Supplementary information

Graphene Aerogel Induced Anisotropic Electrical Conductivity in Polymer Derived Ceramics

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RGO Density (mg/mL)	Specific Surface Area (m^2/g)
10	407
20	185
30	159
40	142

Table S1. Specific surface area of rGO aerogels with different rGO density.

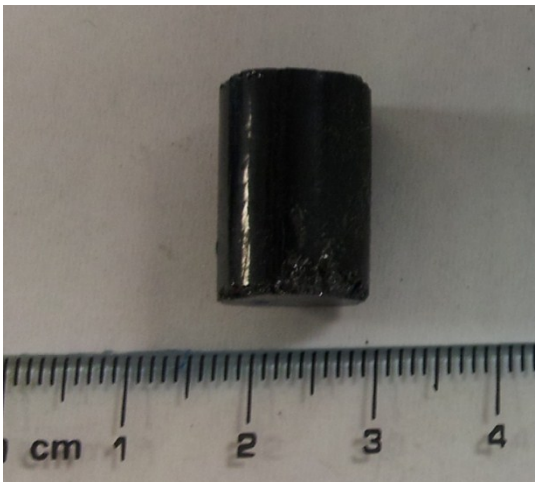

Fig. S1 A picture of bulk SiCN/rGOA composite.

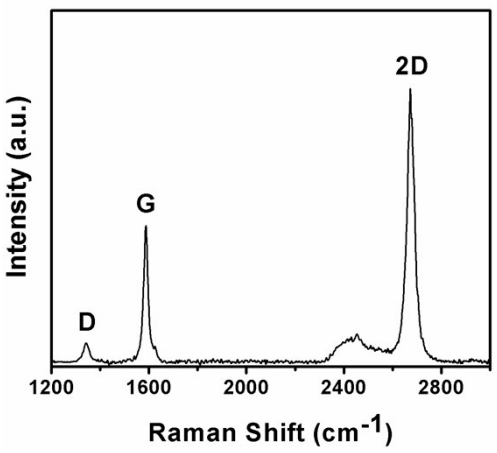

Fig. S2 Raman spectrum of single layer graphene transferred onto a quartz slide.

The quality of CVD graphene transferred onto quartz slides was verified by using Raman spectroscopy. The characteristic peaks of graphene, namely the G band (1587 cm^{-1}), the 2D band (2673 cm^{-1}), and the D band (1343 cm^{-1}) are labeled in Figure S5. The intensity ratio between the 2D band and G band is 2.0.[2, 3] In addition, the D band which corresponds to defects in graphene only shows a small intensity, verifying the high quality of the graphene.[4, 5]

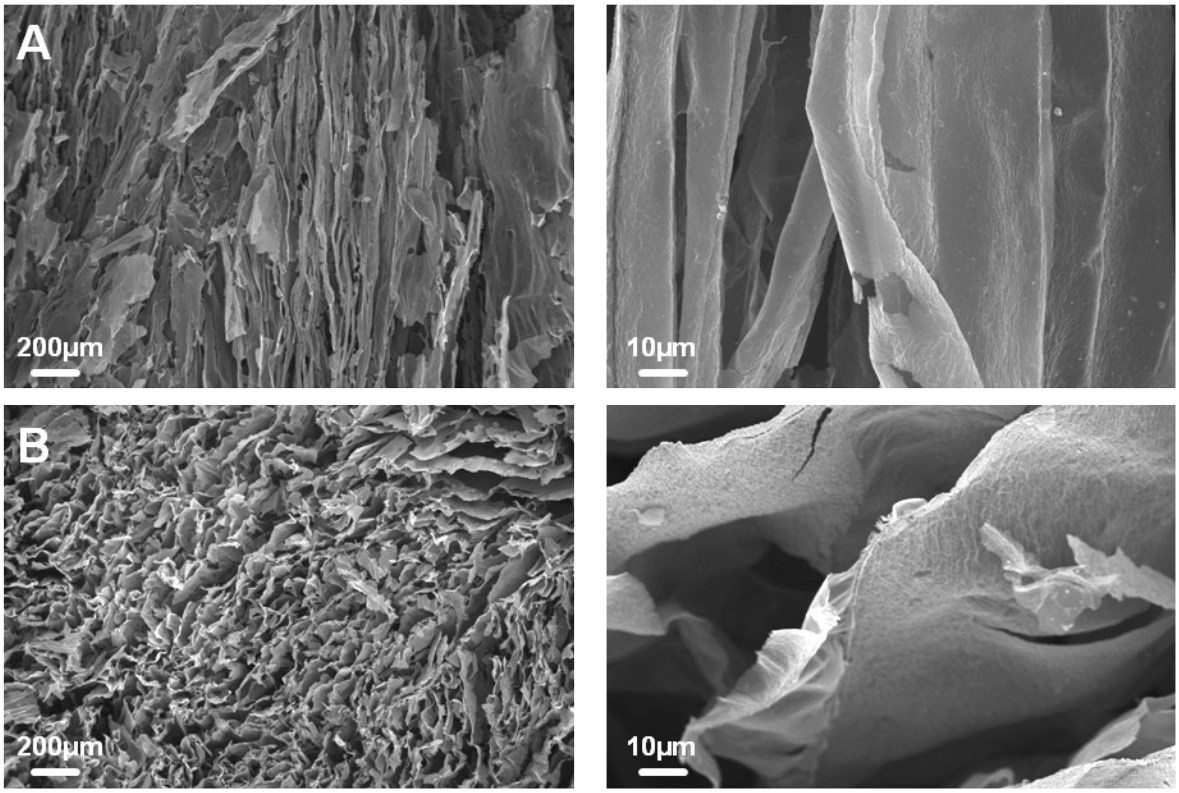

Fig. S3 SEM images of longitudinal (A) and transversal (B) section of 30mg/mL rGO aerogel.

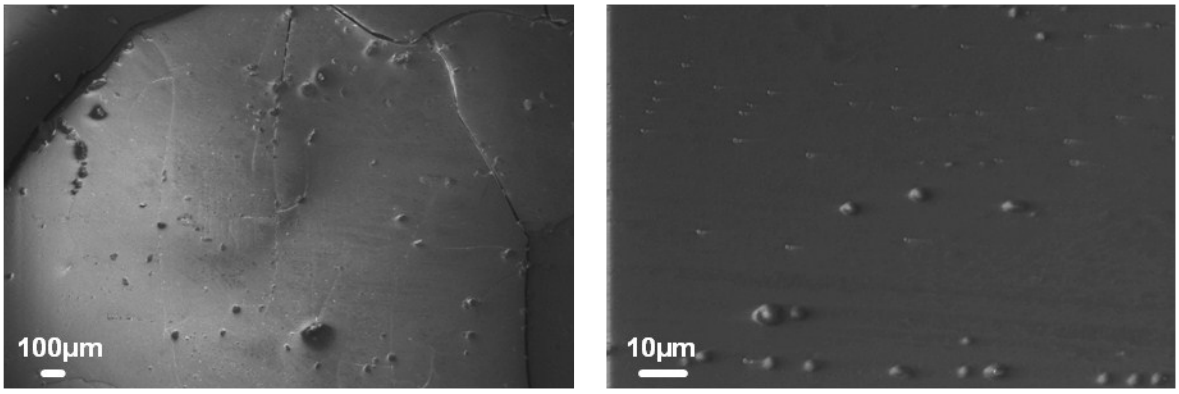

Fig. S4 SEM images of SiCN ceramic surfaces at low (left) and high (right) magnification.

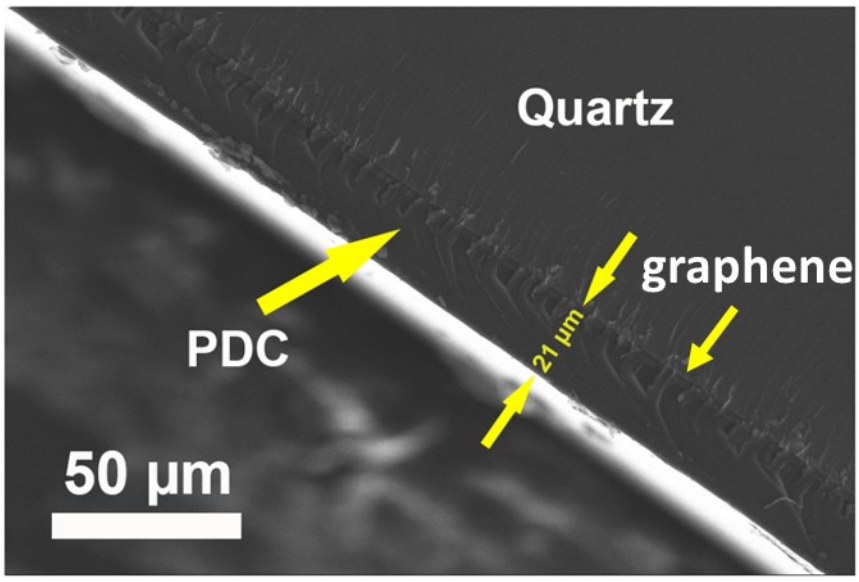

Fig. S5 The SEM image of a SiCN film on graphene embedded between PDC and quartz slide.

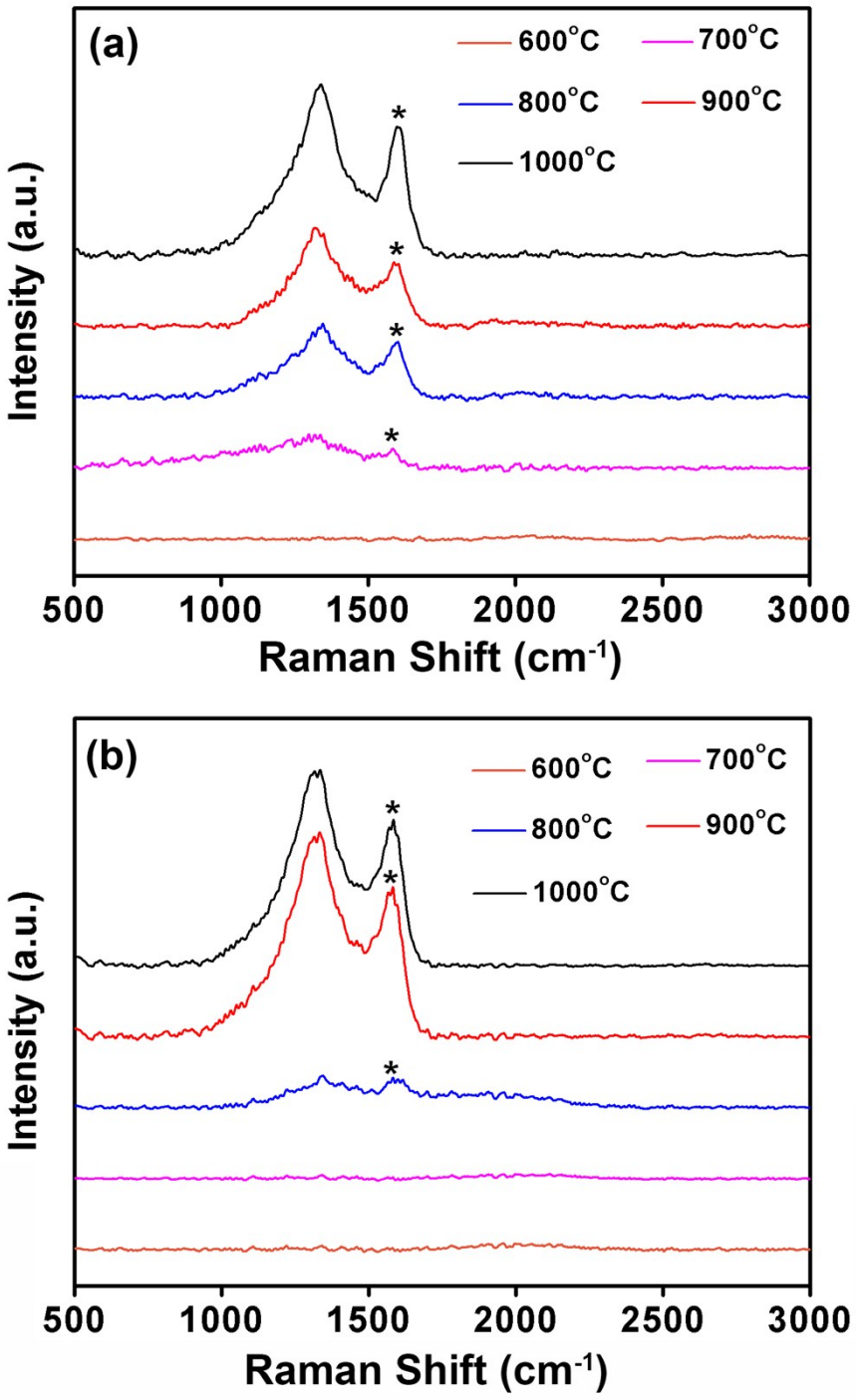

Fig. S6 Raman spectra of (a) PDC on graphene coated quartz slides after pyrolysis conducted at different temperatures (600 °C, 700 °C, 800 °C, 900 °C, and 1000 °C) and (b) PDC on quartz slides after pyrolysis conducted at different temperatures (600 °C, 700 °C, 800 °C, 900 °C, and 1000 °C). All G band positons are labeled by asterisks.

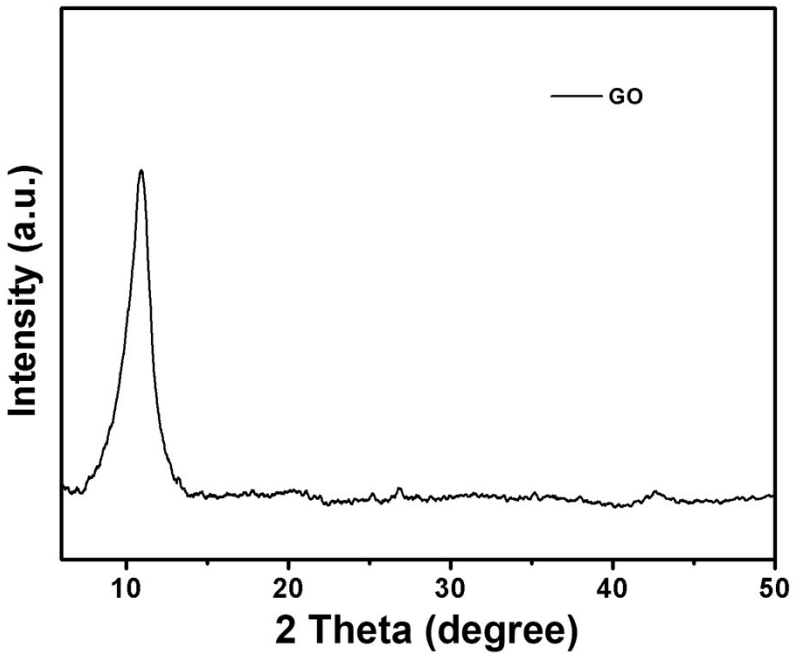

Fig. S7 XRD spectra of GO.

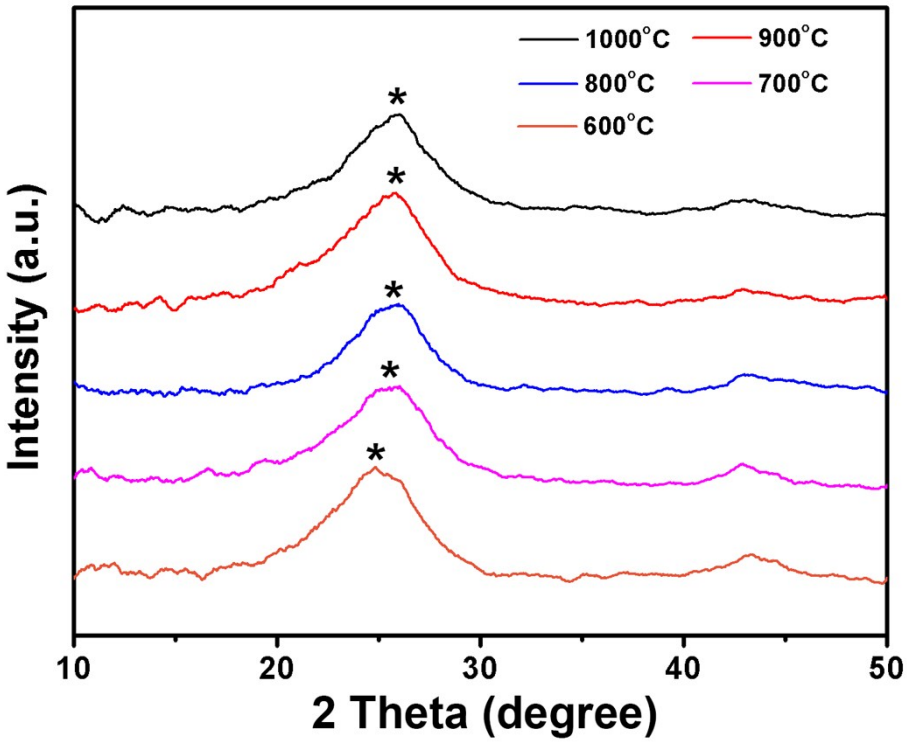

Fig. S8 XRD spectra of GO pyrolyzed at different temperatures.

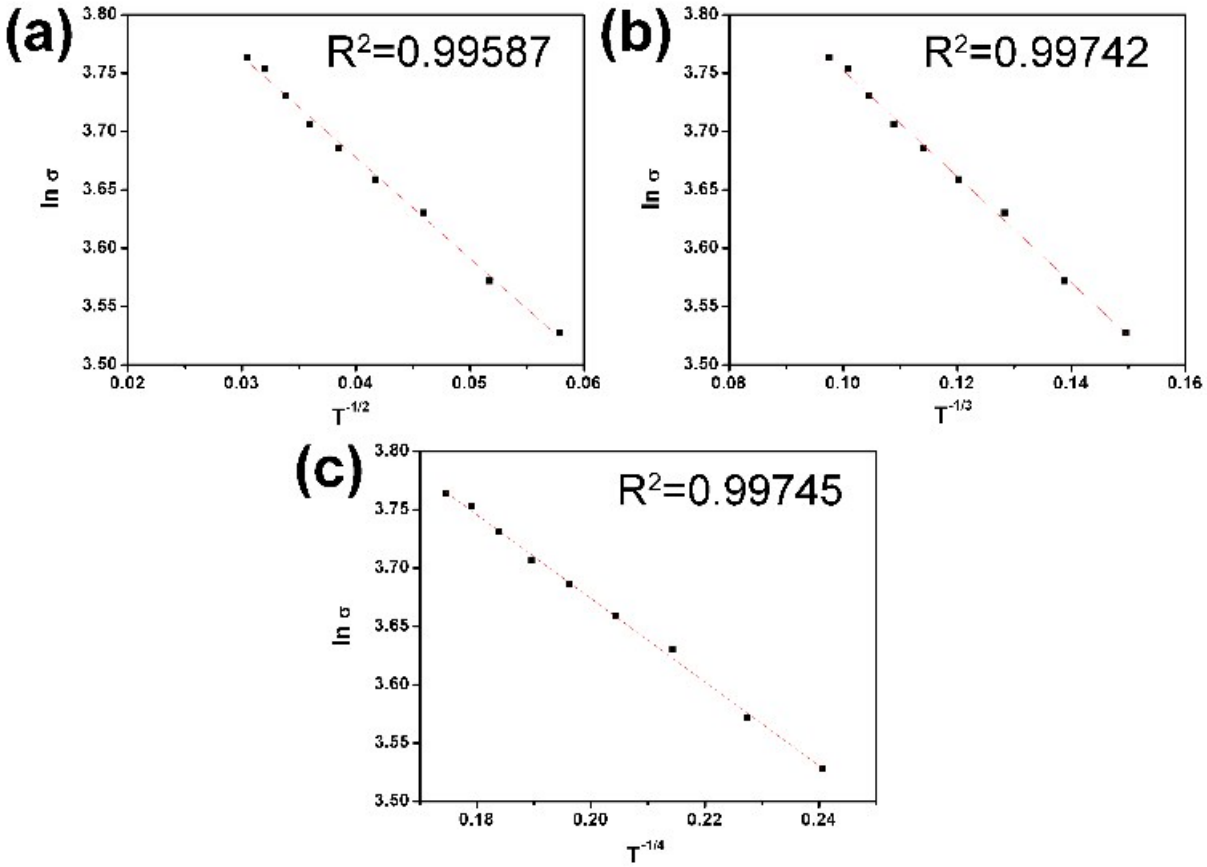

Fig. S9 Fitting the relationship between conductivity and temperature to the function of (a) $\sigma \propto T^{-1/2}$, (b) $\sigma \propto T^{-1/3}$, (c) $\sigma \propto T^{-1/4}$, respectively.

REFERENCES

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