Green Synthesis of Sodium Pyrithione Salt-Activated Biomass-derived Carbon for Aqueous Zinc-ion Capacitors

Lingqi Huang,[a,b] Zilong Gu,[a] Jiayang Gu,[a] Fei Zhang, *[c,f] Jingshun Zhuang,[a] Qingzhi Ma,[a] Tao Zhang,[d] Jingfei Li,[e] Heyang Liu, *[a,d] and Wei Feng*[b]

[a] School of Environmental and Natural Resources, Zhejiang University of Science and Technology, Hangzhou, 310023, P. R. China.

[b] School of Materials Science and Engineering, Tianjin University, Tianjin, 300072, P. R. China.

[c] Leibniz-Institut für Polymerforschung Dresden e.V. (IPF), Hohe Str. 6, 01069 Dresden, Germany.

[d] School of Biological & Chemical Engineering, Zhejiang University of Science and Technology, Hangzhou, 310023, P. R. China

[e] Zhejiang Institute of Product Quality and Safety Science, Hangzhou, 31000, P. R. China

[f] School of Science and Engineering, The Chinese University of Hong Kong, Shenzhen, Shenzhen, Guangdong 518172, P. R. China

Email: feizhang@tju.edu.cn; heyang.liu@zust.edu.cn; weifeng@tju.edu.cn

Table S1. Synthesis, surface area and pore analysis, and composition analysis[a] of carbon materials.

	Lignin (g)	Hemicellulose (g)	NaOH (g)	SP (g)	Product (g)	BET surface area (m^2/g)	C 1s	N 1s	O 1s	S 2p
LC	4	/	/	/	1.4	2.2	0.675	/	0.325	/
SHLC	4	/	4	/	1.07	374.8	0.574	/	0.426	/
SPLC	4	/	/	4	1.69	249	0.586	0.018	0.391	0.005
SP2LC[b]	□	□	□	0.5	0.44	103.6	0.642	0.061	0.276	0.021
HC	/	4	/	/	0.76	6.6	0.585	/	0.415	/
SHHC	/	4	4	/	0.22	405.3	0.756	/	0.244	/
SPHC	/	4	/	4	0.98	1217.9	0.526	0.024	0.436	0.013
SP2HC[b]	□	□	□	0.5	0.53	42.5	0.626	0.047	0.311	0.016

[a] atomical percentage values are used; [b] equal amount of SPLC or SPHC were used for the synthesizing.

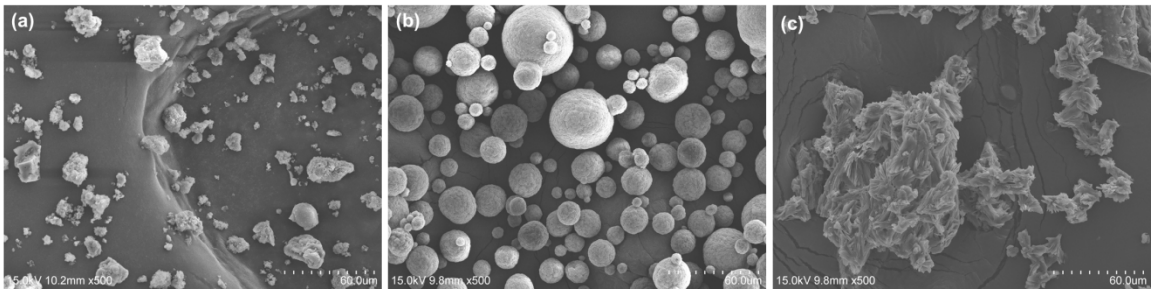

Figure S1. SEM images of (a) lignin, (b) hemicellulose, and (c) sodium pyrithione.

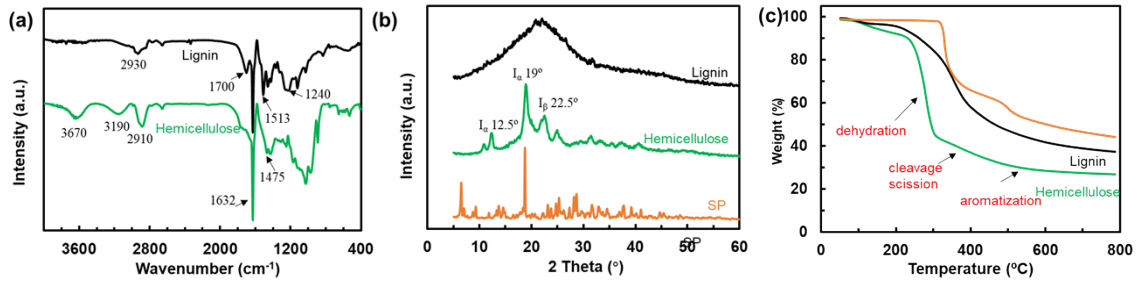

Figure S2. (a) FTIR spectra for Lignin and hemicellulose, (b) XRD patterns and (c) TGA curves for Lignin, hemicellulose, and sodium pyrithione.

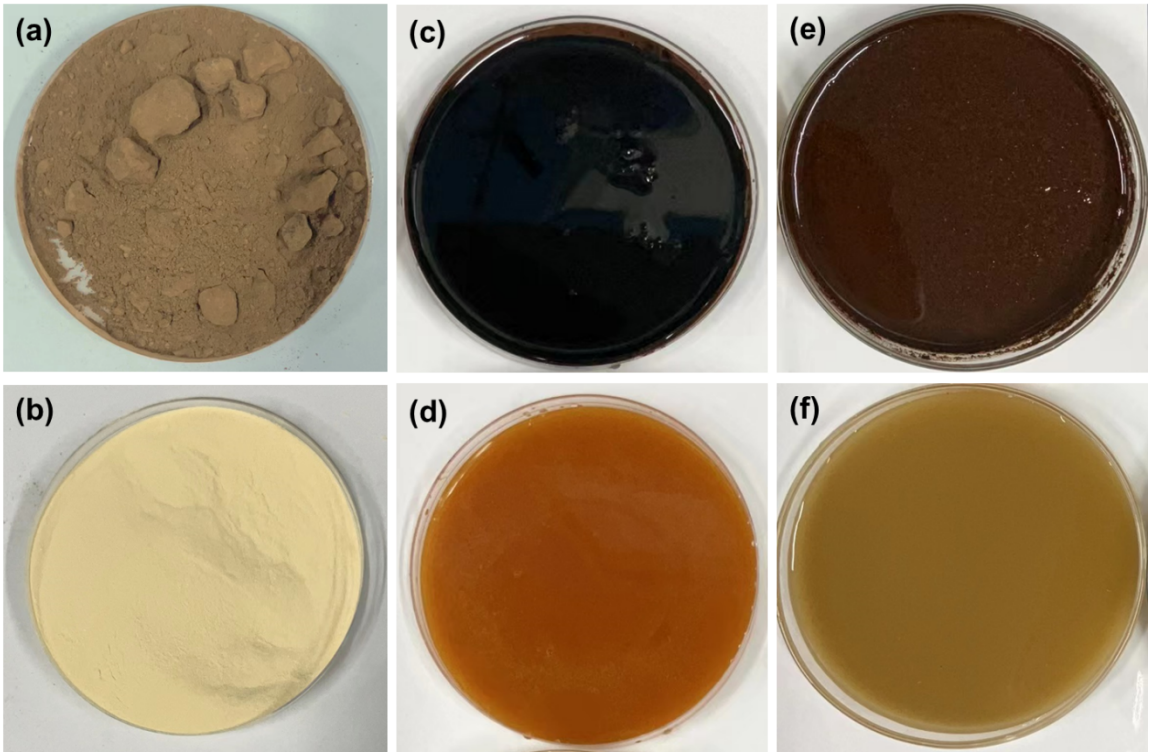

Figure S3. Photos of (a) lignin powder, (b) hemicellulose power, (c) mixture of lignin and NaOH (w/w: 1/1), (d) mixture of hemicellulose and NaOH (w/w: 1/1), (e) mixture of lignin and sodium pyrithione (w/w: 1/1), and (f) mixture of hemicellulose and sodium pyrithione (w/w: 1/1) in water.

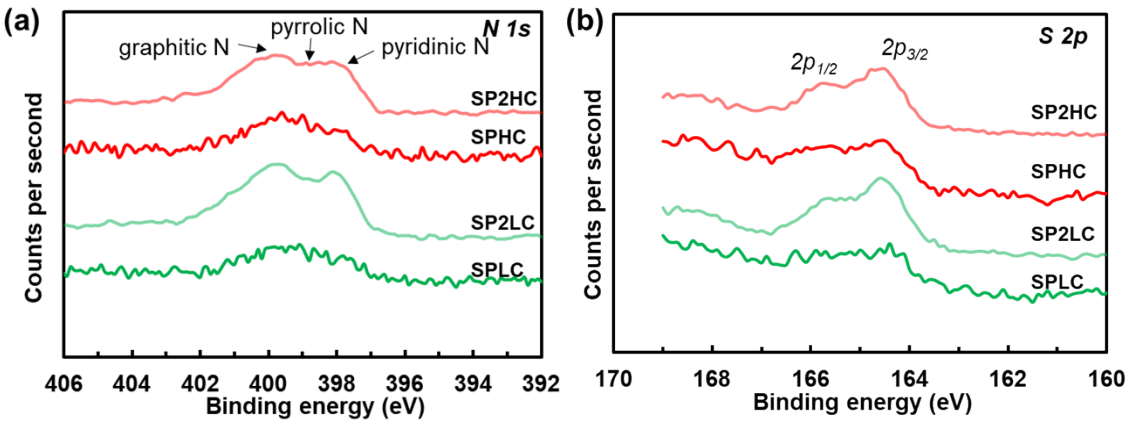

Figure S4. High-resolution XPS spectra of (a) N1s and (b) S2p for SP-activated carbons.

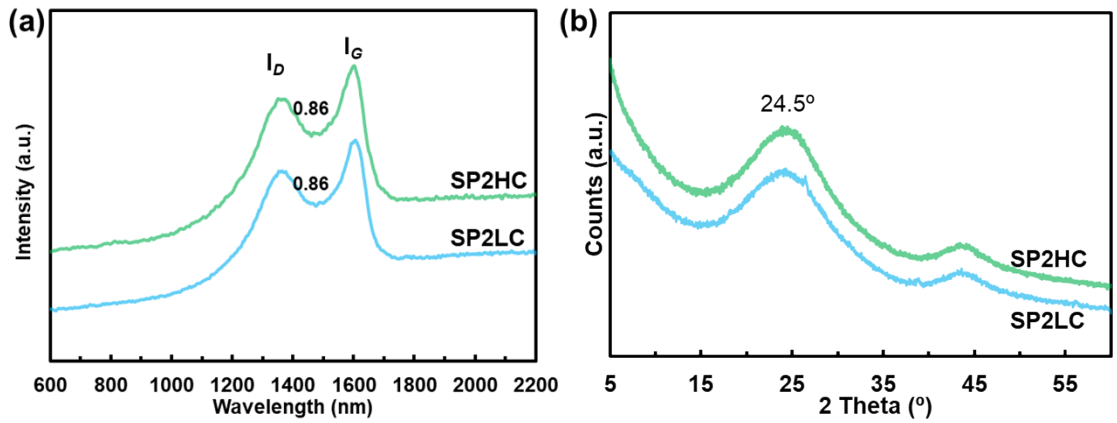

Figure S5. (a) Raman spectra and (b) XRD patterns of SP2HC and SP2LC.

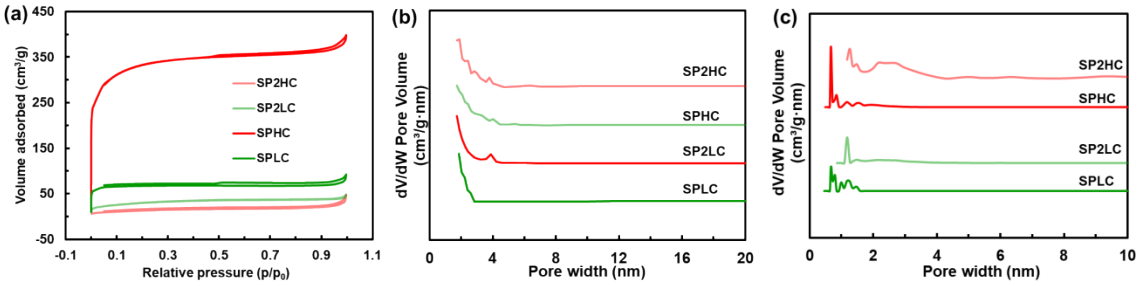

Figure S6. (a) Nitrogen absorption/desorption isotherms and pore analysis based on (b) BJH and (c) DFT calculations.

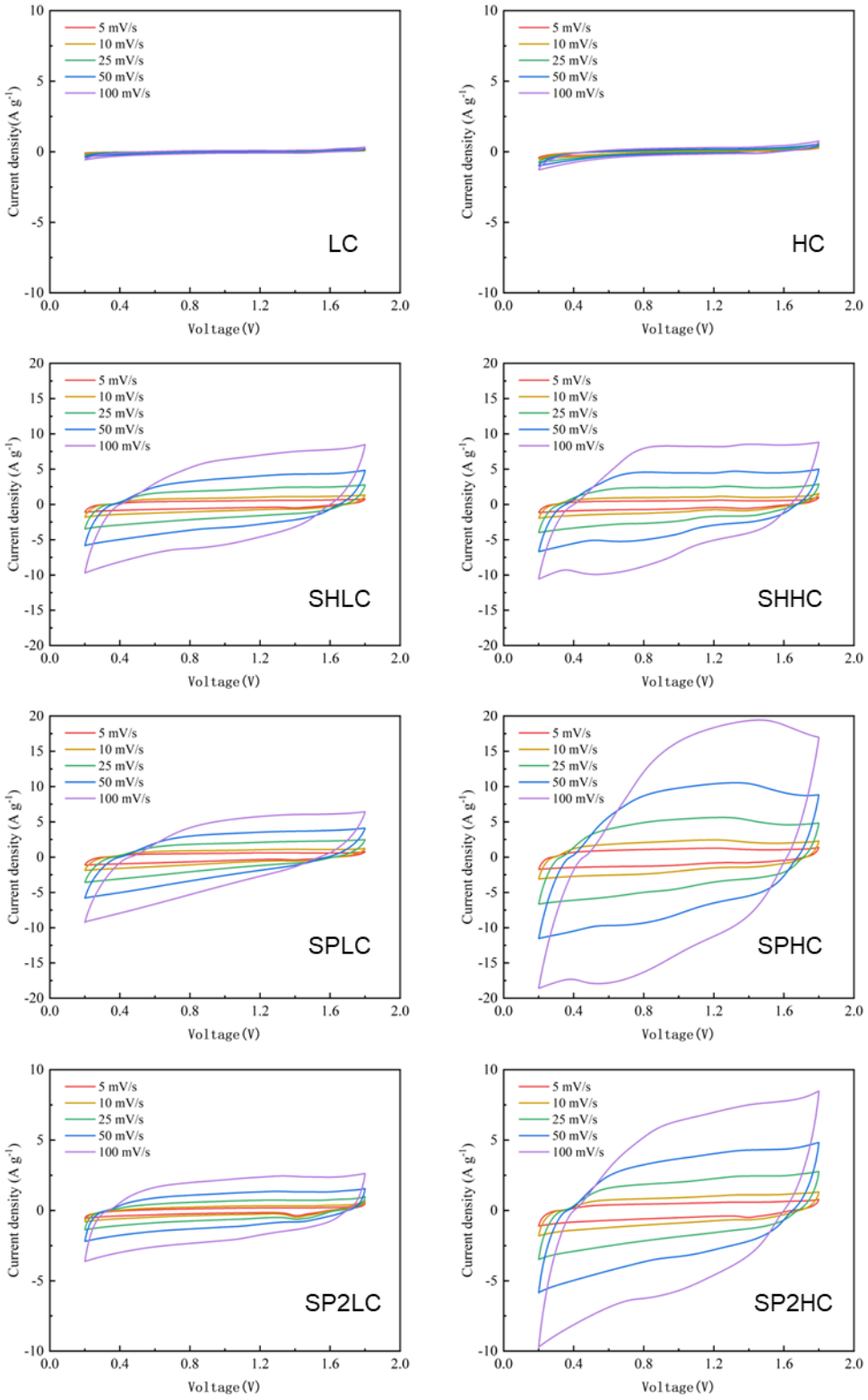

Figure S7. CV profiles for different ZICs at different scan rates.

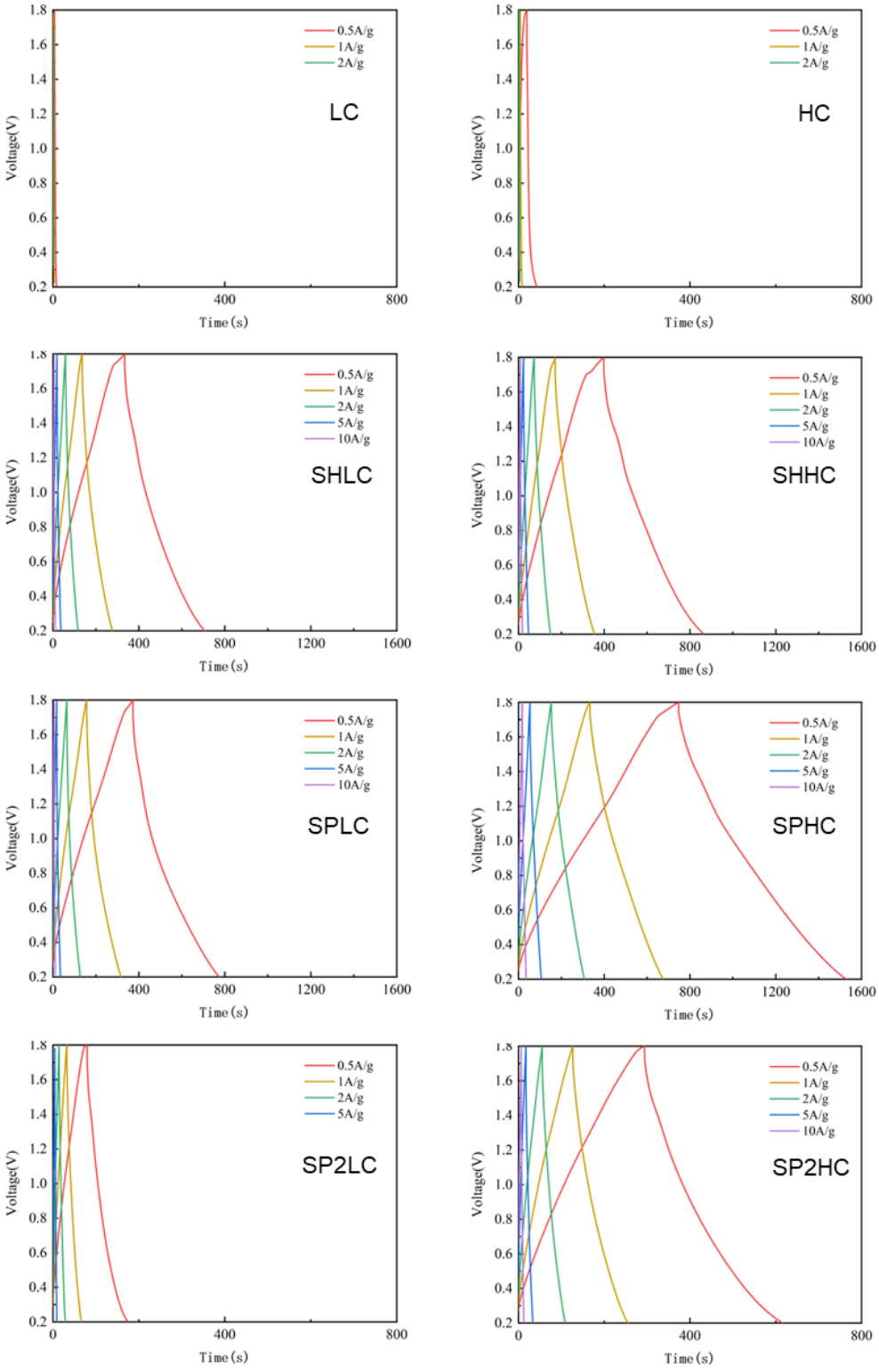

Figure S8. CD profiles for different ZICs at different current densities.

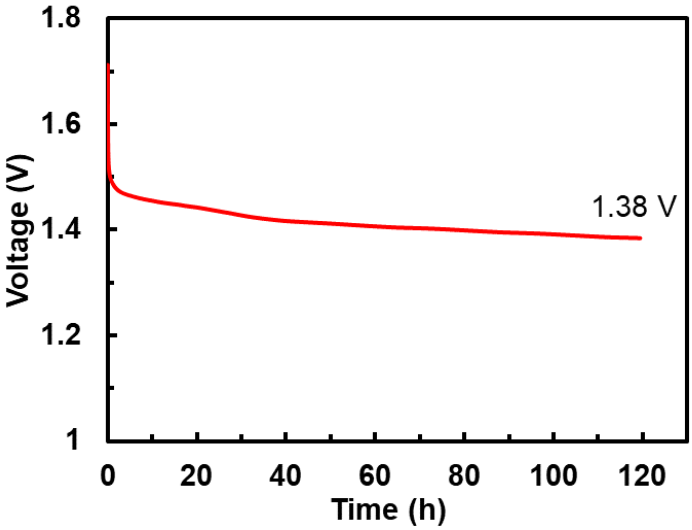

Figure S9. Open circuit voltage-time profile of SPHC-based ZIC.