Electronic Supplementary Material
Facile strategy for carbon foam fabrication with lignin as sole feedstock and its applications

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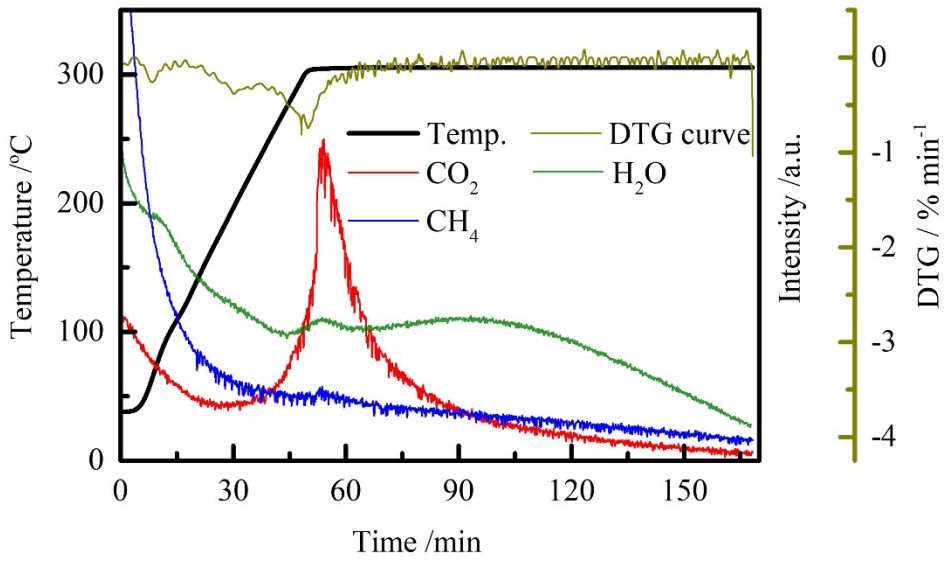

Fig. S1 The TG–MS of lignin heated in air from RT to 300 °C at 5 °C min^{-1} and maintained for 2 h.

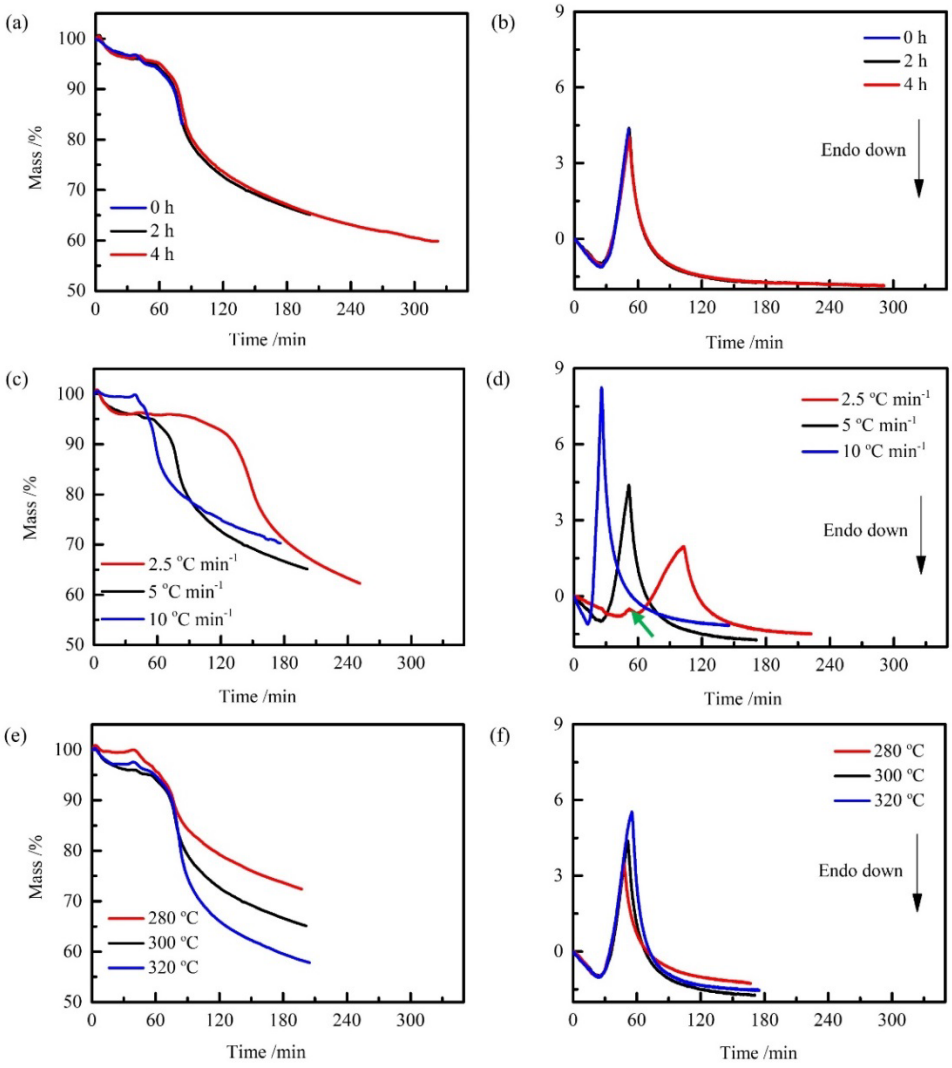

Fig. S2 (a, c, e) TG-time and (b, d, f) DCS-time plots of lignin varied with residence time, heating rate, and target temperature in thermal pretreatment stage.

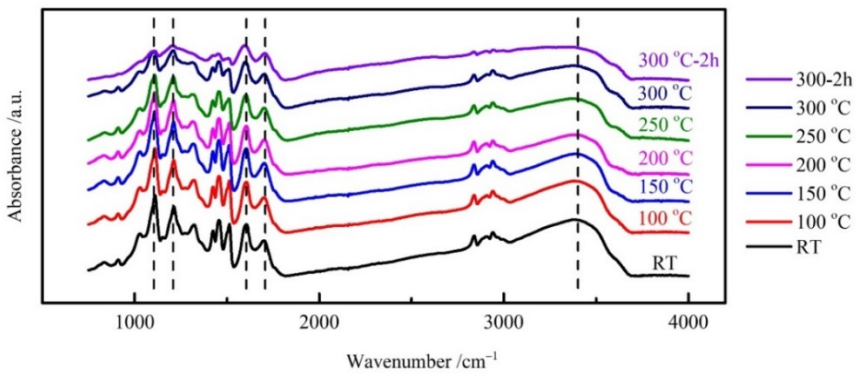

Fig. S3 Ex-FTIR of lignin powder at different temperature stages which heated from RT to 300°C at the heating rate of 5 °C min^{-1}.

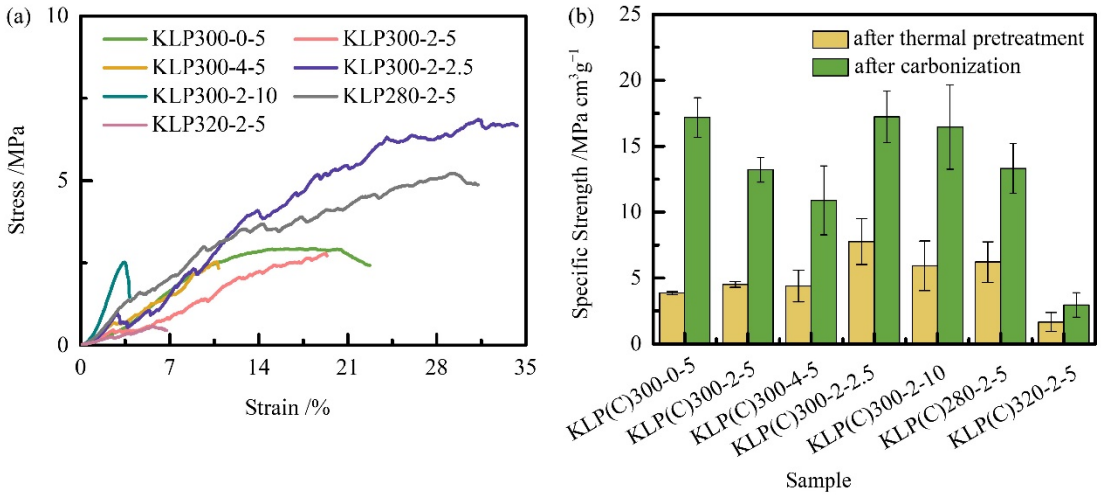

Fig. S4 (a) Stress-strain curves of KLPx-y-z samples. (b) Specific strength of all KLP(C) carbon foams.

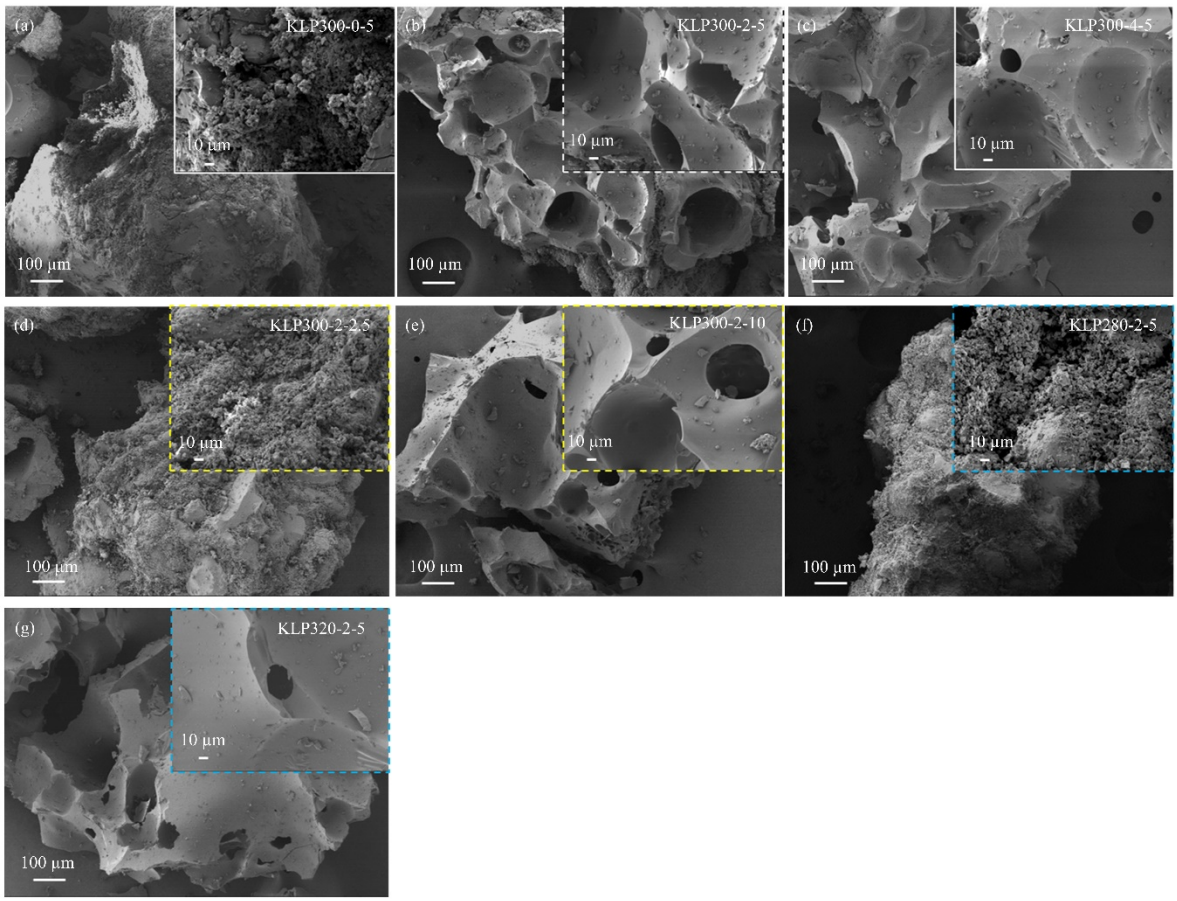

Fig. S5 SEM images of (a) KLP300-0-5, (b) KLP300-2-5, (c) KLP300-4-5, (d) KLP300-2-2.5, (e) KLP300-2-10, (f) KLP280-2-5, (g) KLP320-2-5, respectively.

Table S1. Comparison of key properties of carbon foams with the published literatures.

Precursors	Density (g cm^{-3})	Compressive strength (MPa)	Thermal conductivity (W/mK)	Ref.
Mesophase pitch	0.61-0.73	6.1-12.8	0.25-2	[S1]
Coal tar pitch	0.34-0.45	8.6-10.9	---	[S2]
Allyl COPNA-modified BMI resin	0.25-0.26	2.65-3.1	0.44-0.54	[S3]
Coal	0.32-0.40	2.9-9.9	---	[S4]
Bio-based phenol formaldehyde	0.04-0.108	0.152-0.405	0.033-0.04	[S5]
Montmorillonite	0.35	6.90	0.108	[S6]
mesophase pitches	0.54-0.83	1.60-3.40	151-201	[S7]
Lignin	0.18-0.68	7.03-30.16	0.21 to 0.75	[S8]
Lignin	0.13-0.15	0.49-0.95	---	[S9]
Lignin-SBP	0.38-0.44	1.03-2.03	---	[S10]
Lignin	0.27-0.83	0.8-14.23	0.1-0.88	This work

Fire resistance experiment.mp4

Video S1 Video of the fire resistance experiment.

References

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