

Supplementary information

Synthesis of porous carbon from cotton using Mg(OH)₂ template for form-stabilized phase change materials with high encapsulation capacity, transition enthalpy and reliability

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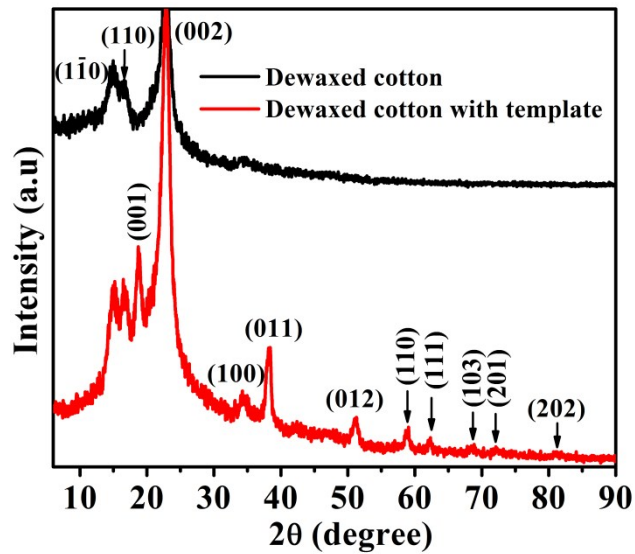


Fig. S1. XRD patterns of dewaxed cotton with and without template before carbonization.

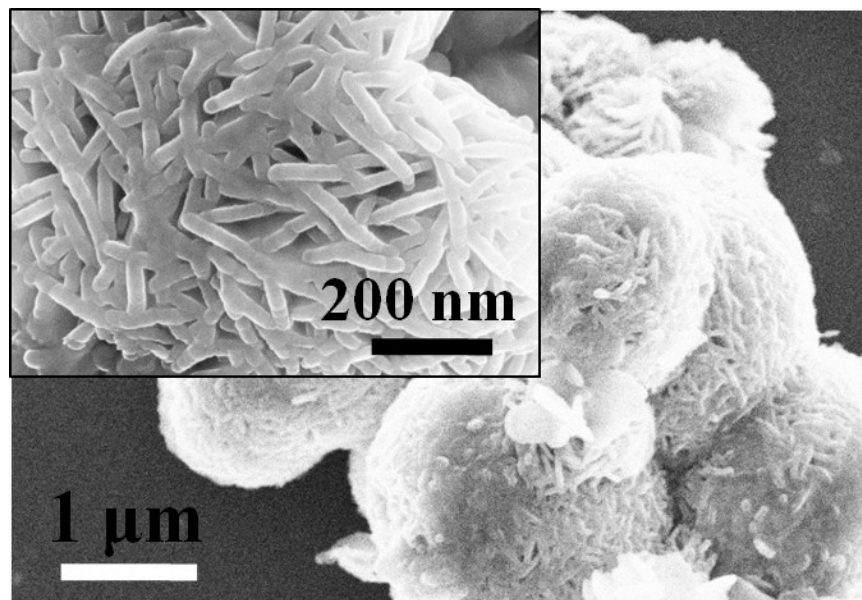


Fig. S2. SEM image of carbon prepared without template at 800 °C.

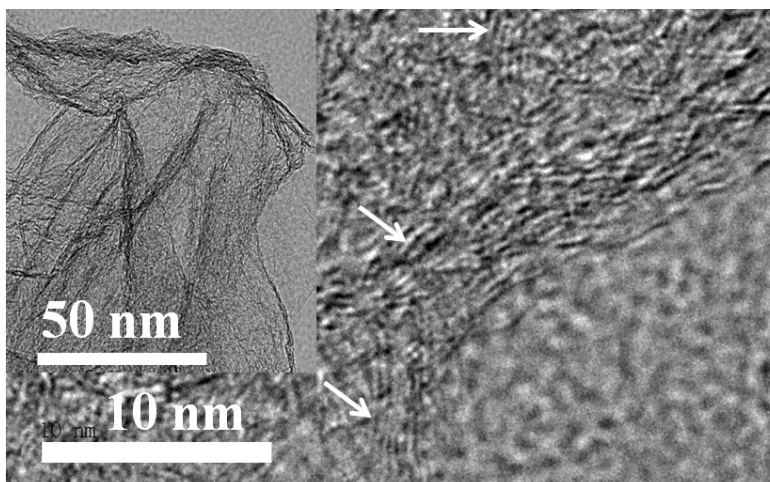


Fig. S3 High-resolution TEM image of PC12. Inset shows the TEM image with different magnification.

Table S3. Textural characteristics of as-prepared carbon materials.

Samples	BET surface area (m ² /g)				Pore volume (cm ³ /g)		
	Micropore	Mesopore	Total	Ratio ^a	Micropore	Mesopore	Total
PC7	229.2	258.7	487.9	0.53	0.14	1.08	1.22
PC8	419.0	298.7	717.7	0.42	0.18	1.40	1.58
PC9	571.8	304.8	876.6	0.34	0.30	1.53	1.83
PC12	301.5	286.2	587.7	0.48	0.16	1.24	1.40

^aRatio of mesopore area to total area.

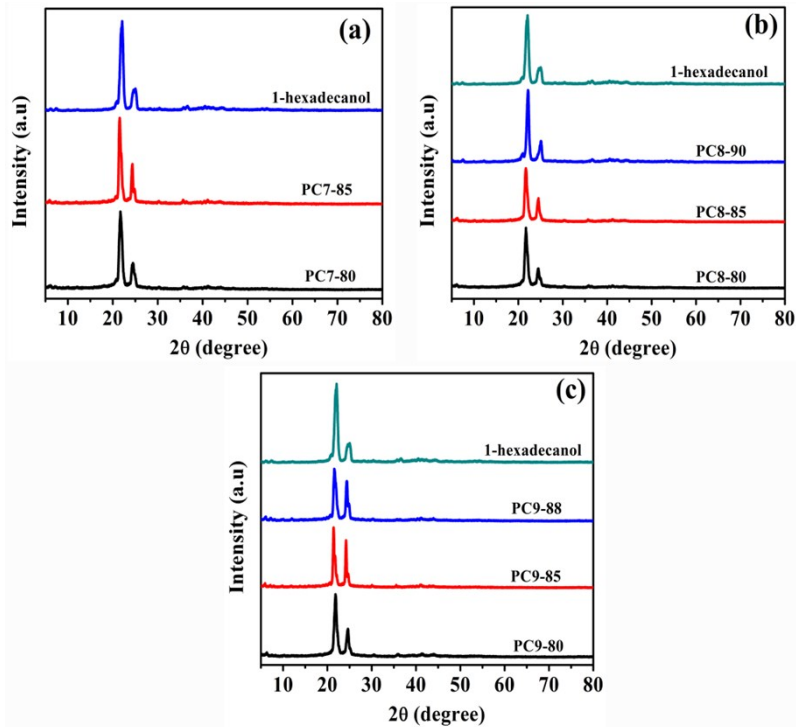


Fig. S4 XRD patterns of pristine PCM and as-prepared composite PCM with different wt% of PCM.

Table S2. Thermal properties of pure PCM and as-synthesized form-stabilized composite PCMs.

Samples	T_m (°C)	ΔH_m (kJ/kg)	ΔH_m^{exp} (kJ/kg)	T_c (°C)		ΔH_c (kJ/kg)
				α	β	
PCM	51.4	222.8	222.8	40.4	34.9	210.3
Pc7-80	49.3	168.9	178.2	41.2	34	160.6
Pc7-85	50.4	204.4	189.4	40.6	33.6	194.2
Pc8-80	49.3	177.1	178.2	41.1	33.3	167.9
PC8-85	50.3	214.5	189.4	40.7	33.2	194.9
Pc8-90	50.8	219.4	200.5	40.4	33.2	204.6
Pc9-80	49.8	191.0	178.2	41.1	33.9	178.2
Pc9-85	50.6	198.8	189.4	40.2	33.3	186.6
PC9-88	51.2	215.5	196.1	40.2	33.2	196.0

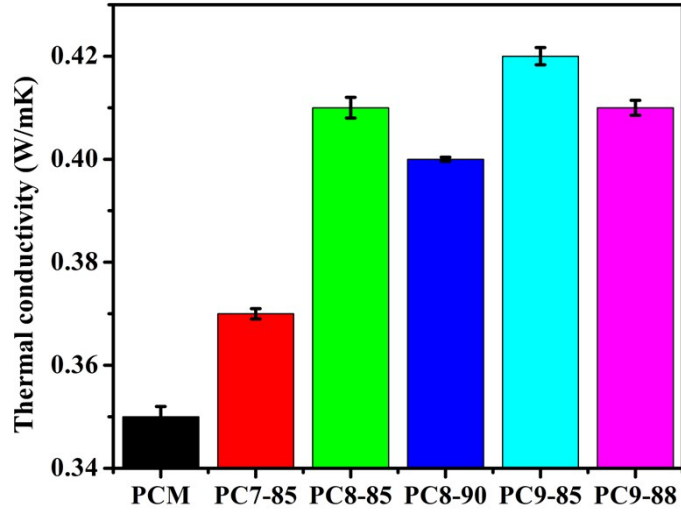


Fig. S5. Thermal conductivity of pure PCM and as-prepared composite PCMs.

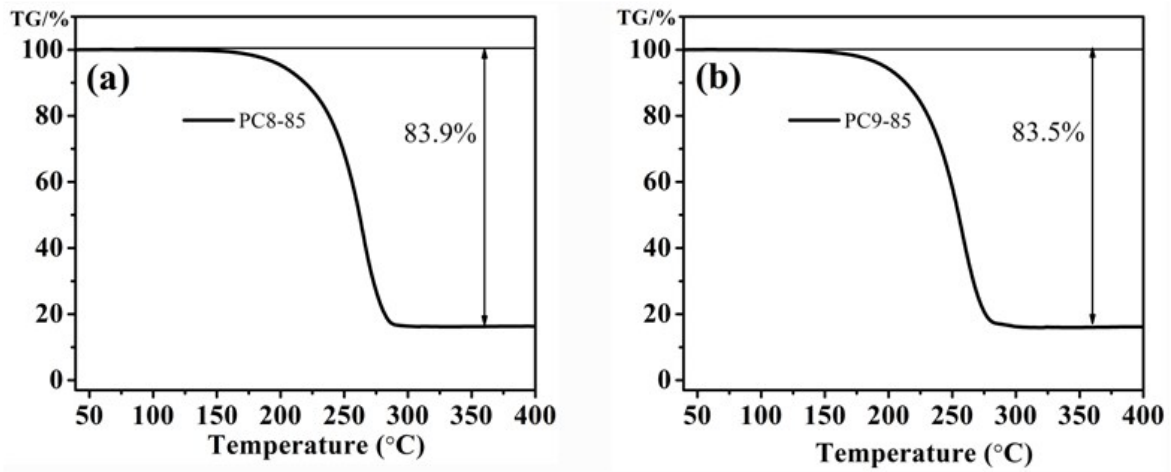


Fig. S6. TG analysis thermograms of as-prepared composite PCMs with 85 wt% of PCM loading.