


**Figure S3:** Nyquist plots from EIS of TiO<sub>2</sub> AAM and plasma spray electrodes before and after discharge. Both electrodes had geometric areas of 2 cm<sup>2</sup> and paired with lithium metal anodes. The panels correspond to the cells containing (A) AAM TiO<sub>2</sub> before discharge, (B) plasma spray TiO<sub>2</sub> before discharge, (C) AAM TiO<sub>2</sub> after discharge, and (D) plasma spray TiO<sub>2</sub> after discharge.

**Table S1:** Resistance of electrodes based off the fitted Thevenin model [1]. R<sub>1</sub> corresponds to the high frequency intercept and R<sub>2</sub> the semicircle region.

		R <sub>1</sub> (Ω)	R <sub>2</sub> (Ω)
<b>Pre-Discharge</b>	AAM	13	109
	Plasma Spray	8	45
<b>Post-Discharge</b>	AAM	71	2,000
	Plasma Spray	5	154

S.I: 4



**Figure S4:** Charge/discharge voltage profiles for LTO/LCO AAM thick electrode full cells. The LTO electrode was fabricated using the (A) high and (B) low intensity plasma spray processing conditions. The relevant C rates were the same for both charge and discharge and are indicated on the figures.

1. Nikolian, A.; Fleurbaey, K.; Timmermans, J.-M.; De Hoog, J.; Fleurbaey, K.; Noshin, O.; Van De Bossche, P.; Van Mierlo, J. *Classification of Electric Modeling and Characterization Methods of Lithium-Ion Batteries for Vehicle Applications* Classification of Electric Modelling and Characterization Methods of Lithium-Ion Batteries for Vehicle Applications;