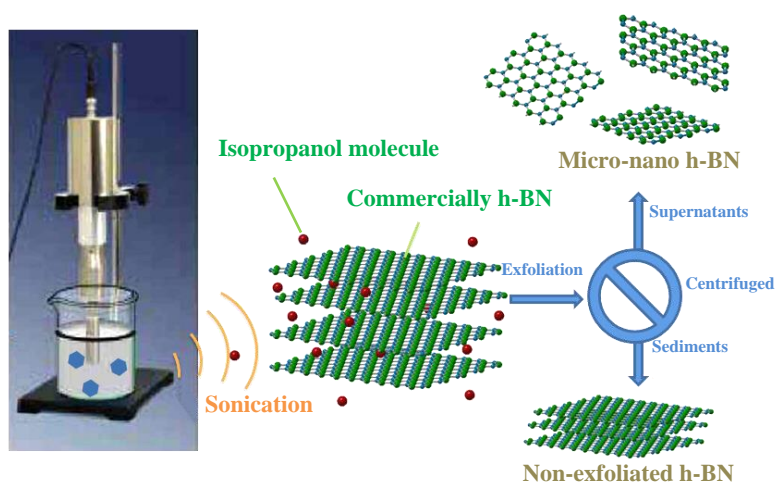
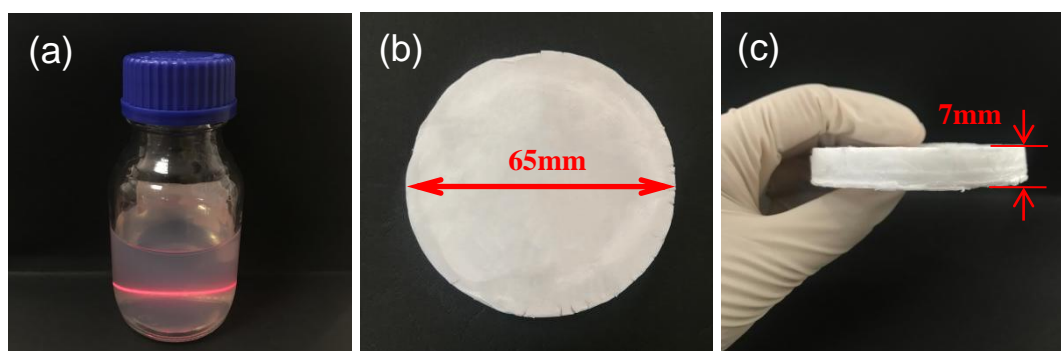


## Supporting Information

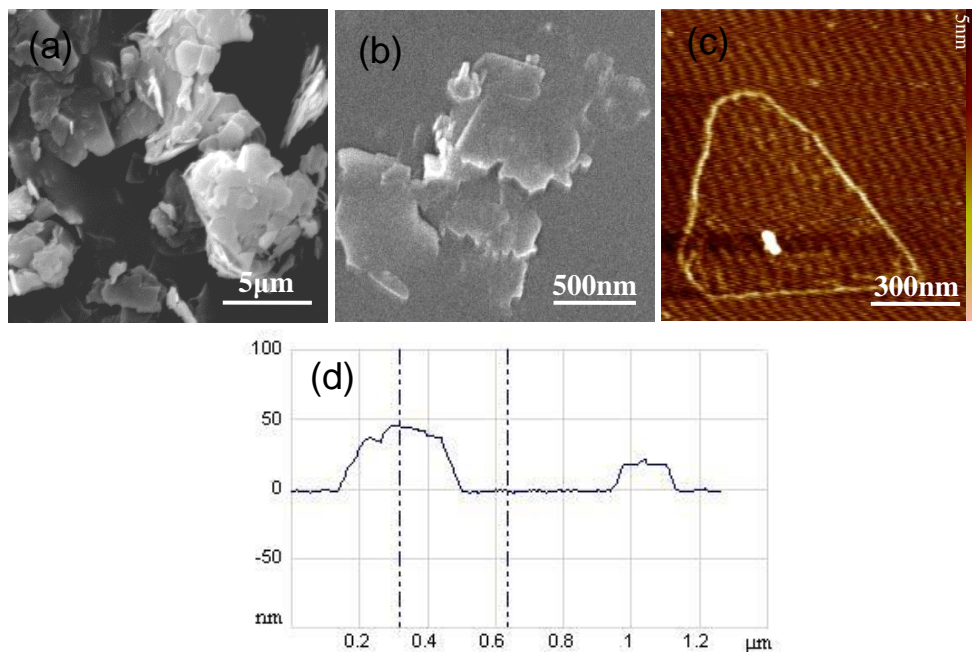
# Aerogel Perfusion-Prepared h-BN/CNF Composite Film with Multiple Thermally Conductive Pathways and High Thermal Conductivity



**Figure S1.** Schematic of exfoliation of h-BN.



**Figure S2.** (a) Tyndall phenomenon of CNF. (b) and (c) Optical photographs of CNF aerogel, red arrows indicated the diameter and the thickness of the CNF aerogel were 65 mm and 7mm.



**Figure S3.** (a) SEM image of commercially h-BN. (b) SEM image of exfoliated h-BN. (c) AFM topographic image of exfoliated h-BN. (d) The corresponding height distribution measured from AFM topographic data from Figure 2f.

**Table S1.** Comparing the specific heat, thermal diffusivity and density of h-BN /CNF composite films prepared by different methods (25 °C).

h-BN Content (wt%)	Blended composite film			Aerogel perfusion composite film		
	Specific Heat $\text{J}\cdot\text{g}^{-1}\cdot\text{K}^{-1}$	Thermal Diffusivity $\text{mm}^2\cdot\text{s}^{-1}$	Density $\text{g}\cdot\text{cm}^{-3}$	Specific Heat $\text{J}\cdot\text{g}^{-1}\cdot\text{K}^{-1}$	Thermal Diffusivity $\text{mm}^2\cdot\text{s}^{-1}$	Density $\text{g}\cdot\text{cm}^{-3}$
0	$1.489 \pm 0.001$	$0.268 \pm 0.003$	$1.035 \pm 0.002$	$1.488 \pm 0.002$	$0.268 \pm 0.002$	$1.036 \pm 0.002$
4.79	$1.446 \pm 0.003$	$0.270 \pm 0.003$	$1.076 \pm 0.001$	$1.450 \pm 0.003$	$0.314 \pm 0.003$	$1.088 \pm 0.002$
9.09	$1.414 \pm 0.002$	$0.277 \pm 0.001$	$1.116 \pm 0.001$	$1.411 \pm 0.001$	$0.566 \pm 0.001$	$1.119 \pm 0.001$
13.07	$1.378 \pm 0.003$	$0.302 \pm 0.001$	$1.156 \pm 0.002$	$1.377 \pm 0.001$	$0.664 \pm 0.002$	$1.165 \pm 0.003$
16.67	$1.354 \pm 0.001$	$0.340 \pm 0.002$	$1.193 \pm 0.001$	$1.355 \pm 0.003$	$0.785 \pm 0.001$	$1.197 \pm 0.002$
20.02	$1.289 \pm 0.003$	$0.387 \pm 0.002$	$1.233 \pm 0.002$	$1.284 \pm 0.004$	$0.882 \pm 0.003$	$1.257 \pm 0.001$
23.08	$1.248 \pm 0.004$	$0.425 \pm 0.003$	$1.278 \pm 0.002$	$1.239 \pm 0.002$	$0.931 \pm 0.001$	$1.289 \pm 0.001$