Enhanced Gypsum Boards with Activated Carbon Composites and Phase Change Materials for Advanced Thermal Energy Storage and EMI Shielding Properties

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Supporting information

Table S1. Density of reference gypsum board and composite gypsum boards.

Sample	ϱ, Density (Kg/m^3)
GB	0.960
GB/RT18HC@AC-5%	0.930
GB/RT18HC@AC-10%	0.910
GB/RT18HC@AC-15%	0.880
GB/RT18HC@AC-20%	0.830
GB/RT18HC@AC-30%	0.810

Table S2. Thermal conductivity (k), thermal effusivity (e) and specific heat capacity (Cp) of reference gypsum board and composite boards GB/RT18HC@AC.

Sample	k (W/m K)	e (W*√(s)/(m^2)*K)	C_p (J/Kg K)
GB	0,330	679	1455,31
GB/RT18HC@AC-5%	0,368	720	1514,73
GB/RT18HC@AC-10%	0,447	803	1639,23
GB/RT18HC@AC-20%	0,479	835	1753,72
GB/RT18HC@AC-30%	0,530	887	1832,68

Table S3. Maximum load (Fmax), absorbed energy (Ea), and percentage increament of Ea (I) for the gypsum boards with varying % w.t. content of RT18HC@AC additive.

Sample	F_{max}(N)	E_a(J)	I(%)
GB	605.84	1.632	100
GB/RT18HC@AC-5%	809.77	1.659	101.65
GB/RT18HC@AC-10%	960.07	1.709	104.72
GB/RT18HC@AC-20%	678.61	1.574	96.50
GB/RT18HC@AC-30%	382.39	1.103	67.59

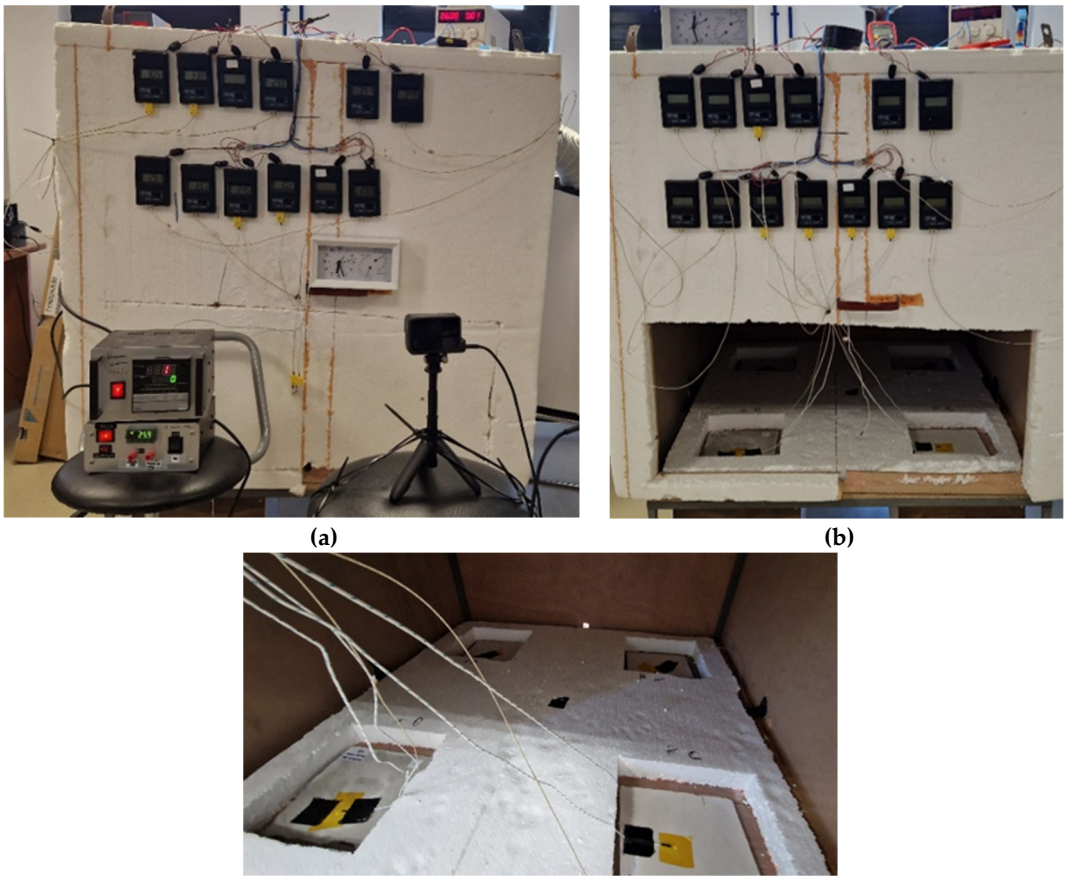

Figure S1. Pictures from the custom made environmental chamber. a) The chamber during the measurements, b) and c) the internal area of the chamber.

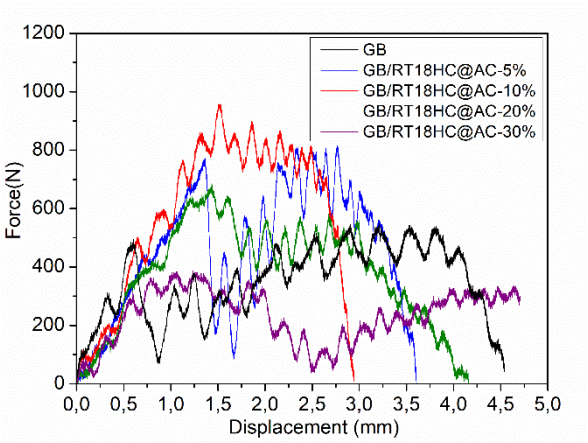

Figure S2. Force-displacement plots, obtained from impact resistance tests for the gypsum boards with varying % w.t. content of RT18HC@AC additive.