

Preparation and properties of a composite carbon foam as energy storage and EMI shield additive for advanced cement and gypsum boards

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Supporting Information

Table S1. The melting and solidification temperatures (T_m and T_s , respectively) and enthalpies (ΔH_m and ΔH_s , respectively) derived from DSC measurements.

Sample	T_m (° C)	T_s (° C)	ΔH_m (J/g)	ΔH_s (J/g)
PCM	28.8	21.5	249.6	-251.9
GB/OD@CCF-10	27.2	24.4	6.30	-5.2
GB/OD@CCF-20	28.1	24.3	13.10	-13.2
GB/OD@CCF-30	28.3	24.5	22.50	-22.0
CB/OD@CCF-10	26.4	22.7	6.0	-8.3
CB/OD@CCF-20	26.6	22.8	12.0	-9.7
CB/OD@CCF-30	26.7	23.4	14.8	-13.50

Table S2. Thermal conductivity (k), thermal effusivity (e), specific heat capacity (C_p) and density (d) of reference gypsum board and composite boards.

Sample	k (W/m K)	e (W ^{1/2} (s)/(m ² *K))	C_p (J/Kg K)	d (g/cm ³)
GB	0.33	679	1455.31	0.96
GB/OD@CCF-10	0.828	1170	1722.15	0.96
GB/OD@CCF-20	0.851	1191	1773.23	0.94
GB/OD@CCF-30	0.97	1296	1822.1	0.92
CB	0.058	150	760	0.51
CB/OD@CCF-10	0.054	137	643	0.54
CB/OD@CCF-20	0.066	173	720	0.63
CB/OD@CCF-30	0.077	205	840	0.65

Table S3. Mechanical properties of CB reference and composite boards derived from compression tests. Compressive strength, Compressive modulus, percentage of compressive strength (ICS) and compressive modulus (IEM) of CB respective values.

	Compressive strength (MPa)	Compressive modulus (MPa)	ICS (%)	ICM (%)
CB	1.308	15.08	100.00	100.00
CB/OD@CCF-10	1.1496	14.55	87.89	96.48
CB/OD@CCF-20	1.152	14.70	88.07	97.48
CB/OD@CCF-30	0.972	8.89	74.31	58.95

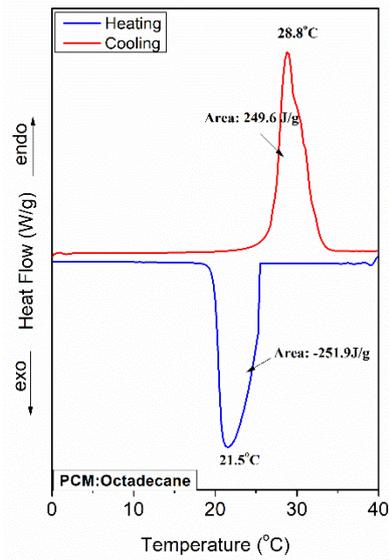


Figure S1. DSC curves of pure n-octadecane.



(a)



(b)



(c)

Figure S2. Pictures from the custom made environmental chamber. a) The chamber during the measurements, b) and c) the internal area of the chamber.