

## Supplemental Information

### Highly flexible, erosion resistant and nitrogen doped hollow SiC fibrous mats for high temperature thermal insulators

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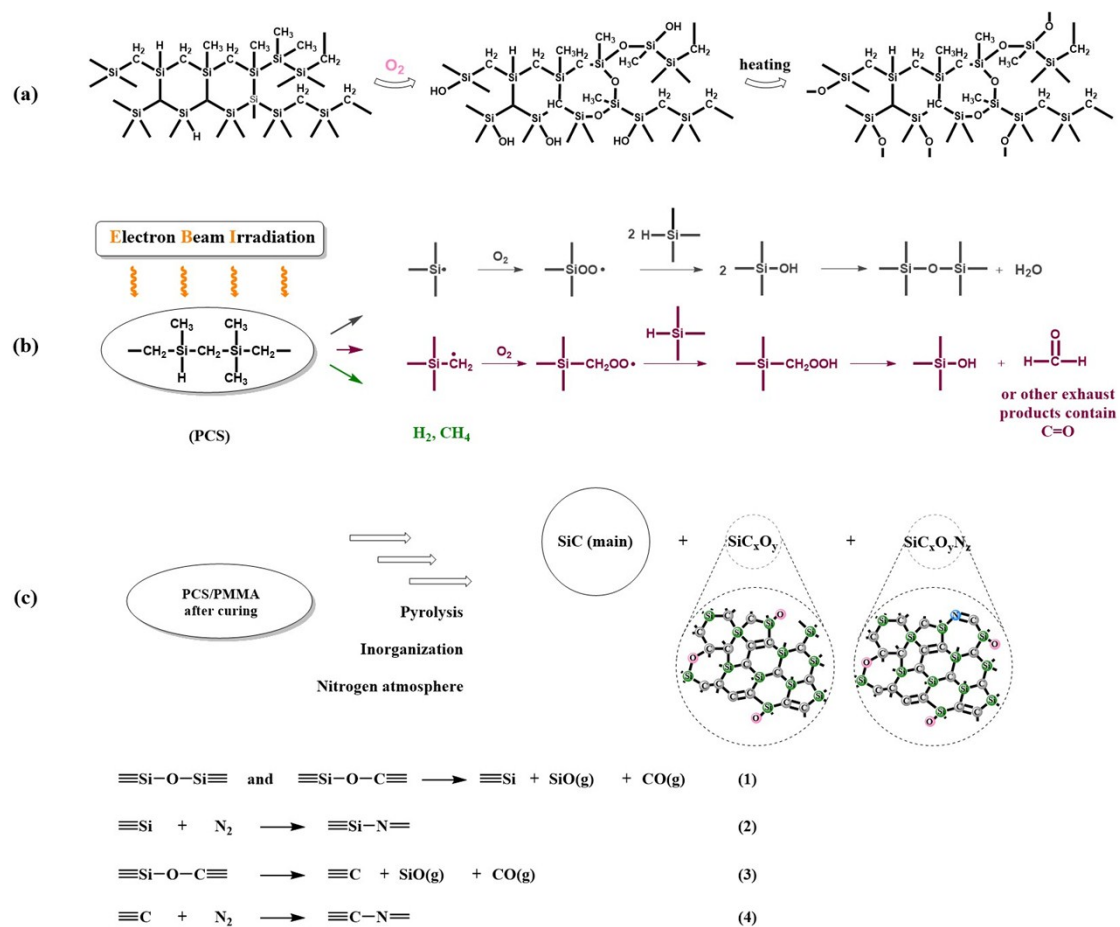


Fig. S1 The main reaction mechanisms during the (1) thermal curing process, (2) EBI curing process and (3) pyrolysis process of PCS.

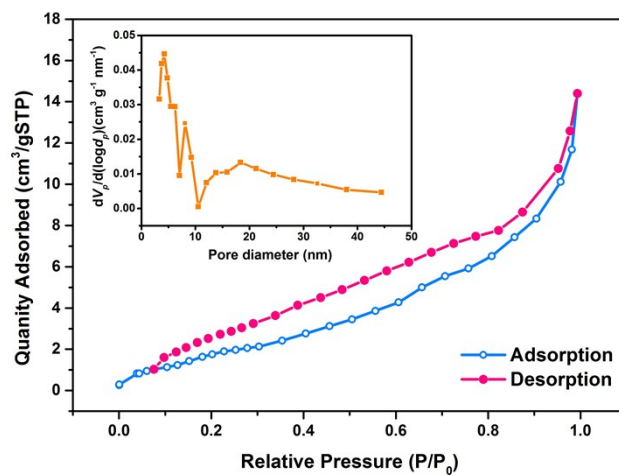


Fig. S2 Nitrogen adsorption–desorption isotherms and the corresponding pore size distribution calculated using adsorption branch of the BJH algorithm for NHSiC-1500 fibrous mats.

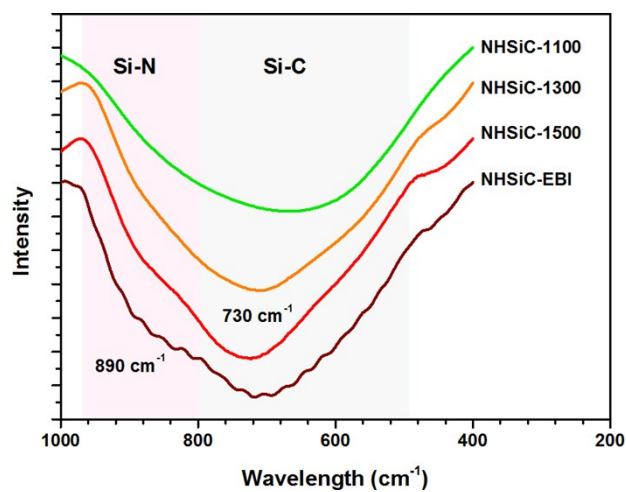


Fig. S3 The magnification of the FTIR spectra between 1000  $\text{cm}^{-1}$  and 400  $\text{cm}^{-1}$ .

Table S1. The atomic analysis of NHSiC-1100, 1300, and 1500 fibers from XPS spectra.

Samples	Atomic %			
	C1s	N1s	O1s	Si2p
NHSiC-1100	54.20	1.33	12.90	31.57
NHSiC-1300	53.54	3.21	12.07	31.18
NHSiC-1500	49.05	8.55	11.48	30.92
NHSiC-EBI	52.05	9.48	7.34	31.14

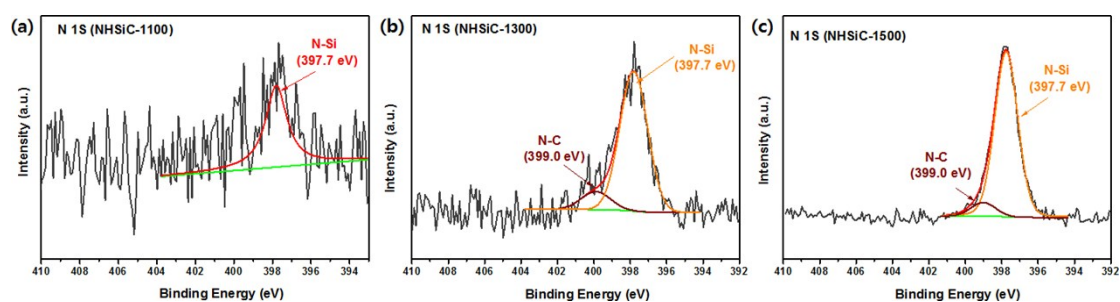


Fig. S4 XPS spectra of N 1s analysis of NHSiC-1100, 1300, and 1500 fibers.

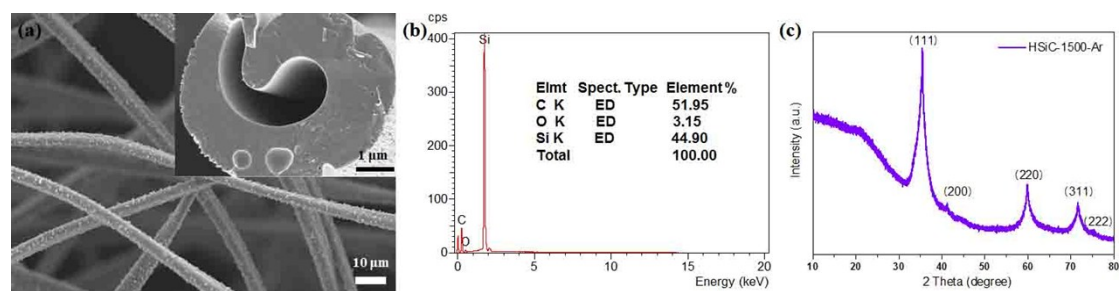


Fig. S5 SEM images, EDX, and XRD patterns of HSiC-Ar fibers

Table S2. Thickness, bulk density, thermal conductivities, thermal diffusivities and specific heats of NHSiC-1500, NHSiC-EBI and HSiC-Ar fibers

Samples	Thickness (mm)	Bulk density (g/cm <sup>3</sup> )	Skeletal density (g/cm <sup>3</sup> )	Temp (°C)	Specific heat (J/g/K)	Thermal diffusivity (mm <sup>2</sup> /s)	Thermal conductivity (W/mK)
NHSiC-1500	0.572	0.218	2.487	25	0.548	0.121	0.014
				150	0.641	0.137	0.019
				300	0.682	0.161	0.024
				450	0.689	0.199	0.030
				600	0.704	0.252	0.039
NHSiC-EBI	0.621	0.216	2.456	25	0.563	0.130	0.016
				150	0.663	0.142	0.020
				300	0.692	0.173	0.026
				450	0.710	0.228	0.035
				600	0.725	0.266	0.042
HSiC-Ar	0.552	0.191	2.251	25	1.772	0.407	0.138
				150	2.101	0.391	0.157
				300	2.158	0.395	0.163
				450	2.252	0.420	0.181
				600	2.287	0.434	0.190