

Supporting Information

High-value utilization of lignin to prepare functional carbons toward advanced lithium ion capacitors

Zhewei Yang ^{a, b}, Huajun Guo ^b, Guochun Yan ^b, Xinhai Li ^b, Zhixing Wang ^b,
Yuntao Guo ^b, Xiaomin Wang ^a, Yucheng Wu ^a, Jiexi Wang ^{b*}

*a College of Materials Science and Engineering, Taiyuan University of
Technology, Taiyuan 030024, PR China*

*b School of Metallurgy and Environment, Central South University, Changsha
410083, PR China*

** Corresponding author*

Jiexi Wang, Associate Professor

School of Metallurgy and Environment, Central South University

932 South Lushan Road, Changsha 410083, Hunan Province, China

Tel: +86-731-88836633

Email: wangjiexi@csu.edu.cn

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Number of figures: 9 (Figure S1-S9)

Number of tables: 1 (Table S1)

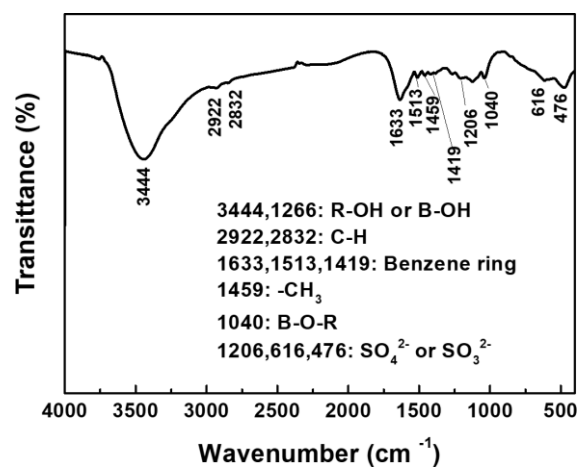


Figure S1. FT-IR spectra of lignin.

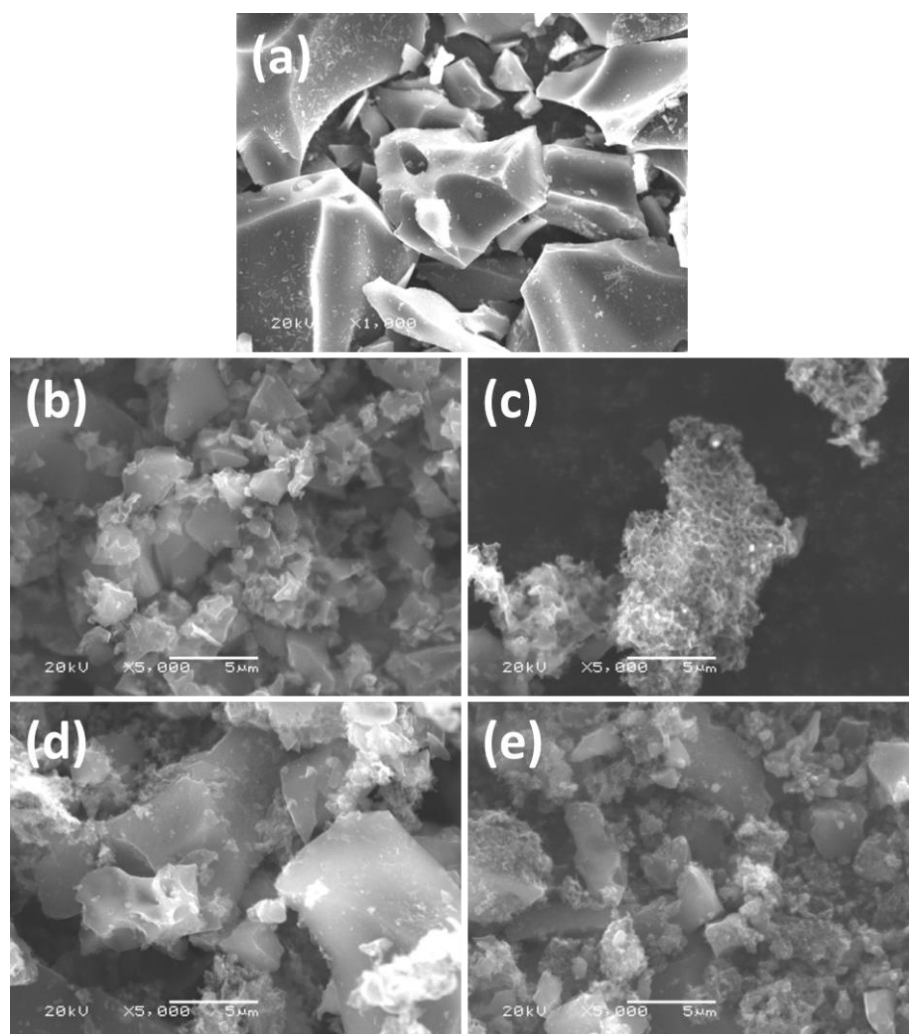


Figure S2. SEM images of (a) LPC-0, (b) LPC-2, (c) LPC-4, (d) LGC-1100 and (e) LGC-1300.

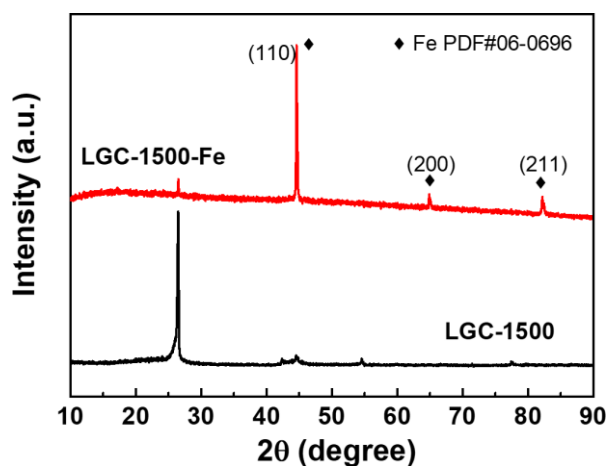


Figure S3. XRD patterns of LGC-1500-Fe (without washing by 2 M HCl solution) and LGC-1500 (with washing by 2 M HCl solution).

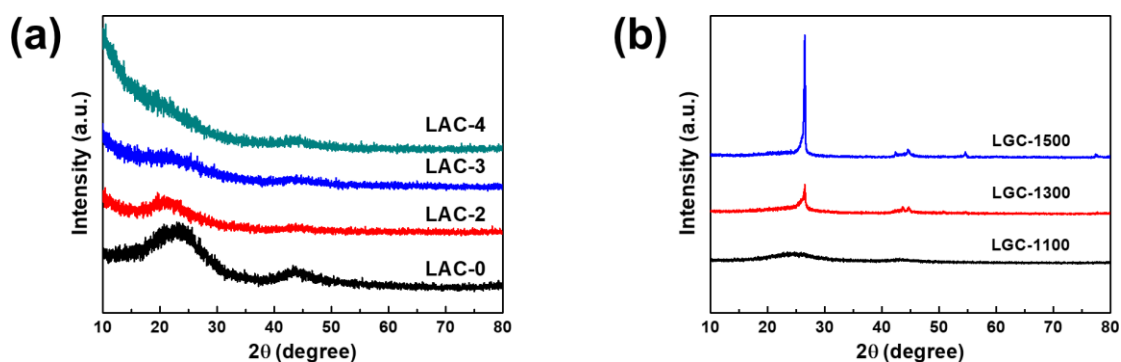


Figure S4. XRD patterns of (a) LPCs and (b) LGCs.

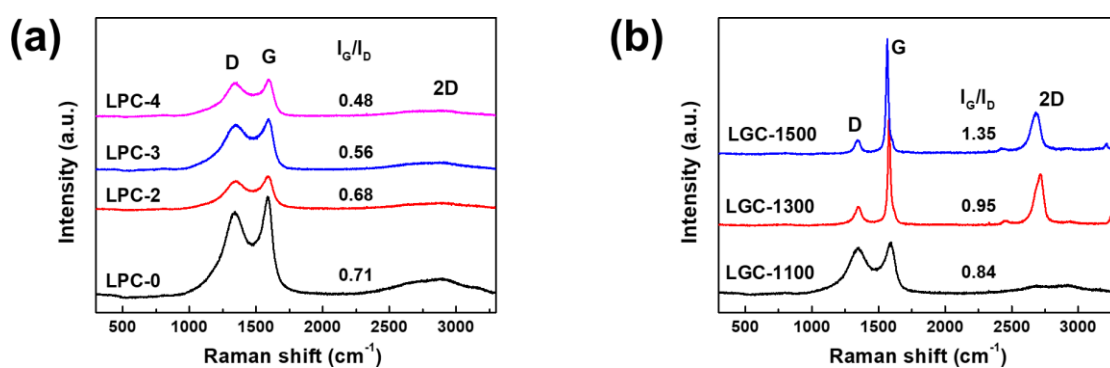


Figure S5. Raman spectra of (a) LPCs and (b) LGCs.

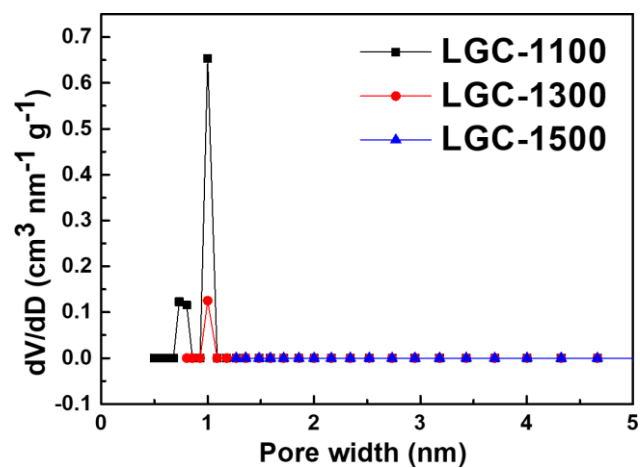


Figure S6. Pore size distribution (PSD) of LGCs determined by using the DFT model.

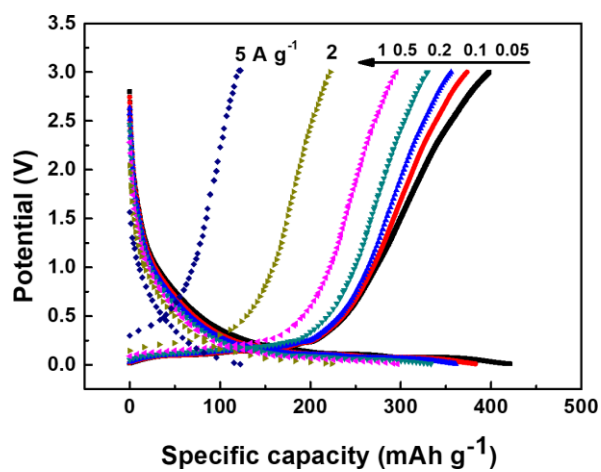


Figure S7. GCD curves of LGC-1500 at different current densities.

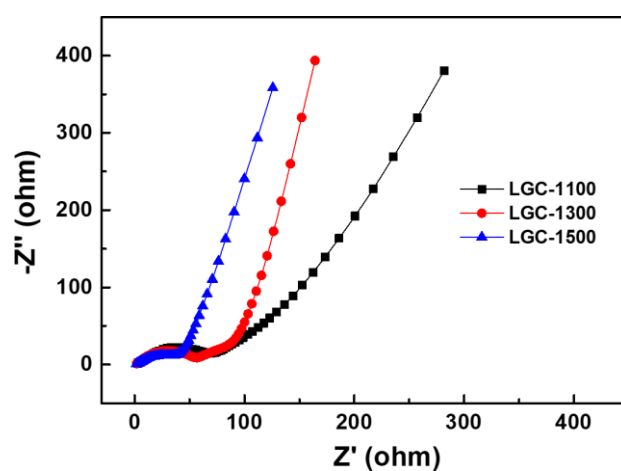


Figure S8. Nyquist plots after 5 cycles at 0.1 A g⁻¹ for LGCs.

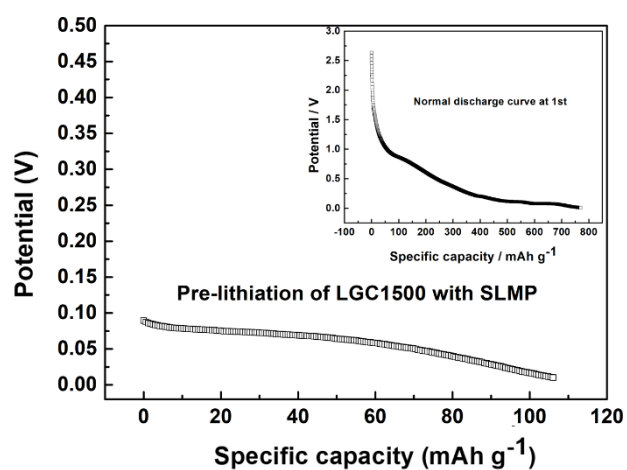


Figure S9. Discharge curve of pre-lithiated LGC-1500 at 0.05 A g⁻¹. Inset: Discharge curve of LGC-1500 at 0.05 A g⁻¹ for the initial cycle.

Table S1. Comparison of the results in our work with some LIC configurations reported in literatures.

Configurations	Work voltage (V)	Mass ratio cathode/anode)	$E_{max} @ P_{min}$ (Wh kg ⁻¹ , W kg ⁻¹)	$P_{max} @ E_{min}$ (W kg ⁻¹ , Wh kg ⁻¹)	Cycles	Retention (%)	Ref.
Sb/CNT // KPN900	0~3.8	2	97 @ 120	7900@17.4			46
LTO/Graphene // AC	1-2.5	2	50.3 @ 11	4000 @ 16.6	10000	81 @ 10 C	47
HC // AC	1.5~4.2		100 @ 150	8000@ 22	10000	94 @ 2 A g ⁻¹	48
H ₂ Ti _{12-x} Nb ₂ O ₅ // AC	0-2,8		50 @ 194	5821 @ 11.3	1000	91.4 @ 3 A g ⁻¹	49
PVG // GPC	2-4	1.5	86 @ 150	7400 @ 48			50
MCMB // AC	2-4	1	92.3 @ 50	5500 @ 23	1000	97 @ 0.37 A g ⁻¹ ₁	9
SFGC // SFAC	2-4	1.2	104 @ 143	6628 @ 32	3000	96.5 @ 1 A g ⁻¹	38
Zn ₂ Ti ₃ O ₈ /rGO // SCCB	0.01~4.5	2.8	204 @ 112.5	67500@54.6	1000	76 @ 1 A g ⁻¹	51
Fe ₃ O ₄ /Graphene // 3D Graphene	1-4	4.5	147 @ 150	2587 @ 86	1000	70 @ 2 A g ⁻¹	28
rGO // AC	2-4.2	2	231 @ 57	2800 @ 131.9	1000	84.2 @ 0.5 A g ⁻¹	52
NiFe-LDH/rGO // MCM	0~4	6	133 @ 26	4016 @ 58	5000	76@5 A g ⁻¹	53
LGC-1500//LPC-3	2-4	0.8	97 @ 55	11400 @ 19	5000	92.3 @ 1 A g⁻¹	This work