Response to the Reviewer #1’s Comments

1. English is very poor, should be edited professionally.

We have revised the English language throughout the manuscript by a native speaker. The revised places have been marked by blue color in the manuscript.

2. Optical microscopy images shown do not provide any morphology insights.

We agreed with the reviewer that the optical microscopy images do not provide any morphology insights. However, we just show them to reveal the distribution of the pores in the composites. Due to the large difference between the size of the SiC nanowires (about sub-micron) and pores (about 20 μm), it is difficult to shown them both clearly in the same image. Sorry we did not state it clear in our manuscript. We have revised the manuscript in Line 105-109 as:

“Due to the large difference between the size of the SiC nanowires (about sub-micron) and pores (about 20 μm), it is difficult to shown them both clearly in the same image. In order to shown the effect of the extrusion treatment on the distribution of pores in the composites, optical morphologies of SiCnw/2024Al composite extruded at different temperature have been shown in Fig.3.”

3. SEM images (Fig 3, 4) shown do not provide any evidence that the rod-like structures shown are SiC nanowires. The morphology is always different, no EDX mapping was performed to confirm

We have added the elements distribution of the Al, Si and C in revised Fig.5. we also added the discussion on the EDX analysis results in Line 136-142 as:

“In order to reveal the distribution of the SiC nanowires in the composites, EDX mapping has been performed, and the distribution of the Al, Si and C elements have been shown in Fig.5. Due to the accuracy of the EDX, the distribution of C element was not very reliable. However, the distribution of Si element was very clear, as shown in Fig.5c. Due to the low content of Si element in 2024Al matrix, the distribution of Si, mainly in morphology of rod-like, could be considered to be equivalent to distribution of SiC nanowires. It also well agreed with our previous research work [15, 17] and literature results [11, 14].
Figure 5. EDX mapping of the polished SiCnw/2024Al composite. (a) SEM image and corresponding distribution of (b) Al, (c) Si and (d) C, respectively.

4. Same applies to TEM images (Fig 9). The authors claim that the hexagonal particles indicated by arrows are perpendicularly oriented SiC nanowires. This is simply not true. What I see in these images are flat platelets of regular and irregular morphology, which have nothing to do with the nanowires.

Sorry for the confusion. We have revised the manuscript and added more discussion on the TEM results. The presence of the SiC nanowires was further confirmed by the selected area electron diffraction (SAED) patterns, as shown in the revised Fig. 12b.

Figure 12. The TEM microstructure of extruded SiCnw/2024Al composite after annealing. (a) Low magnification image, (b) SAED patterns of the SiC nanowire in the dashed circle and (c) SiC nanowires located at the boundaries of Al grains, (d) Few non-directional SiC nanowires.
Moreover, in our previous research work (R. Dong, W. Yang, P. Wu, M. Hussain, Z. Xiu, G. Wu, P. Wang. Microstructure characterization of SiC nanowires as reinforcements in composites, Mater. Charact. 2015, 103, 37–41), the cross-section and axial microstructure of the SiC nanowires embedding into Al matrix have been investigated, and it has been found that the SiC nanowires were composed of a large number of small fragments that are formed by hybrid 3C-SiC and 2H-SiC structures. Therefore, their SAED patterns were composed of two sets of diffraction patterns, corresponding to 2H-SiC and 3C-SiC, respectively, which agreed well with the present observation. The corresponding results have been cited to shown below:

Fig. 4 The microstructure characterization of SiC nanowires perpendicular to their axial direction. (a) Cylindrical SiC nanowires; (b) Bamboo shaped SiC nanowires; (c) and (d) Selected area electron diffraction patterns of cylindrical (Fig. 4a) and bamboo shaped (Fig. 4b) nanowires, respectively. (e) The superposition of the simulated diffraction patterns of 2H-SiC along [2̅1̅0] zone axes (blue spots) and 3C-SiC along [011] zone axes (red spots).

Fig. 5 The cross-section microstructure characterization of SiC nanowires. (a) Cylindrical type SiC nanowires; (c) Bamboo shaped SiC nanowires; (b) and (d) Selected area electron diffraction patterns of cylindrical (Fig. 5a) and bamboo shaped (Fig. 5c) nanowires, respectively. (e) The superposition of the simulated diffraction patterns of 2H-SiC along [0001] zone axes (blue spots) and 3C-SiC along [111] zone axes (red spots).
We have also added the discussion in the manuscript from Line 228 to 233 as:

“In our previous research work [37], the cross-section and axial microstructure of the SiC nanowires embedding into Al matrix have been investigated, and it has been found that the SiC nanowires were composed of a large number of small fragments that are formed by hybrid 3C-SiC and 2H-SiC structures. Therefore, their SAED patterns were composed of two sets of diffraction patterns, corresponding to 2H-SiC and 3C-SiC, respectively, which agreed well with the present observation.”

5. The authors have failed to obtain statistically significant data as evidenced by graphs in Fig 2, 5, 8

Thanks for the suggestion. We have revised the Fig.4 (former Fig.2) and Fig.14 (former Fig.8) and added the statistically significant data in the figures.

**Figure 4.** Effect of extrusion temperature on the relative density of the SiCnw/2024Al composite.

**Figure 14.** The detailed comparison of the yield and tensile strength of the SiCnw/2024Al composite.

Regarding the former Fig.5, it is very sorry that we have not stated clearly about the data of “the average length of SiC nanowires.” We measured the length of the SiC nanowires from SEM images, while the corresponding length would be counted by the Nano Measurer software. After statistical analysis, the normal distribution of the SiC nanowires’ length could
be given by the software, as shown in Fig.7b, and the average length of SiC nanowires is already the statistical results. We have added the process in Line 160 to 162 as:

“eventually the length of the SiC nanowires has been counted by the Nano Measurer software. After statistical analysis, the normal distribution of the SiC nanowires’ length could be given by the software, as shown in Fig.7b.”

We also revised the Fig.7 to make it clearer as:

![Graph](image)

**Figure 7.** Microstructure of SiCnw/2024Al composite extruded at 560°C after etched by 10% NaOH solution for 480s and corresponding statistical results of the SiC nanowires’ length. (a) Microstructure, (b) Statistical results.

6. Overall, the message of this paper is very poor, novelty is questionable. This is a technical reports which will not secure any wider interest.

We are sorry that confused information in our previous manuscript misled the reviewer. We have revised the manuscript and added more data and discussion, as stated in above.

Regarding the novelty, SiC nanowires reinforced Al matrix composites have been widely investigated due to the high specific strength and modulus recently. However, the effect of the extrusion temperature on the SiCnw/Al composites, which with high strength and high aspect ratio reinforcement (more than 50), has not been investigated. Our work revealed the effect of the extrusion temperature on the the microstructure evolution and mechanical properties of the SiCnw/2024Al composites, and the corresponding mechanism has been discussed. These results are original and would be helpful for the design of high strength Al matrix composites.