

Fig. S1 The SEM photos of the aligned nanofibers prepared from spinning solutions with different PVP mass fractions of 3.8%(a), 3.9%(b), 4.3%(c), 4.6%(d) and 5.0%(e).

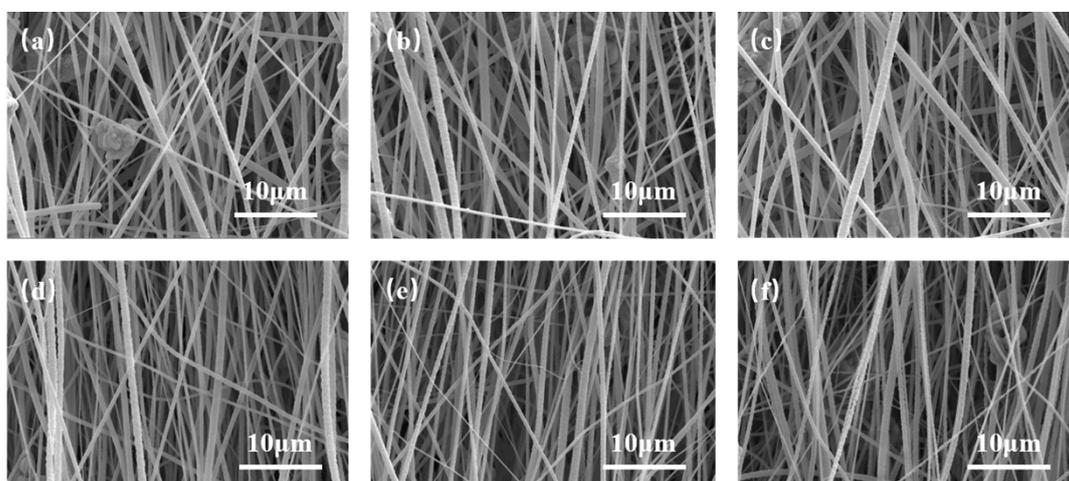


Fig. S2 The SEM photos of the aligned nanofibers prepared under different collecting speeds of 1000 rpm (a), 1100 rpm (b), 1200 rpm (c), 1300 rpm (d), 1400 rpm (e) and 1500 rpm (f).

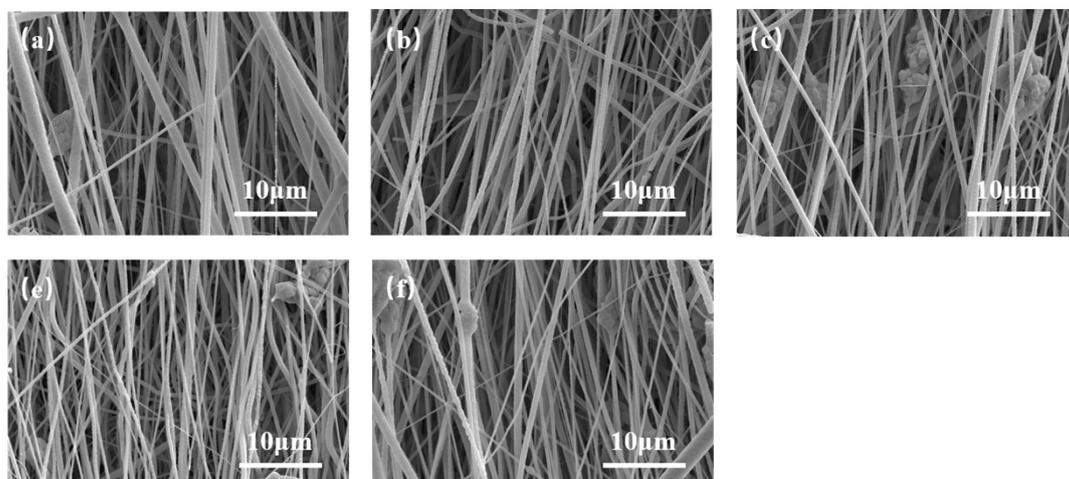


Fig. S3 The SEM photos of the aligned nanofibers prepared with different collecting distances of 15.0cm (a), 15.6cm (b), 16.0cm (c), 16.3cm (d) and 17cm (e).

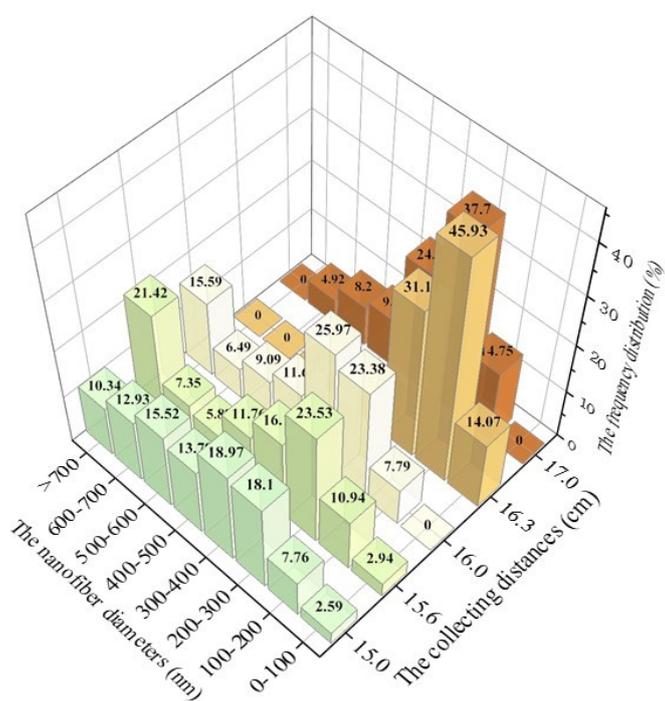


Fig. S4 The frequency distribution of the nanofibers' diameters in different collecting distances.

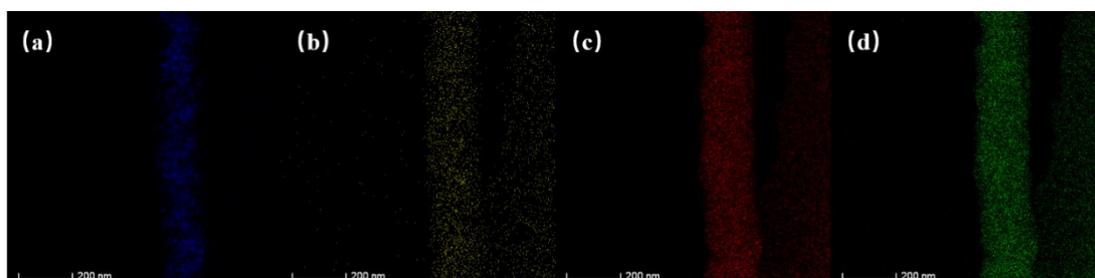


Fig. S5 The EDS mapping of elements Si (a), O (b), C (c), N (d) of the N3 sample.

Tab. S1 The change of the Gibbs free energy ΔG for the Eq. (1-3) at different temperatures.

| $\Delta G/J$ | 1300 °C | 1400 °C | 1500 °C | 1600 °C |
|--------------|-----------|-----------|-----------|-----------|
| Reaction (1) | -648672.8 | -660936.1 | -673497.5 | -686389.5 |
| Reaction (2) | -489727.3 | -473637.9 | -458011.9 | -442868.8 |
| Reaction (3) | -291948.1 | -278125.3 | -264781.0 | -251938.7 |

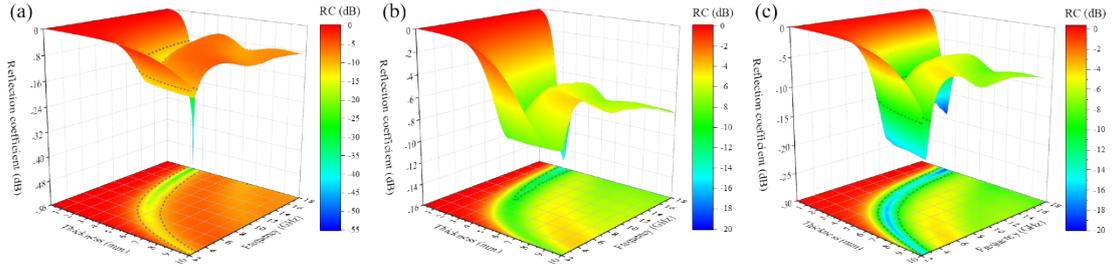


Fig. S6 The 3D images of the reflection coefficient of the aligned Si-C-N nanofibers composites S1(a), S2(b) and S3(c).

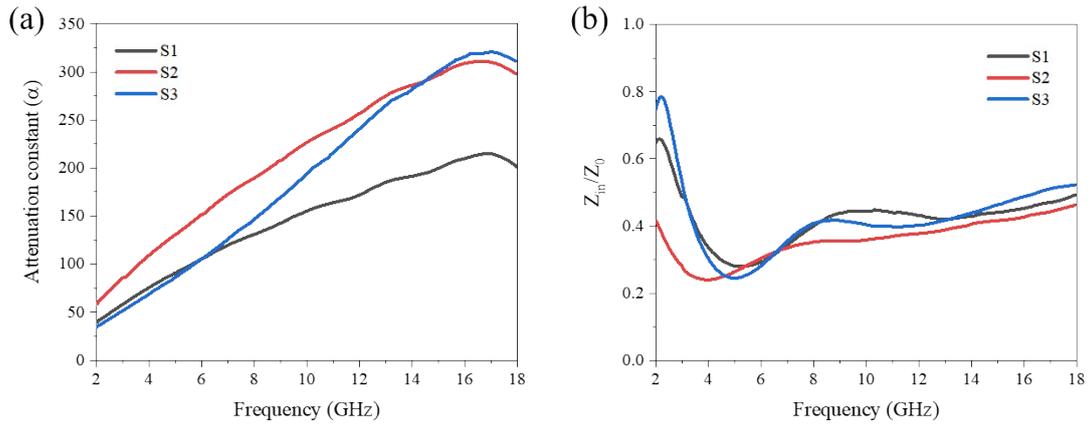


Fig. S7 The curves of the attenuation constant (a) and the Z_{in}/Z_0 (b) along of the aligned Si-C-N nanofibers composites S1, S2 and S3.

Tab. S2 The carrier concentration and resistivity in both radial and axial direction of the aligned Si-C-N nanofibers N1, N2 and N3.

| Samples | Radial direction | | | Axial direction | | |
|--|------------------|---------|---------|-----------------|---------|---------|
| | N1 | N2 | N3 | N1 | N2 | N3 |
| Carrier concentration (cm^{-3}) | 1.64E16 | 3.42E16 | 1.84E16 | 2.80E16 | 5.37E16 | 3.16E16 |
| Resistivity ($\Omega \cdot \text{cm}$) | 13.75 | 4.31 | 10.22 | 5.94 | 2.17 | 4.36 |