Supporting Information

A novel polymer aerogel towards high dimensional stability, mechanical property and fire safety

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Table S1. Mechanical and fire safety properties of present fire safety aerogels.

High flame retardant polymer aerogel	Density (g cm^{-3})	Modulus (MPa)	Specific modulus (m^2/s^2)	LOI (%)	PHRR (kW/m^2)	Ref
PVA/MMT	0.097	3.2	32.6	24.0	108	30
PVA/laponite	0.101	4.1	40.4	25.0	99	
PVA/hallyosite	0.115	1.3	11.6	24.0	121	
PVA/SiO_2	0.116	2.9	25.2	25.0	110	
5P5C5Al$(OH)_3$	0.148	2.1	14.2	-	122	48
5P5C2APP	0.115	0.8	7.5		115	
5P5C0.5SG	0.106	0.8	7.5		168	
5P5C0.5SG0.3PC	0.110	0.9	8.2		174	
5P5C1SG	0.112	1.1	9.8		179	
5P5C1SG0.6PC	0.119	1.0	8.4		191	
P5C5-irradiation (30 kGy)	0.086	11.4	133.2	-	137	36
P2C8-irradiation (30 kGy)	0.083	13.2	159.3		74	
P18-2C8-10	0.090	15.7	181.0	-	52	37
P/M/APP	0.101	0.9	9.0	42.0	88	31
P/M/PA-APP_8	0.096	1.8	18.5	34.0	94	
A5MH5Ca	0.110	7.1	64.2	＞60	24	32
A5MMT5Ca	0.093	10.3	110.4	＞60	22	
CNF-GO-BA-SEP	0.0075	0.57	77	34.0	45	35
Nanocomposite 1	0.184	11.4	62	-	187	39
P5M5-24h	**0.124**	**23.2**	**187.4**	**36.5**	**61**	**this work**

Table S2. Dimensional, strength and fire safety stability of P5M5 aerogel.

Sample	H_0 /mm	D_0 /mm	V_0 /cm^3	H_1 /mm (variation)	D_1 /mm (variation)	V_1 /cm^3 (variation)	Modulus /MPa	LOI /%
P5M5	20.55	18.90	23.31	-	-	-	23.24±1.13	36.5
	19.54	19.12		-	-			
	21.24	19.15		-	-			
-20℃: 1day	21.76	19.92	22.10	21.57 (-0.87%)	19.12 (-4.02%)	19.62 (-11.22%)	22.71±0.95	36.3
	14.34	21.46		13.73 (-4.25%)	20.47 (-4.61%)			
	13.76	20.67		13.26 (-3.63%)	19.63 (-5.03%)			
-20℃: 7days	26.61	19.59	24.01	25.87 (-2.78%)	19.05 (-2.76%)	21.56 (-10.20%)	23.96±1.75	36.6
	14.32	21.84		13.75 (-3.98%)	20.89 (-4.35%)			
	13.95	20.55		13.38 (-4.09%)	19.74 (-3.94%)			
100℃: 1 day	24.63	19.56	23.83	23.73 (-3.65%)	18.91 (-3.32%)	21.13 (-11.33%)	22.85±0.63	36.2
	14.32	21.82		13.68 (-4.47%)	20.88 (-4.31%)			
	14.01	21.58		13.45 (-3.40%)	20.67 (-4.22%)			
100℃: 7 days	21.85	19.40	22.05	21.31 (-2.47%)	18.84 (-2.89%)	19.37 (-12.15%)	22.67±0.89	36.3
	13.97	21.11		13.22 (-5.37%)	20.01 (-5.21%)			
	14.26	21.54		13.48 (-5.47%)	20.48 (-4.92%)			

Note: H_0, D_0 and V_0 stand for the original height, diameter and volume of the sample, and H_1, D_1 and V_1 stand for the corresponding values after exposure, respectively.