Supporting Information

A scalable strategy toward compliant tandem yarn-shaped supercapacitors with high voltage output

Juan Zhang[a], Qingli Xu[a], Xiangyu Qian[a], Xinhou Wang[ab*], Kun Zhang[a*]

[a] *Key Laboratory of Textile Science & Technology (Donghua University), Ministry of Education, College of Textiles, Donghua University, Shanghai 201620, China*

[b] *College of Mechanical Engineering, Donghua University, Shanghai 201620, China*

E-mail address: kun.zhang@dhu.edu.cn (Kun Zhang); xhwang@dhu.edu.cn (Xinhou Wang)

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Supplementary Note 1

Calculation process of contact resistance. In theory, the total resistance R_n for T-YSSCs consisting of different unit numbers (n) are composed of different components:

$$R_1=R_i + R_{ct}$$

$$R_2=2R_i + R_{ct} + R_{lt}$$

…

$$R_n=nR_i + R_{ct} + (n\text{-}1)\ R_{lt}$$

$$\Delta R_{\text{T-YSSCs}}=R_n - R_1=(n\text{-}1)\ (R_i + R_{lt}) \quad (1)$$

Where R_i is internal resistance for single YSSC, R_{ct} is contact resistance between $MnO_2/rGO_{(1:1)}$ electrode and metal (current collector or metal wire) and R_{lt} is the resistance generated from T-YSSCs interconnection. As the unit number increases, R_{ct} will not increase since no more contact between $MnO_2/rGO_{(1:1)}$ electrode and metal generates.

Correspondingly, R_n for MI-YSSCs consists of following components:

$$R_1=R_i + R_{ct}$$

$$R_2=2(R_i + R_{ct}) + R_{lt}$$

…

$$R_n=n(R_i + R_{ct}) + (n\text{-}1)R_{lt}$$

$$\Delta R_{\text{MI-YSSCs}}=R_n - R_1=(n\text{-}1)\ (R_i + R_{ct} + R_{lt}) \quad (2)$$

R_{ct} of MI-YSSCs will increase with the unit number due to metal-wire connections. Therefore, the R_{ct} value will be calculated from this formula:

$$\Delta R_{\text{MI-YSSCs}} - \Delta R_{\text{T-YSSCs}}=(n\text{-}1)\ R_{ct} \quad (3)$$

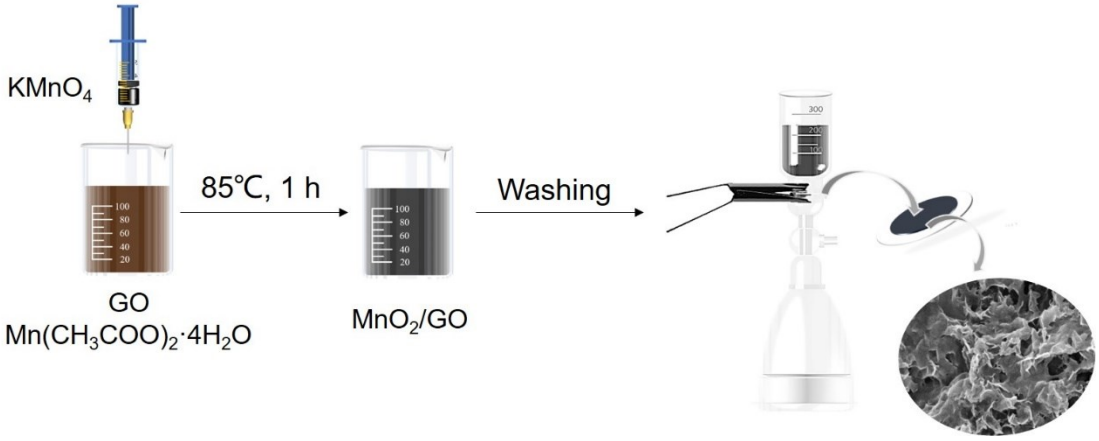

Figure S1. Preparation process of MnO_2/GO nanohybrid slurry.

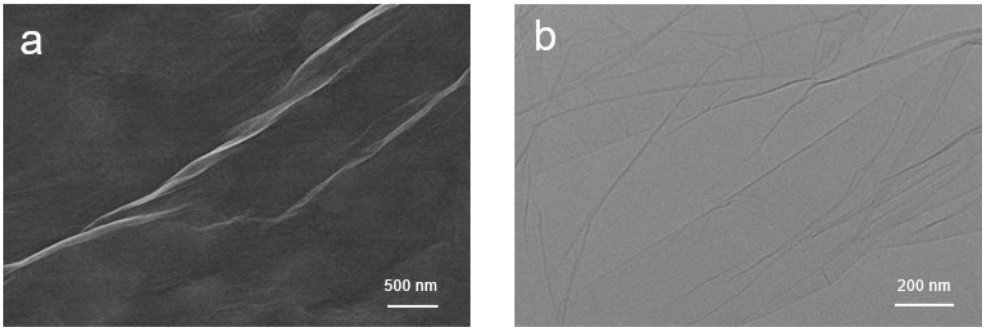

Figure S2. (a) A typical SEM image of GO. (b) A typical TEM image of GO.

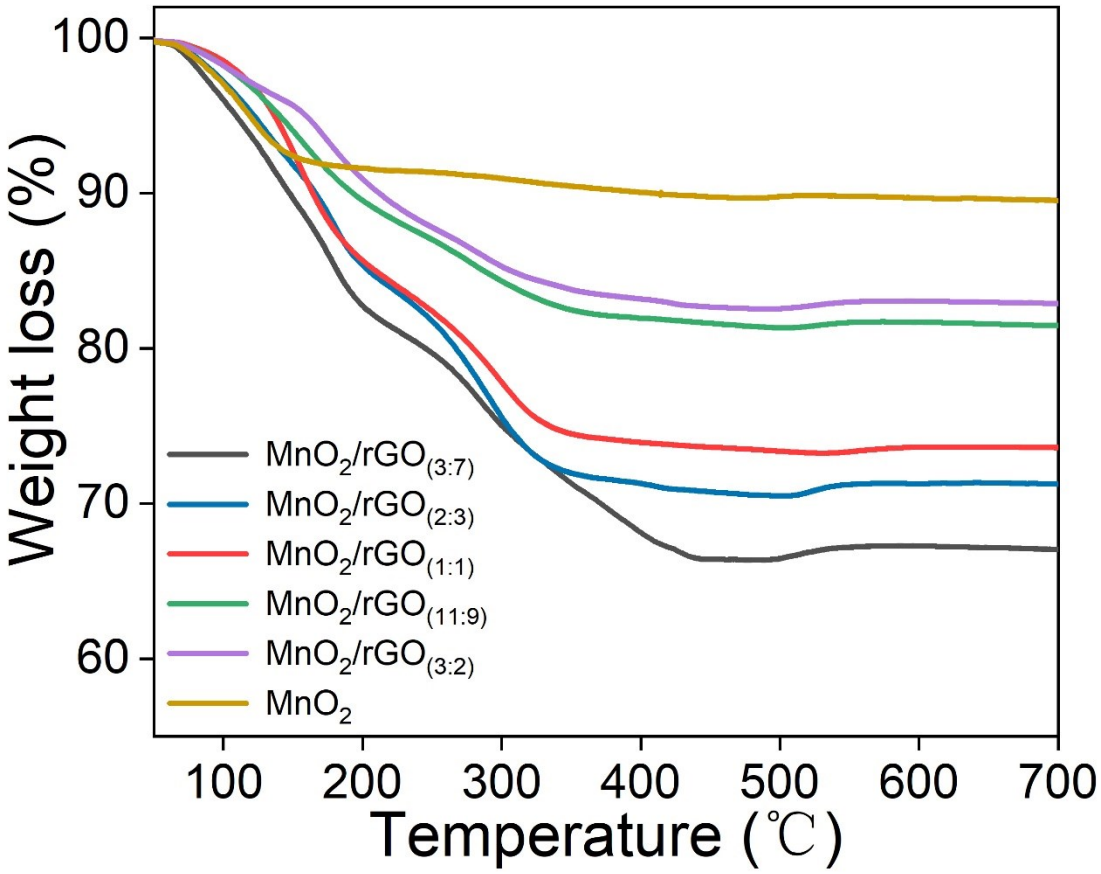

Figure S3. TGA curves of pure MnO_2 and all MnO_2/rGO composites.

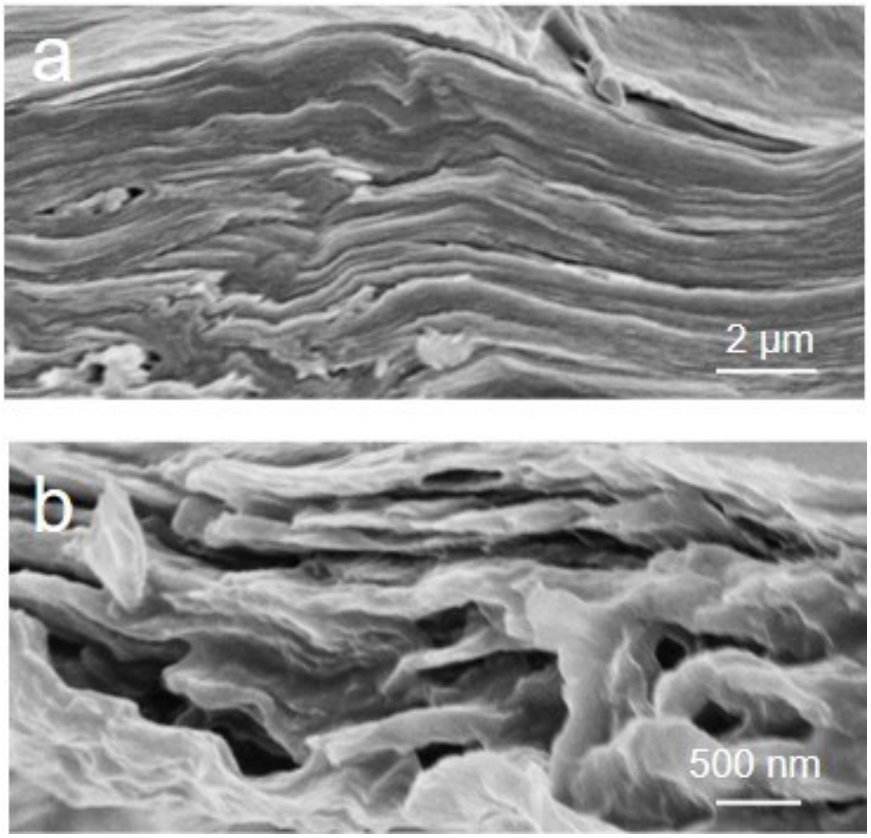

Figure S4. (a) Cross-sectional SEM image of rGO electrode. (b) Cross-sectional SEM image of $MnO_2/rGO_{(1:1)}$ electrode.

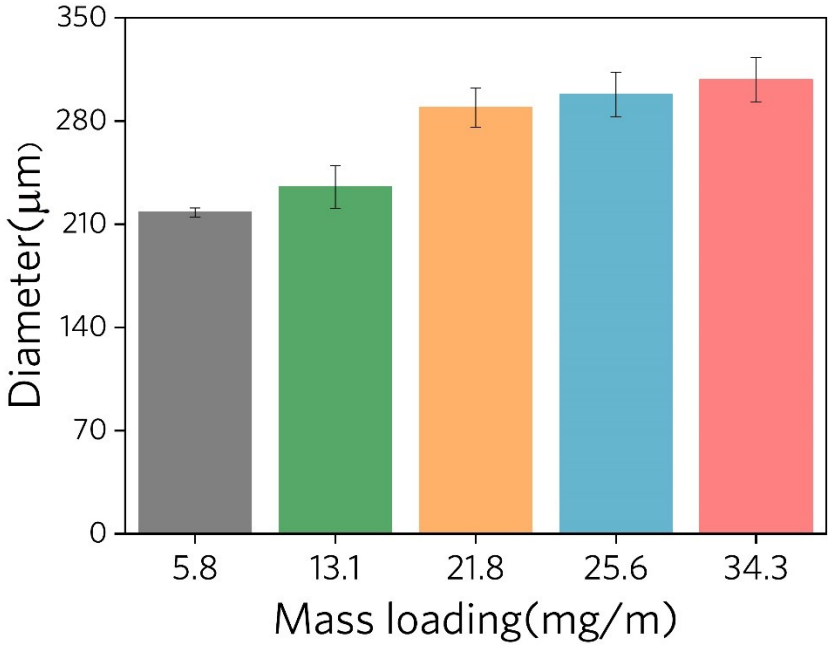

Figure S5. Plots of diameter of $MnO_2/rGO_{(1:1)}$ electrode versus mass loading of active material (5.8-34.3 mg/m).

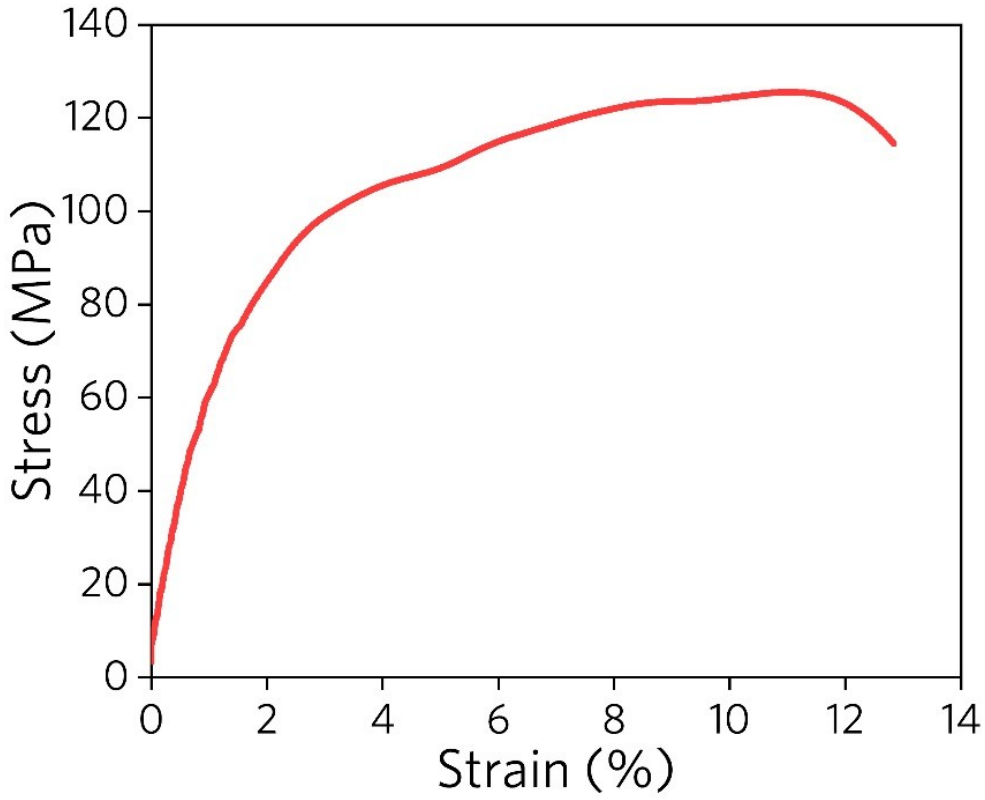

Figure S6. Stress−strain curves of $MnO_2/rGO_{(1:1)}$ based T-YSSCs.

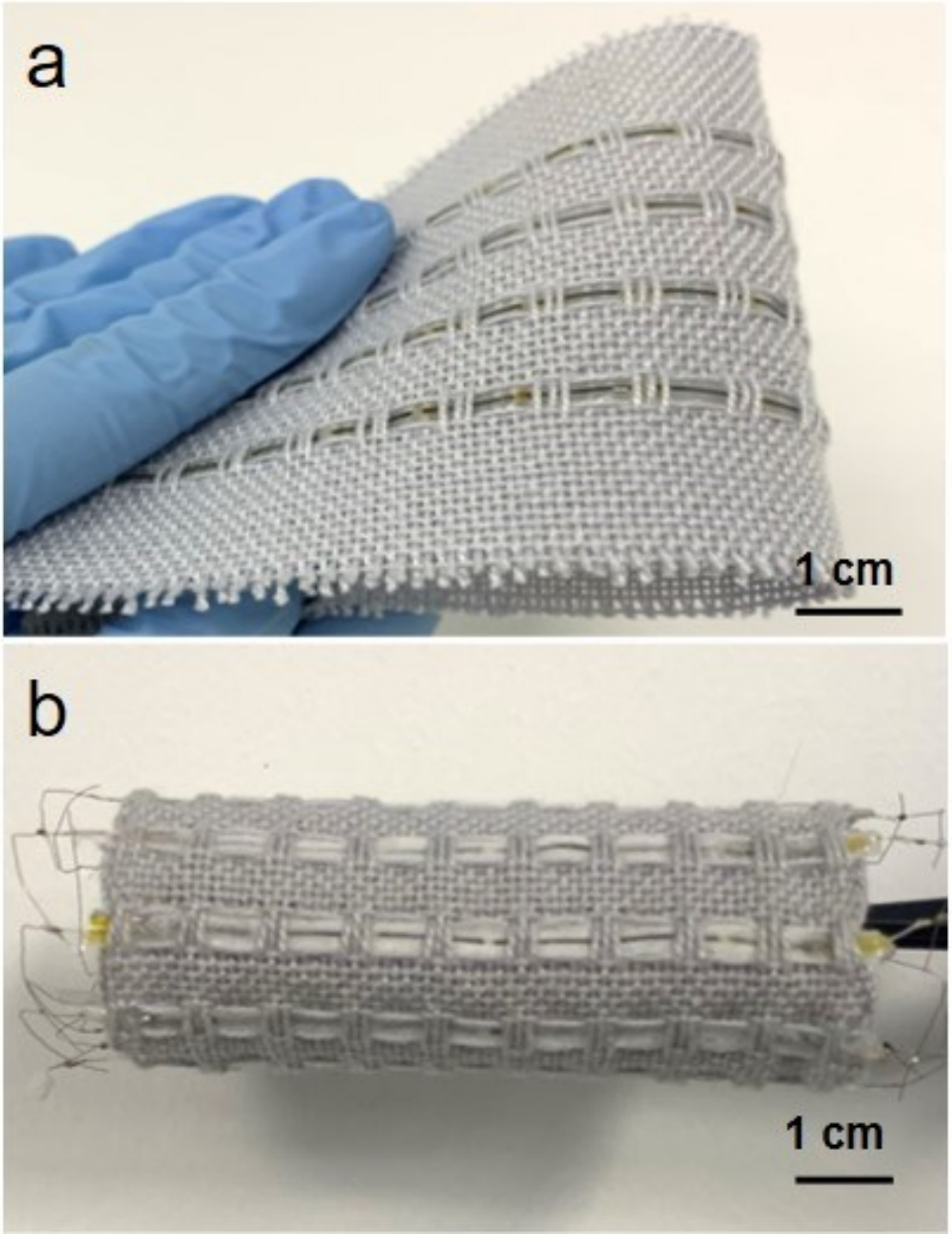

Figure S7. (a) Photograph of ESF-A bending at 180^{o}. (b) Photograph of ESF-B winding at 360^{o}.

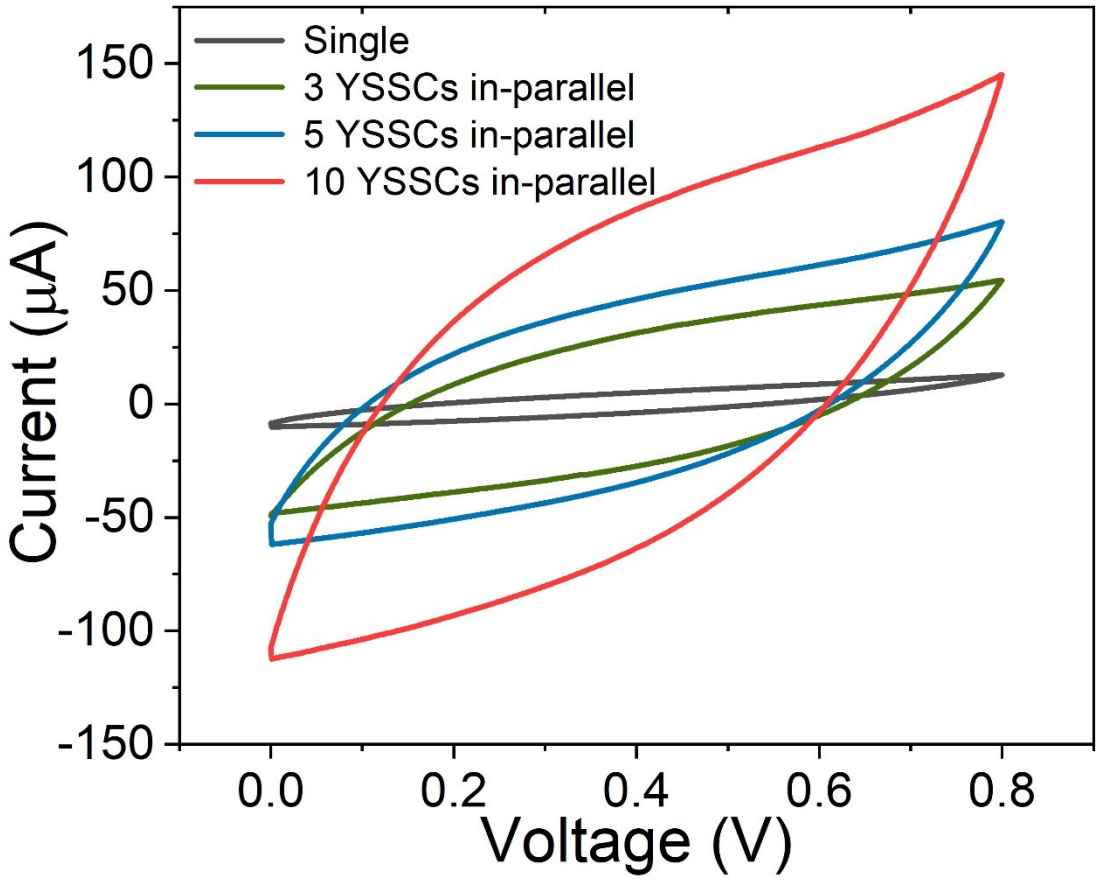

Figure S8. CV curves of YSSC and devices consisting of 3, 5, 10 YSSCs connected in parallel, which are measured at a scan rate of 5 mV/s.

Table S1. Total resistance for T-YSSCs and MI-YSSCs.

Unit number	1	3	5	10
R_n for T-YSSCs (kΩ)	6.7	21.2	33.9	88.5
R_n for MI-YSSCs (kΩ)	6.8	32.2	54.6	122.8