

Supplementary Information

Controlling Electronic States of Few-walled Carbon Nanotube Yarn via Joule-annealing and *p*-type Doping Towards Large Thermoelectric Power Factor

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Contents

Figures

- Figure S1: SEM images of pristine, Joule-annealed and Joule-annealed followed by F4TCNQ doped CNT yarn.
- Figure S2: Fitted curves of the temperature dependence Seebeck coefficient for pristine, Joule-annealed and Joule-annealed followed by F4TCNQ doped CNT yarn.
- Figure S3: Relationship between the amount of joule-annealing and the intensity of 2D band to G band.
- Figure S4: Possible mechanism of morphology-change after Joule-annealing and doping.
- Figure S5: Raman spectrum of F4TCNQ.
- Figure S6: TEM images of pristine, Joule-annealed and Joule-annealed followed by F4TCNQ doped CNT yarn.
- Figure S7: TGA analysis of the CNT yarn before and after Joule-annealing.

Tables

- Table S1: The values of the intensity ratio of I_G/I_D and I_{2D}/I_G .

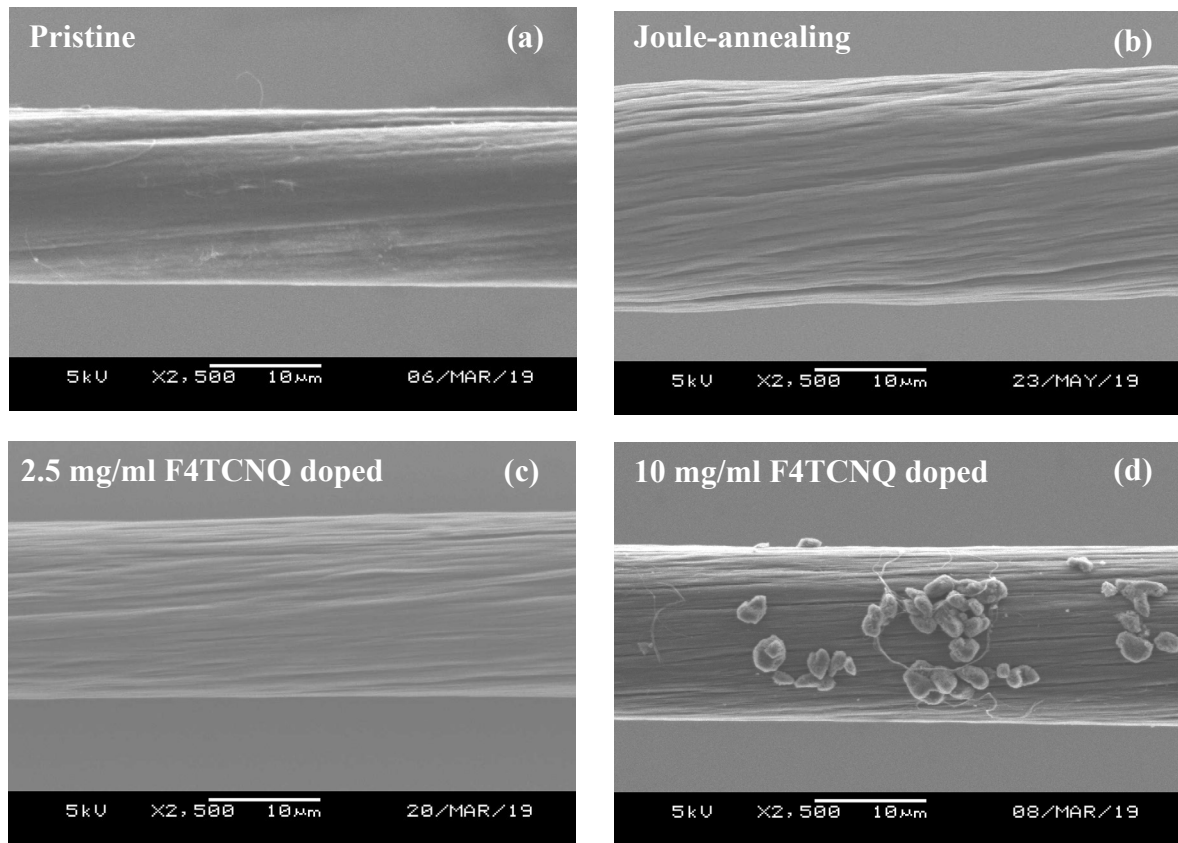


Figure S1: SEM images of (a) pristine, (b) Joule-annealed, (c) Joule-annealed followed by 2.5 mg/ml F4TCNQ doped, and (d) Joule-annealed followed by 10 mg/ml F4TCNQ doped FWCNT yarns.

Table S1: The values of the intensity ratio of I_G/I_D and I_{2D}/I_G .

Joule Heat (W)	I_G/I_D	I_{2D}/I_G
0 (pristine)	1	0.3
1	1.6	0.5
2	5	0.5
3	11.2	0.5
3.4	15.7	0.4
4	17.8	0.7

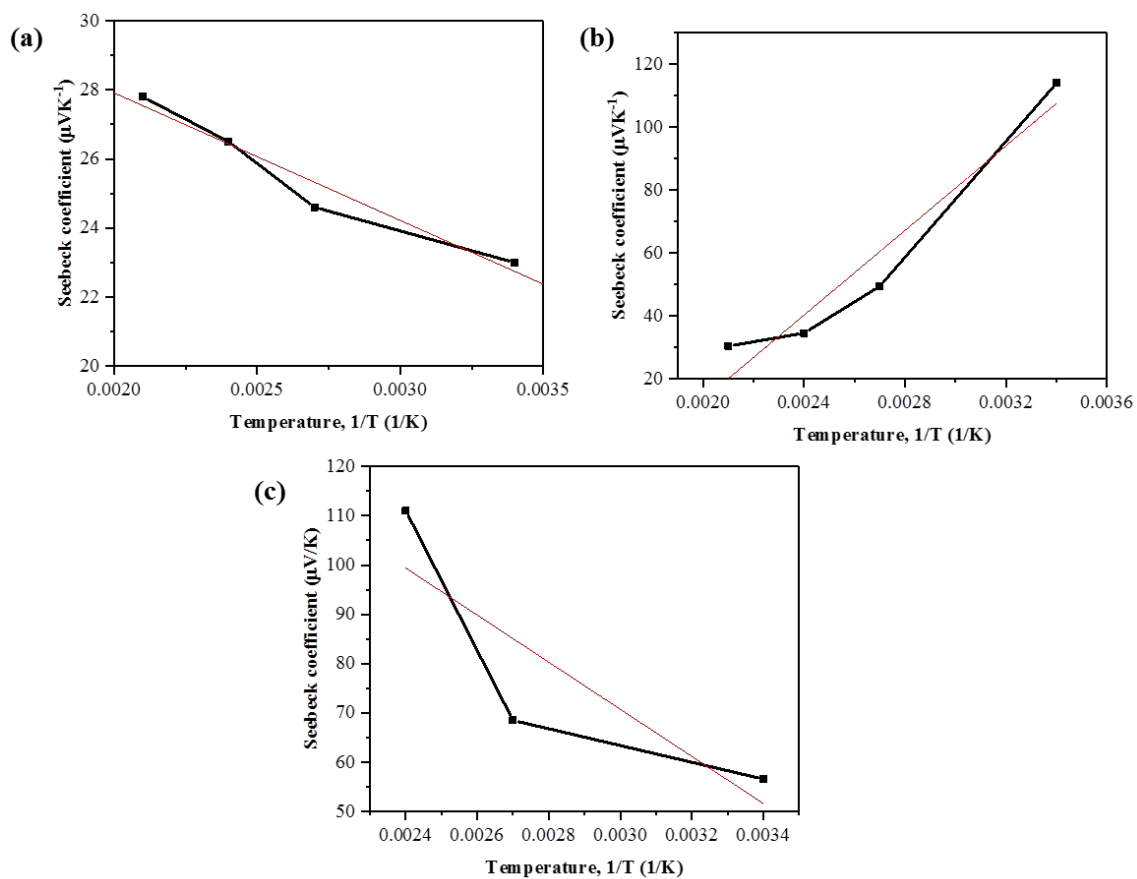


Figure S2: Fitted curves of the temperature dependent Seebeck coefficient for (a) pristine, (b) Joule-annealed and (c) Joule-annealing followed by F4TCNQ doped FWCNT yarns.

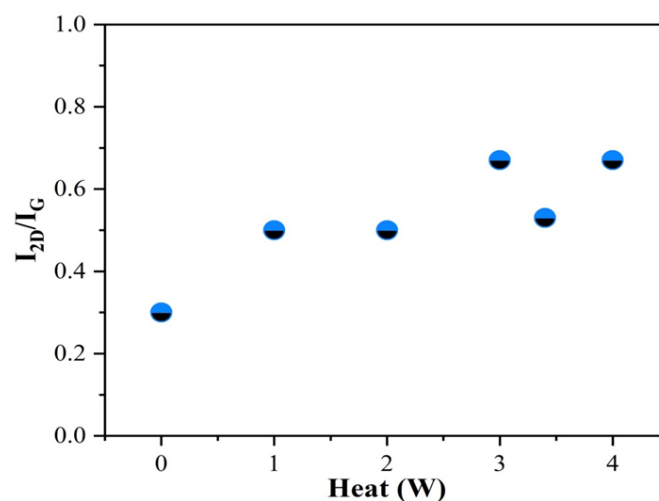


Figure S3: Relationship between the amount of joule-annealing and the intensity of 2D band to G band in Raman spectroscopy, indication of the formation of multi-layered graphene structure on the surface of FWCNT yarn.

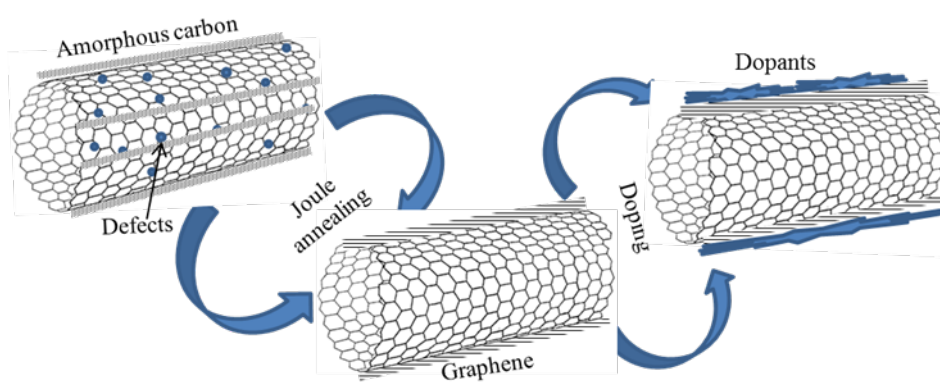


Figure S4: Possible mechanism of morphology-change after Joule-annealing and doping.

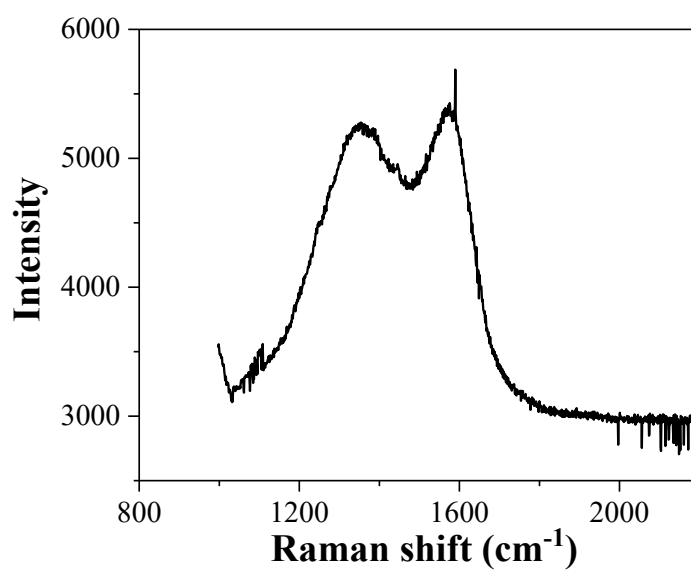


Figure S5: Raman spectrum of F4TCNQ.

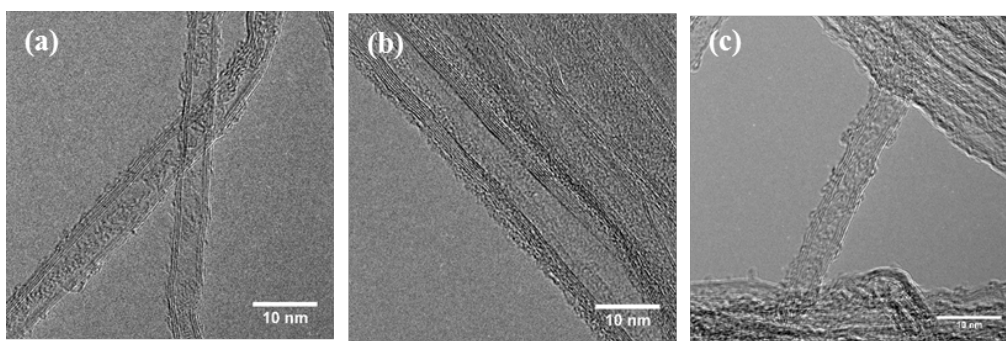


Figure S6: TEM images of (a) pristine, (b) Joule-annealed, and (c) Joule-annealing followed by 2.5 mg/ml F4TCNQ doped FWCNT yarns.

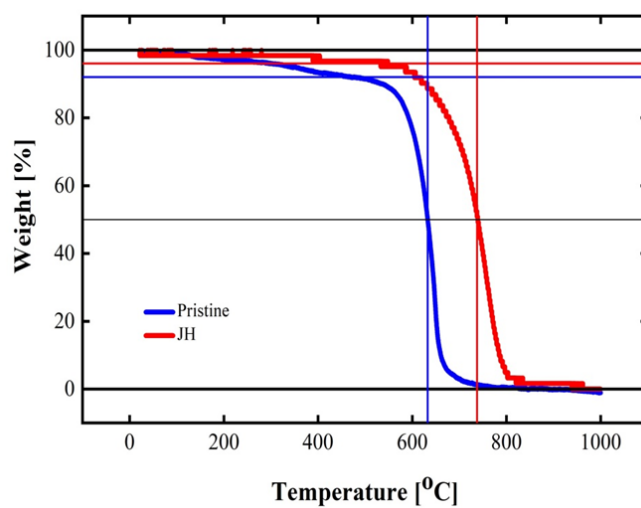


Figure S7: TGA analysis of the FWCNT yarn before and after Joule-annealing.