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Supplemental Data

Preparation and application of composite phase change materials stabilized by cellulose nanofibril-based foams for thermal energy storage

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Including:

Fig. S1–S4, Table S1–S3.

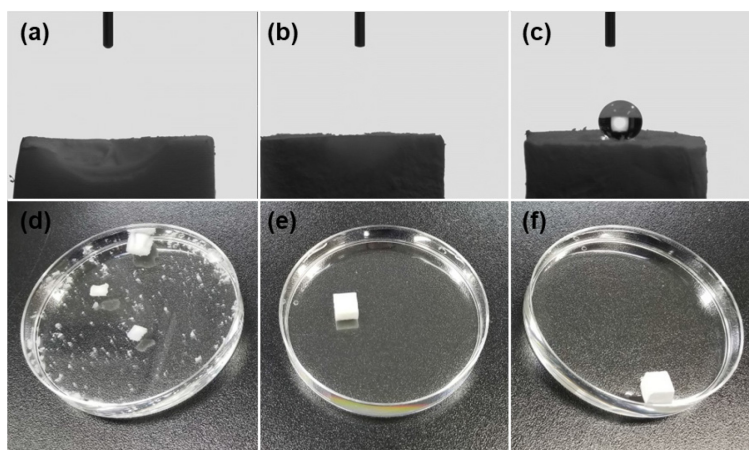


Fig. S1. Images of CNF-based foams upon the contact with water droplet: (a) pristine CNF foam, (b) CNF_{APTMS} foam (c) CNF_{MTMS} foam; digital images of (d) pristine CNF foam, (e) CNF_{APTMS} foam and (f) CNF_{MTMS} foam after 1 min magnetic mixing at 300 rpm in water.

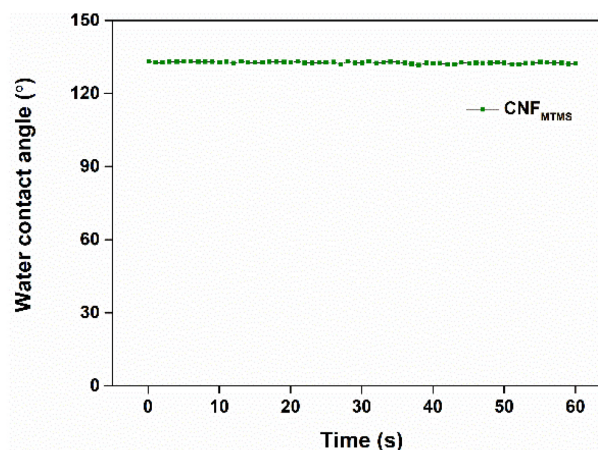


Fig. S2. The WCA of CNF_{MTMS} foam depending on time.

Table S1. The effect of CNF/CNT foams on the absorption capacity and leakage profile of polyethylene glycol (PEG).

Foam	Foam density (kg/m ³)	Foam porosity (%)	Absorption capacity (%)	PEG Leakage percentage (%)
CNF _{APTMS} /CNT ₁₀	61.52	94.72	94.20	2.47
CNF _{APTMS} /CNT ₂₀	63.08	94.66	94.13	2.37
CNF _{APTMS} /CNT ₃₀	64.86	94.58	93.77	1.88
CNF _{APTMS} /CNT ₅₀	67.26	94.52	93.63	1.81

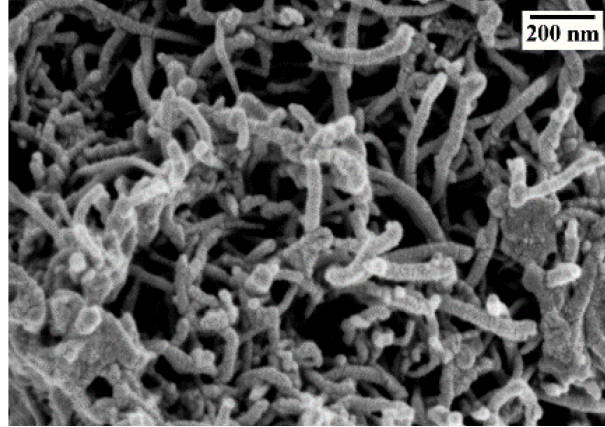


Fig. S3. Distribution of CNTs in the CNF/CNT₅₀ foam.

Table S2. Melting points, freezing points and enthalpies of PEG-based PCM samples after 100melting/freezing cycles.

PCM sample	Heating process			Cooling process		
	Melting point (°C)	Enthalpy (kJ/kg)	Enthalpy reduction (%)	Freezing point (°C)	Enthalpy (kJ/kg)	Enthalpy reduction (%)
PEG	23.6	133.9	11.6	21.3	133.4	11.8
CNF _{APTMS} -PEG	23.6	123.9	14.3	22.6	123.9	14.0
CNF _{APTMS} /CNT ₅₀ -PEG	25.4	126.2	11.9	22.4	126.1	11.9

Table S3. Melting points, freezing points and enthalpies of Pw-based PCM samples after 100melting/freezing cycles.

PCM sample	Heating process			Cooling process		
	Melting point (°C)	Enthalpy (kJ/kg)	Enthalpy reduction (%)	Freezing point (°C)	Enthalpy (kJ/kg)	Enthalpy reduction (%)
Pw	58.8	186.8	7.9	57.3	186.8	7.8
CNF _{MTMS} -Pw	53.5	182.4	1.9	57.4	182.4	1.9
CNF _{MTMS} /CNT ₅₀ -Pw	54.1	173.7	5.9	58.5	173.7	5.9

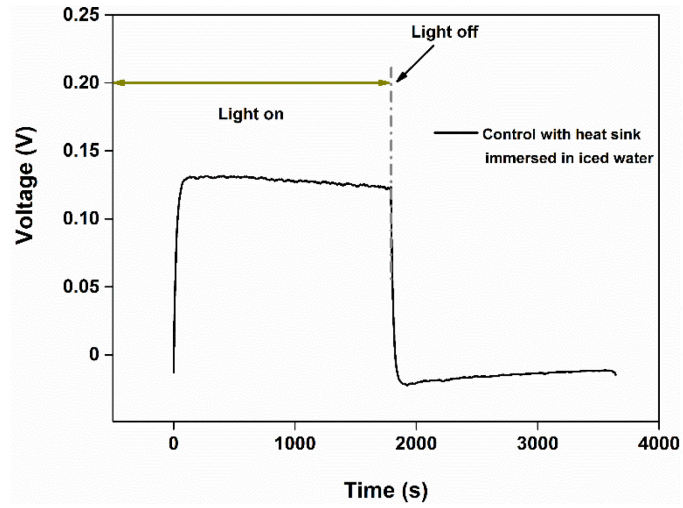


Fig. S4. Time course of the open-circuit voltage of the thermoelectric generator without sandwich PCMs on it (heat sink was immersed in iced water).