Electronic Supplementary Information for

Polyaniline Nanofiber/Vanadium Pentoxide Sprayed
Layer-by-Layer Electrodes for Energy Storage

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Figure S1. Sample A was prepared with a blow-drying time of 30 sec; Sample B was prepared with a blow-drying time of 1 min. Both samples have 50 layer pairs.

Figure S2. Images of PANI NF/V$_2$O$_5$ LbL electrodes prepared by spray process with different PANI NF concentrations. The numbers on top of the images are the number of layer pairs.
Figure S3. Image of PANI NF/V$_2$O$_5$ LbL electrodes after optimization of parameter settings.

Figure S4. (a) UV-Vis spectra of (PANI NF/V$_2$O$_5$)$_{30}$ LbL films at 2.0 V (black curve) and at 3.5 V vs Li/Li$^+$ (red curve).
**Figure S5.** Galvanostatic cycling data based on volume.

**Figure S6.** Ragone plot of (PANI NF/V$_2$O$_5$)$_{30}$ spray-assisted LbL electrodes and (PANI NF/V$_2$O$_5$)$_{16}$ dip-assisted LbL electrodes, which is based on volume.
Table S1. Parameters used for fitting of the equivalent-circuit model to the data

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The impedance of a CPE has the form:

\[ Z = \frac{(1/Y₀)}{(j\omega)^α} \]

When this equation describes a capacitor, the constant \( Y₀ = C \) (the capacitance) and the exponent \( α = 1 \). For a constant phase element, the exponent \( α \) is less than one.

The equation for the Warburg impedance can be written as:

\[ Z = \frac{(1/Y₀)}{\sqrt{j\omega}} \]

where

\[ Y₀ = 1/(\sqrt{2} \cdot σ) \]

If the diffusion layer is bounded, the impedance at lower frequencies no longer obeys the equation above. Instead, we get the form:
\[ Z = \left[ \frac{1}{Y_0} / \sqrt{(j\omega)} \right] \tanh [B \sqrt{j\omega}] \]

with

\[ B = \frac{\delta}{D^{1/2}} \]

\( d = \) Nernst diffusion layer thickness (cm)
\( D = \) an average value of the diffusion coefficients of the diffusing species (cm\(^2\)/s)