Supporting Information

Biomass-derived lightweight SiC aerogels for superior thermal insulation

Chunxue Zheng,[a, b] Xinyang Li,*[a, b] Jie Yu,*[a] Zhulin Huang,[a, b] Ming Li,[a, b] Xiaoye Hu*[a, b] and Yue Li [a, c]

[a] Key Laboratory of Materials Physics and Anhui Key Laboratory of Nanomaterials and Nanotechnology, Institute of Solid State Physics, HFIPS, Chinese Academy of Sciences, Hefei, 230031, China

[b] University of Science and Technology of China, Hefei 230026, China

[c] Tiangong University, Tianjin, 300387, China

* Corresponding authors

Email: xyli@issp.ac.cn, yujie@issp.ac.cn, hxy821982@issp.ac.cn

Table:

Table S1. The density of SiC aerogels synthesized with different concentrate of Si source.

Sample	SNWAs-1	SNWAs-2	SNWAs-3	SNWAs-4	SNWAs-5
Density (mg/cm^3)	36±4	44±5	52±4	57±4	65±7

Figures:

Fig. S1. Optical images of freeze-dried eggplants, BCTs and SNWAs (from left to right).

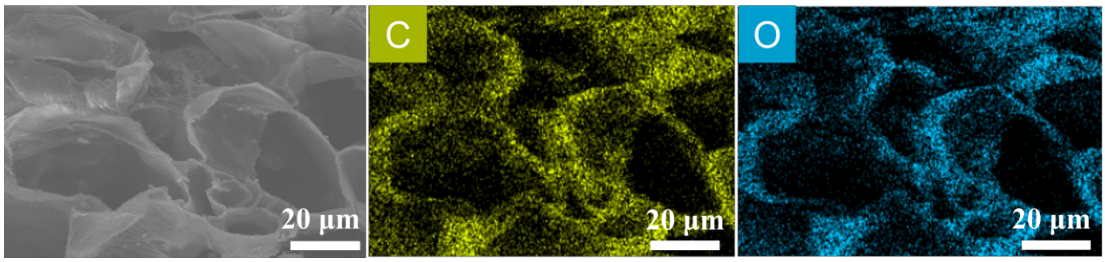

Fig. S2. SEM image and corresponding elemental mapping images for C and O elements.

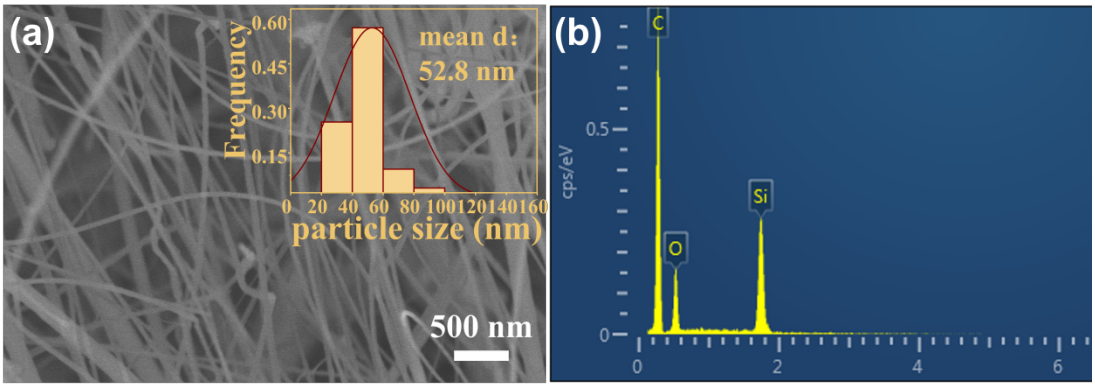

Fig. S3. (a) SEM image of SNWAs-3, (inset) corresponding size distribution for SiC nanowires and (b) corresponding EDS.

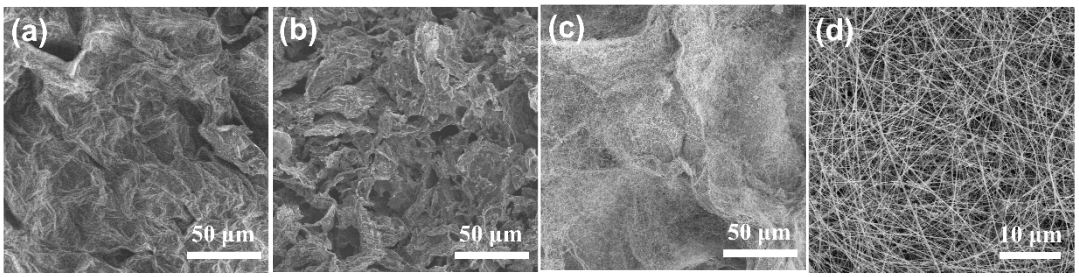

Fig. S4. (a, b) SEM images of freeze-dried (a) and carbonized (b) eggplant. (c, d) SEM images for SNWAs-3.

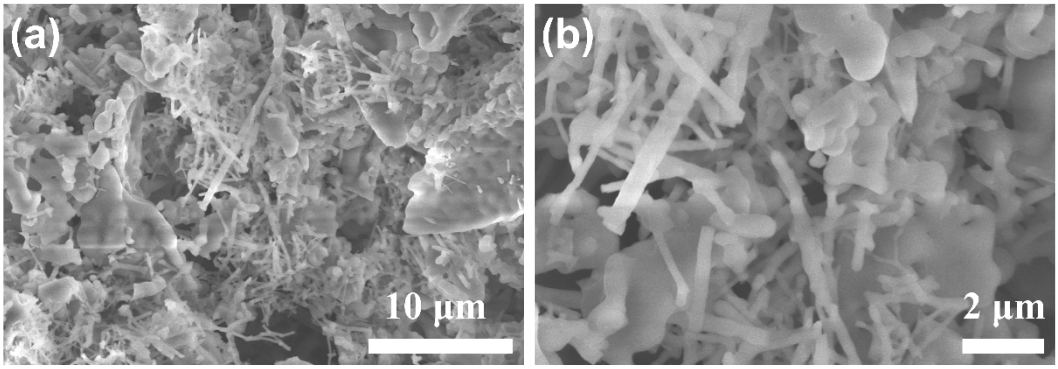

Fig. S5. SEM images of SNWAs-5 after thermal treatment at 1200 °C for 2 h in air.

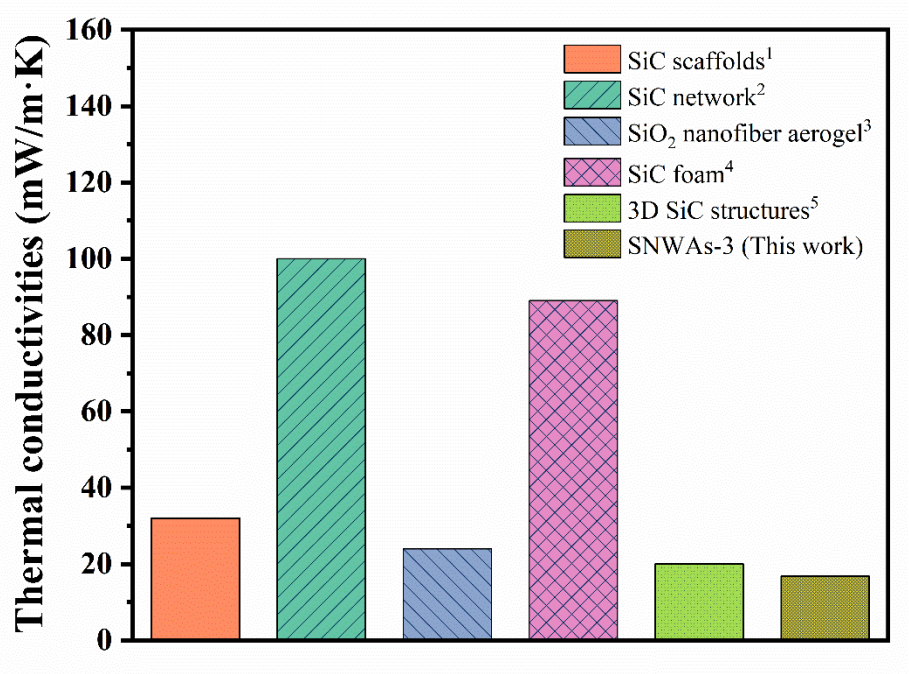

Fig. S6. Comparison of the thermal conductivity of the SNWAs-3 with other recently-reported SiC- and SiO_2-based materials.[1-5]

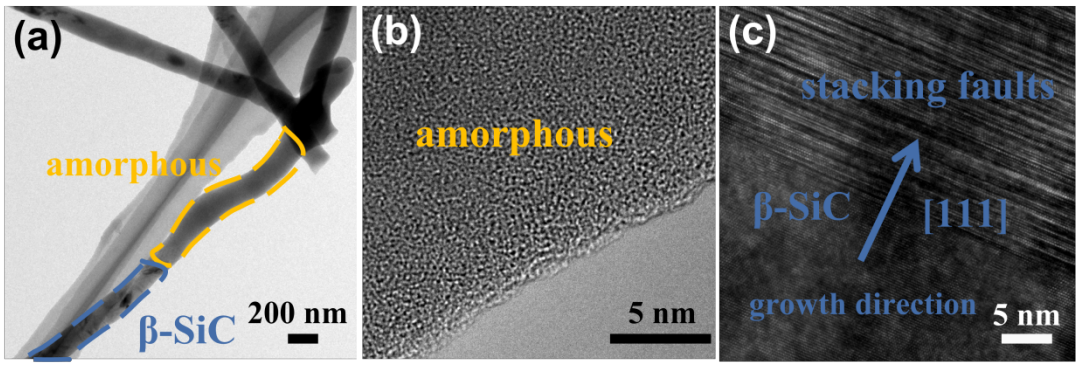

Fig. S7. (a, b) TEM image of SNWAs-3 (a) and amorphous SiO_2 on SNWAs-3 (b) after thermal treatment at 1200 °C for 2 h in air. (c) HRTEM image of SiC on the SNWAs-3.

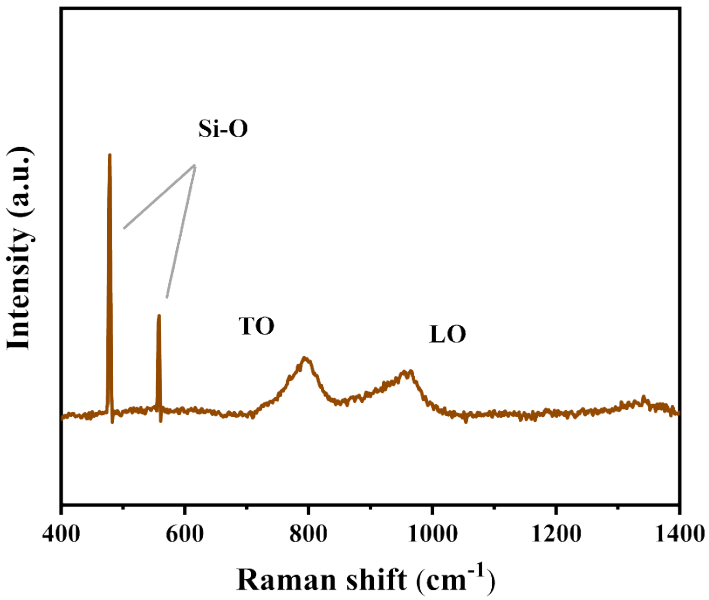

Fig. S8. Raman spectrum of the SNWAs-3 after thermal treatment at 1200 °C for 2 h in air.

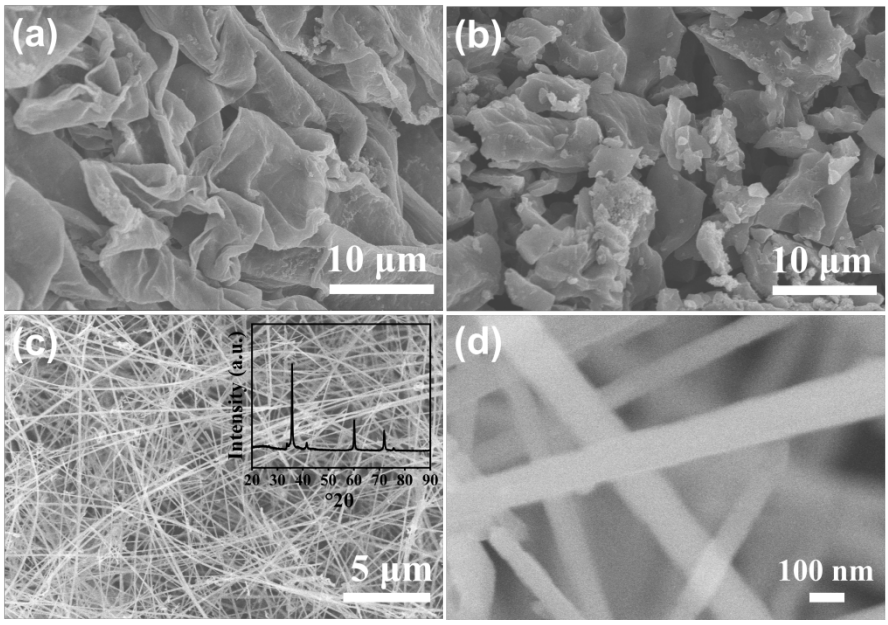

Fig. S9. (a, b) SEM images of freeze-dried (a) and carbonized (b) Pleurotus eryngii Fungus. (c) SEM image and corresponding XRD pattern (inset) for Pleurotus eryngii Fungus-derived SiC nanowire aerogels. (d) Enlarged SEM image for Pleurotus eryngii Fungus-derived SiC nanowire aerogels.

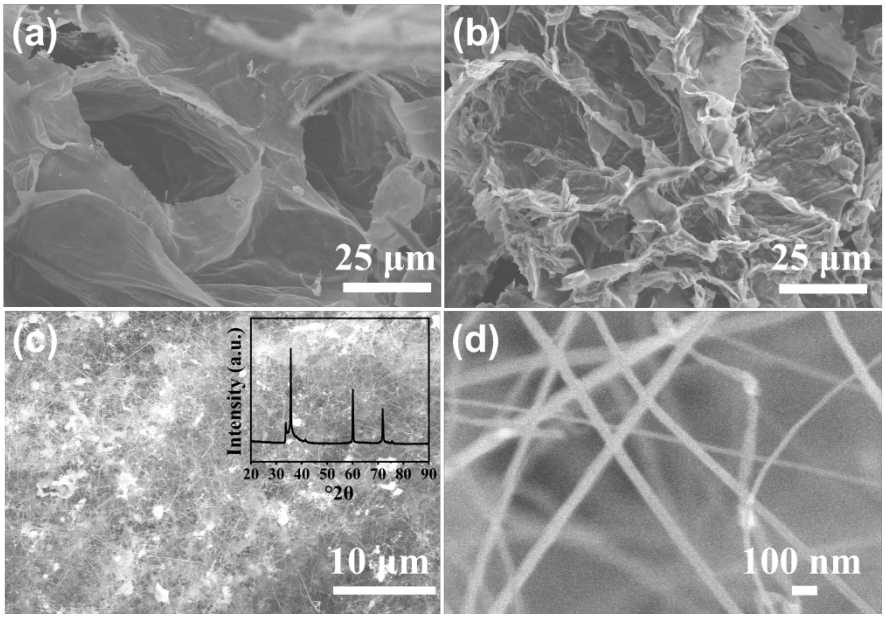

Fig. S10. (a, b) SEM images of freeze-dried (a) and carbonized (b) gourd. (c) SEM image and corresponding XRD pattern (inset) for gourd-derived SiC nanowire aerogels. (d) Enlarged SEM image for gourd-derived SiC nanowire aerogels.

References

1. Y. Chen, O. Ola, G. Liu, L. Han, M. Z. Hussain, K. Thummavichai, J. Wen, L. Zhang, N. Wang, Y. Xia and Y. Zhu, *J. Eur. Ceram. Soc.*, 2021, **41**, 3970-3979.
2. C. Ferraro, E. Garcia-Tuñon, V. G. Rocha, S. Barg, M. D. Fariñas, T. E. G. Alvarez-Arenas, G. Sernicola, F. Giuliani and E. Saiz, *Adv. Funct. Mater.*, 2016, **26**, 1636-1645.
3. F. Wang, L. Dou, J. Dai, Y. Li, L. Huang, Y. Si, J. Yu and B. Ding, *Angew. Chem. Int. Ed.*, 2020, **59**, 8285-8292.
4. S. Vijayan, P. Wilson, R. Sreeja and K. Prabhakaran, *Mater. Lett.*, 2017, **194**, 126-129.
5. S. Chabi, V. G. Rocha, E. García-Tuñón, C. Ferraro, E. Saiz, Y. Xia and Y. Zhu, *ACS Nano*, 2016, **10**, 1871-1876.