Supplementary Material:

New three-dimensional porous electrode concept: vertically-aligned carbon nanotubes directly growth on embroidered copper structures

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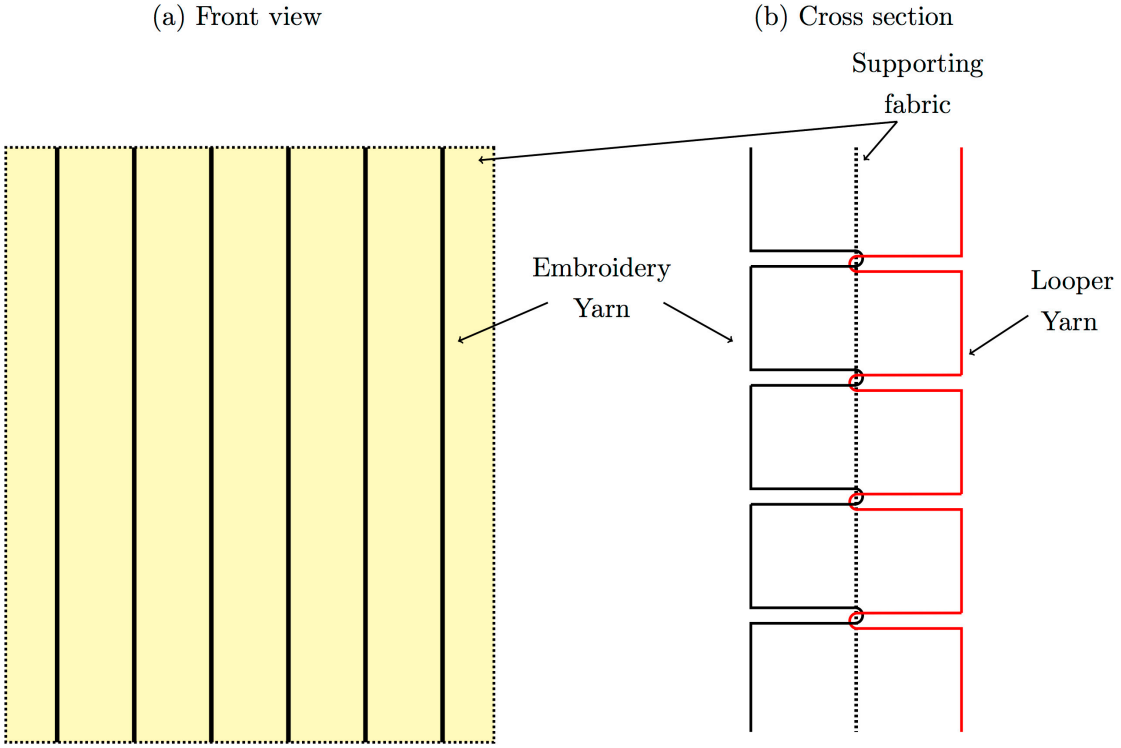

Figure S1. Schematic drawing of an embroidered structure with a layout of one layer. Cu wires are used as embroidery and looper yarns. (**a**) Front view showing the arrangement of one layer with vertical wires; (**b**) Cross section showing the lockstitching technique, and the arrangement of the embroidery and looper yarns.

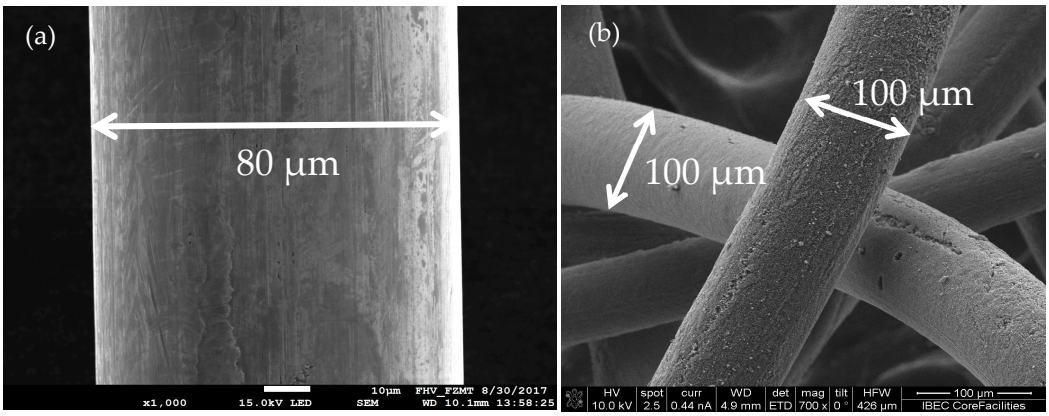

Figure S2. (**a**) SEM image showing the Cu wire used for embroidery with a diameter of 80 μm; (**b**) SEM image of the Cu wires with VA-CNTs. The final diameter is about 100 μm, indicating an average VA-CNT length of about 10 μm.

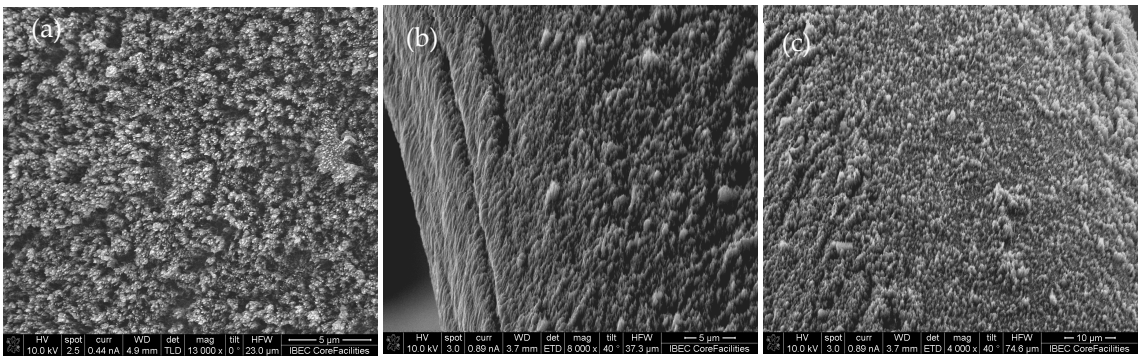

Figure S3. SEM images of the Cu wire with VA-CNTs from different areas: (**a**) front; (**b**) side and (**c**) backside with respect to the plasma. CNTs showed a preferential growth in the vertical direction. Shorter VA-CNTs were observed in the backside.

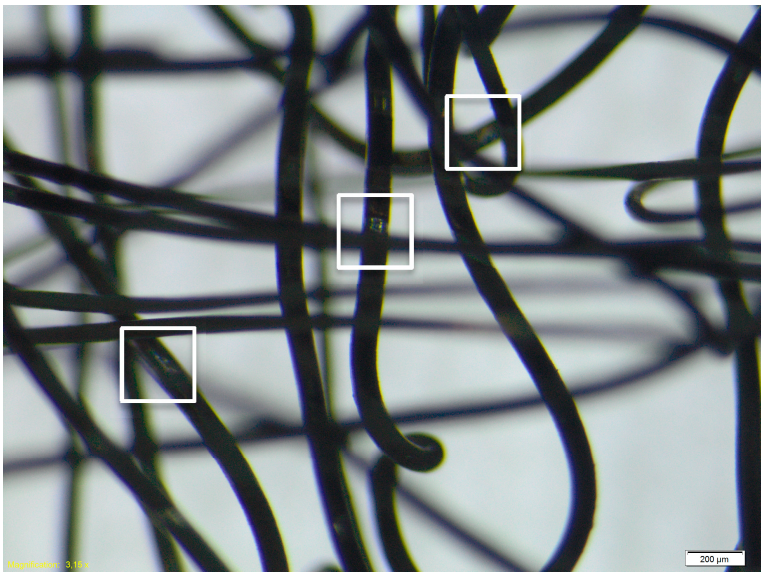

Figure S4. Photomicrograph of the embroidered structure after the growth of VA-CNTs. Some areas where Cu wires crossed (marked with a white rectangle) seem to be semi-completely covered by VA-CNTs.

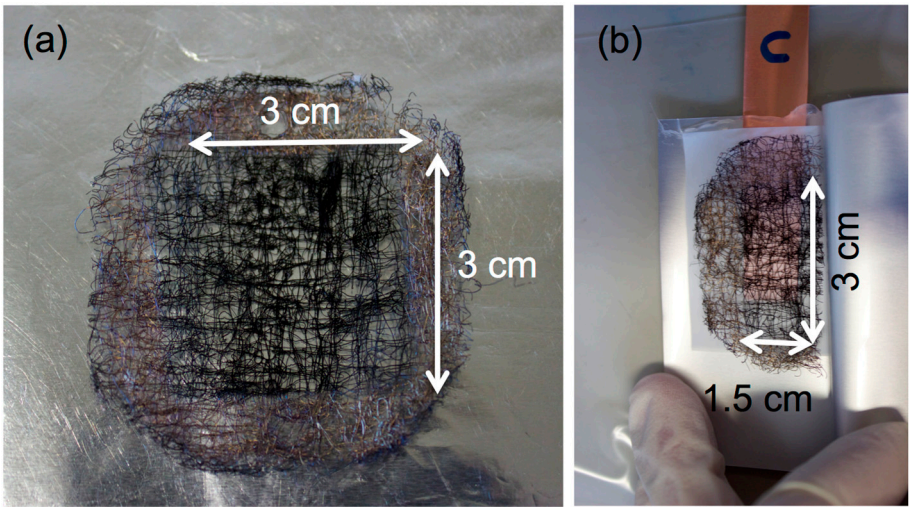

Figure S5. (**a**) Growth of VA-CNTs on 3 × 3 cm^2 embroidered Cu current collectors; (**b**) Preparation of a half-pouch cell of 1.5x3 cm^2.