Electronic Supplementary Material (ESI) for New Journal of Chemistry.

Supplementary information

Sustainable Lignin-derived Hierarchically Porous Carbon for Capacitive Deionization Applications

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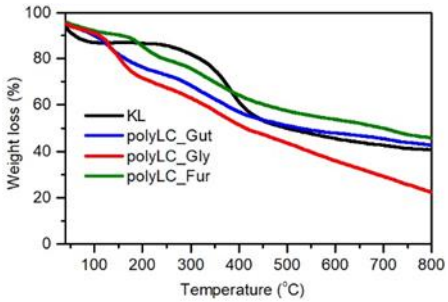

Fig. S1 TGA curves of the samples.

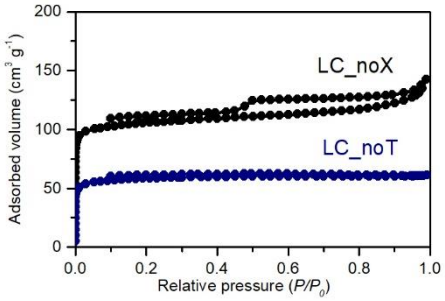

Fig. S2 N_2 adsorption/desorption isotherm of LC samples: prepared without cross-linking agent (LC_noX) and without template (LC_noT).

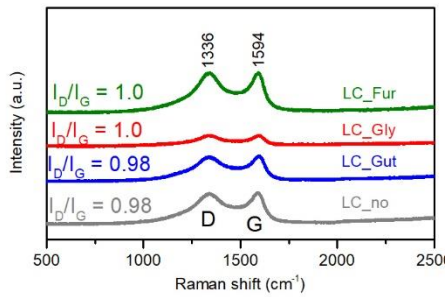

Fig. S3 Raman spectra of LCs samples.

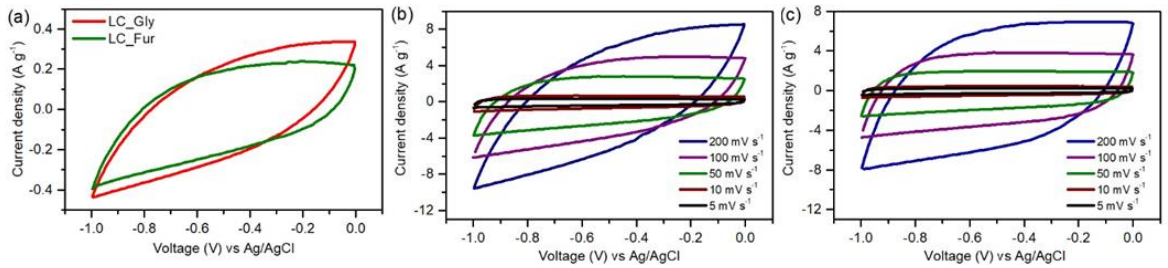

Fig. S4 CV curves of (a) LC_Gly and LC_Fur electrodes in 500 mg L^{-1} (~8.5 mM) NaCl electrolyte at a scan rate of 10 mV s^{-1}, (b) LC_Gly electrode and (c) LC_Fur electrodes at different scan rates in 1 M NaCl electrolyte.

With decreasing the concentration of NaCl electrolyte (1M to 8.5 mM), the specific capacitance of LC_Gly electrode decreased from 47 to 23.8 F g^{-1} (-49%). While LC_Fur electrode had a greater reduction by 68% which dropped from 68 to 24.4 F g^{-1}, compared to LC_Gly electrode. This supported well with an ion-dependent process of EDLs formation[1-4]. Particularly, the micro-dominant electrode material (LC_Fur) was significantly hindered by the decreasing the ion mobility in the inner pores.

Table S1 Parameters for CDI performance

Sample	SAC (mg g^{-1})	Pseudo-second order model		
		k (min^{-1})	q_e (mg g^{-1})	r^2
LC_Gly	16.84	0.053	15.5	0.9392
LC_Fur	8.69	0.029	1.13	0.9662

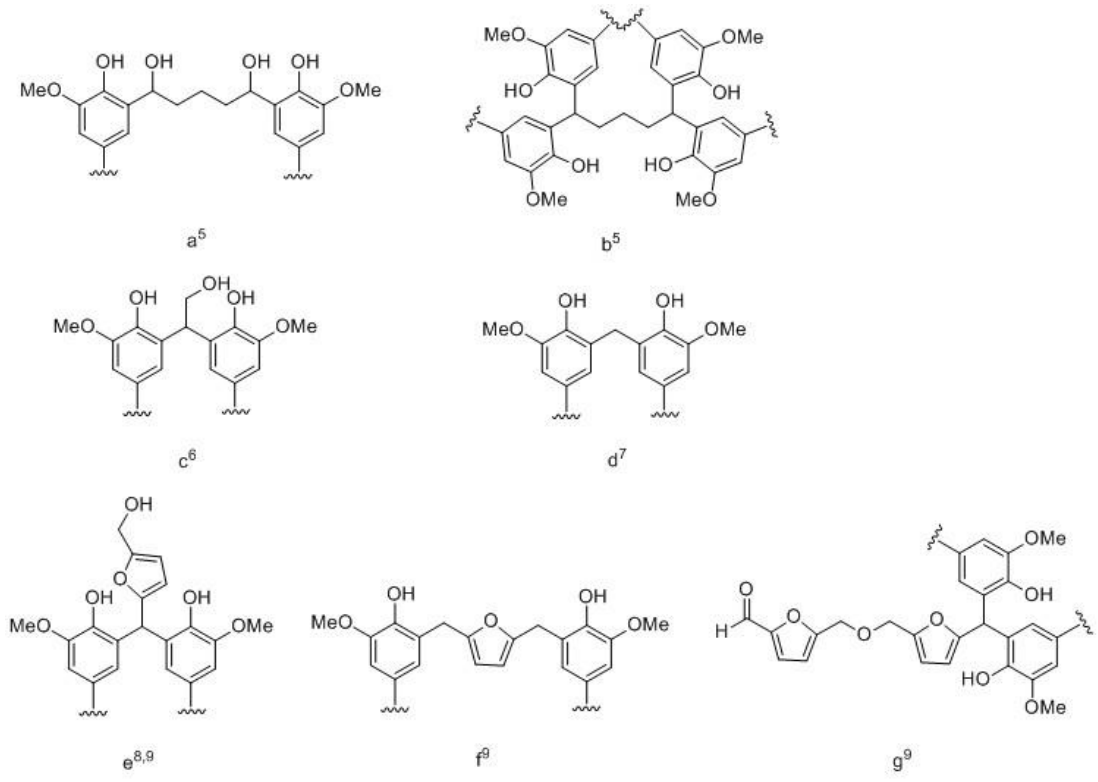

Chart S1 Possible structures of polyLC_Gut (a, b), polyLC_Gly (c, d), and polyLC_Fur (e, f, g).

References

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