

Electronic Supplementary Material

Preparation of biomass-derived carbon loaded with MnO₂ as lithium-ion battery anode for improving its reversible capacity and cycling performance

Likai Zhu¹, Huaping Lin¹, Wenli Zhang², Qinhui Wang³, Yefeng Zhou (✉)¹

1 National & Local United Engineering Research Centre for Chemical Process Simulation and Intensification, Chemical Process Simulation and Optimization Engineering Research Center of Ministry of Education, Xiangtan University, Xiangtan 411100, China

2 Guangdong Provincial Key Laboratory of Plant Resources Biorefinery, School of Chemical Engineering and Light Industry, Guangdong University of Technology (GDUT), Guangzhou 510006, China

3 State Key Laboratory of Clean Energy Utilization, Zhejiang University, Hangzhou 310027, China

E-mail: zhouyf@xtu.edu.cn

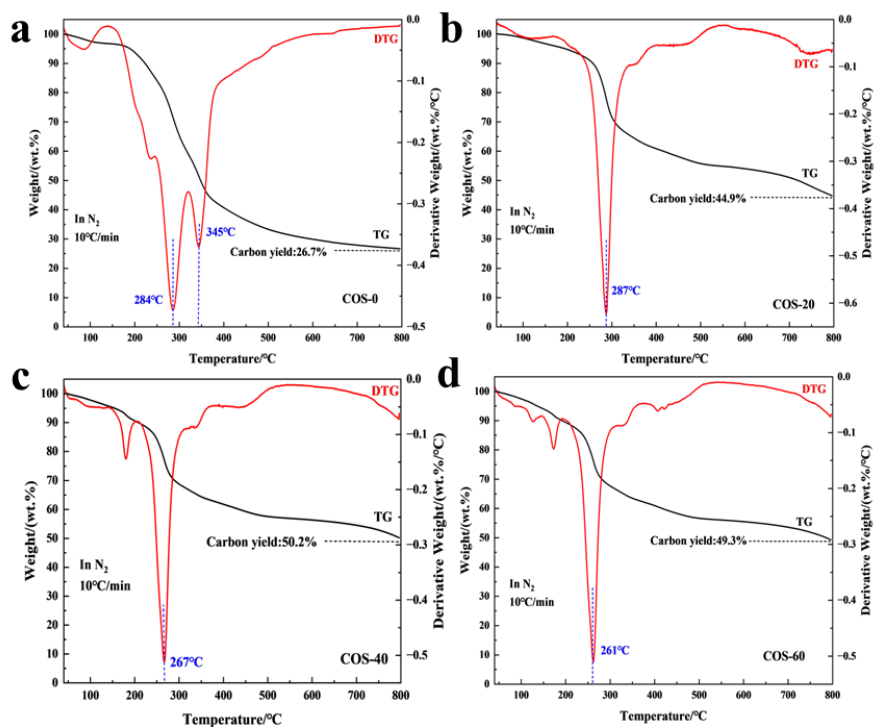


Fig. S1. Thermogravimetric curves of camellia oleifera shell activated with different mass ratios: (a)COS-0, (b)COS-20, (c)COS-40, (d)COS-60.

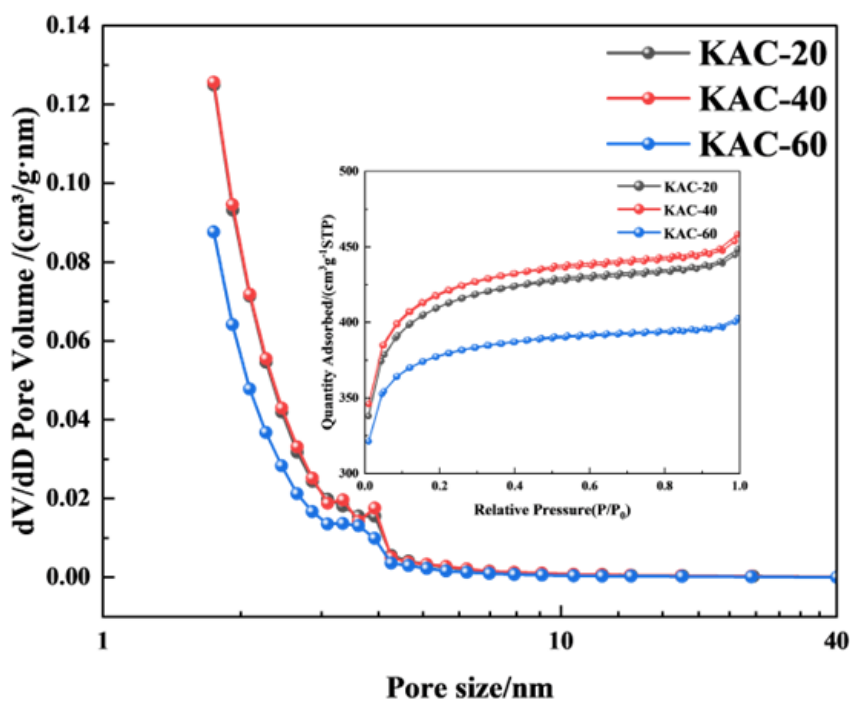


Fig. S2. N₂ adsorption–desorption isotherms and pore diameter distributions of K₂CO₃ activated pyrolysis carbon with different mass ratios.

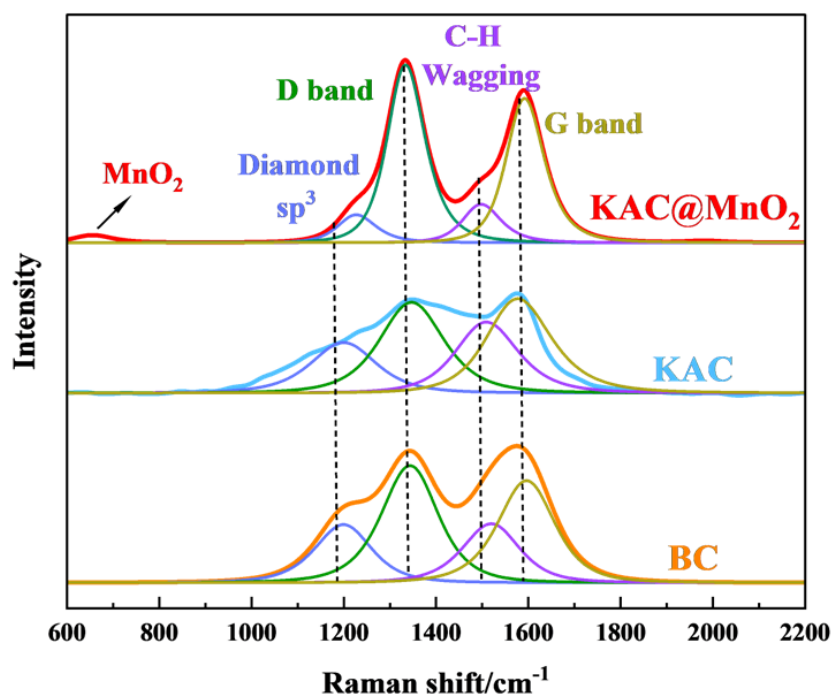


Fig. S3. Raman spectra analyses of KAC@MnO₂ samples.

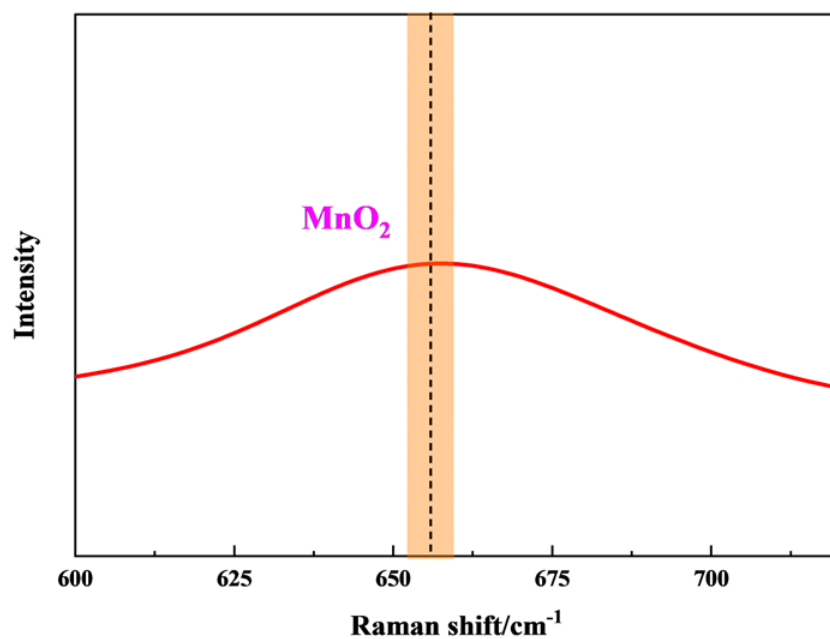


Fig. S4. A magnified view of Raman spectra: the characteristic peak of MnO₂.

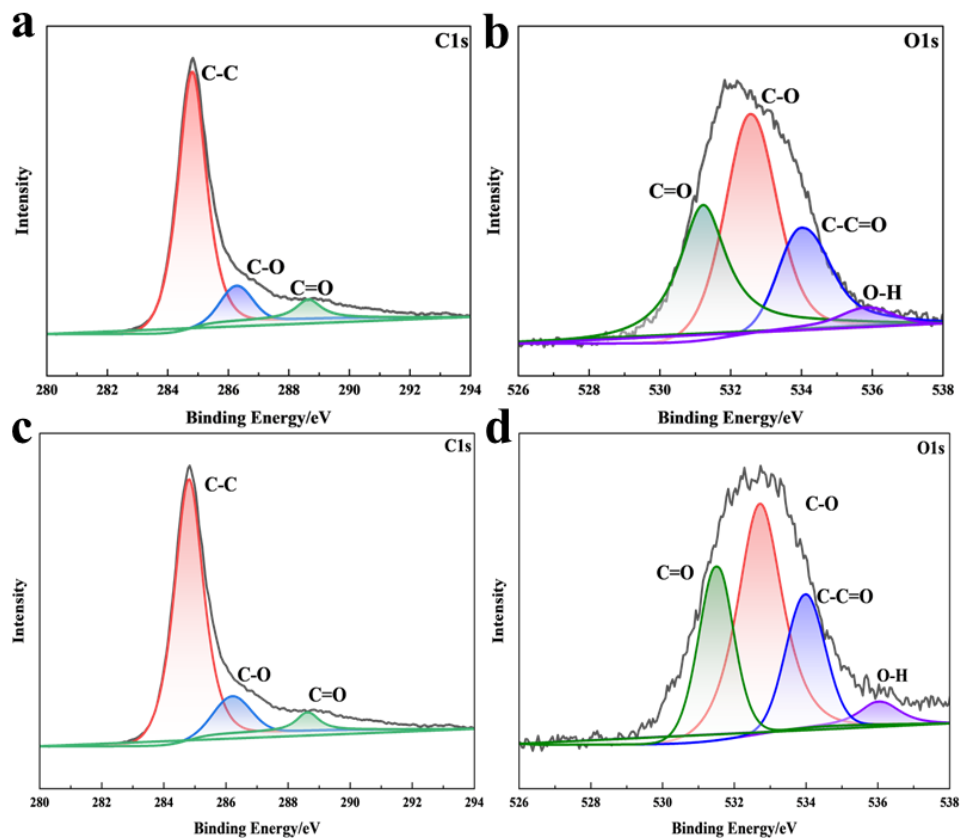


Fig. S5. (a) C1s and (b) O1s spectrum for BC sample, (c) C1s and (d) O1s spectrum for KAC sample.

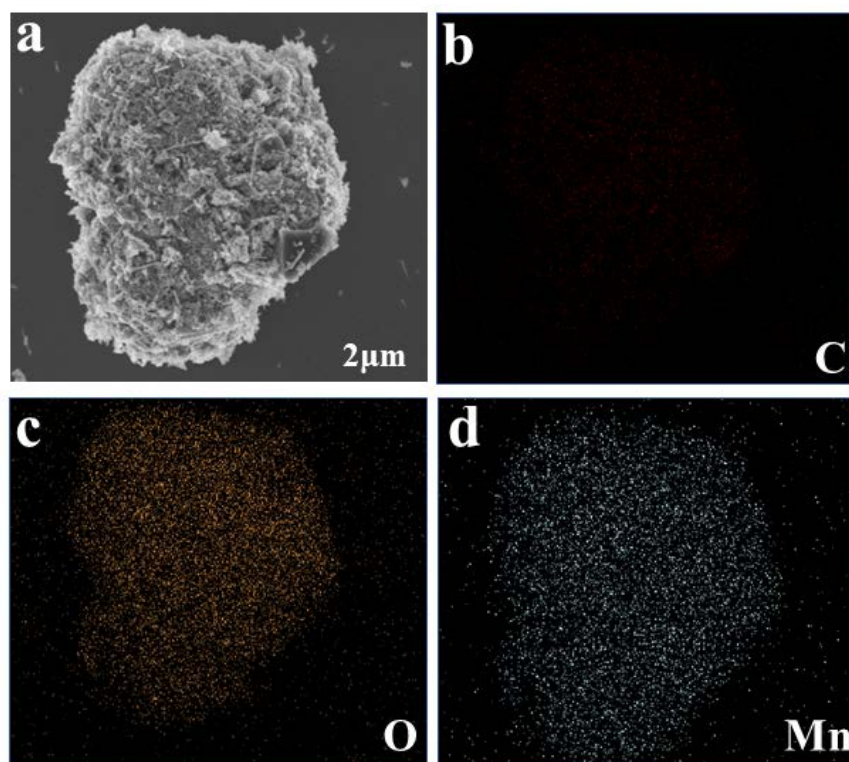


Fig. S6. The energy dispersive spectroscopy of KAC@MnO₂ material: (a) field of view image, (b) C element maps, (c) O element maps, (d) Mn element maps.

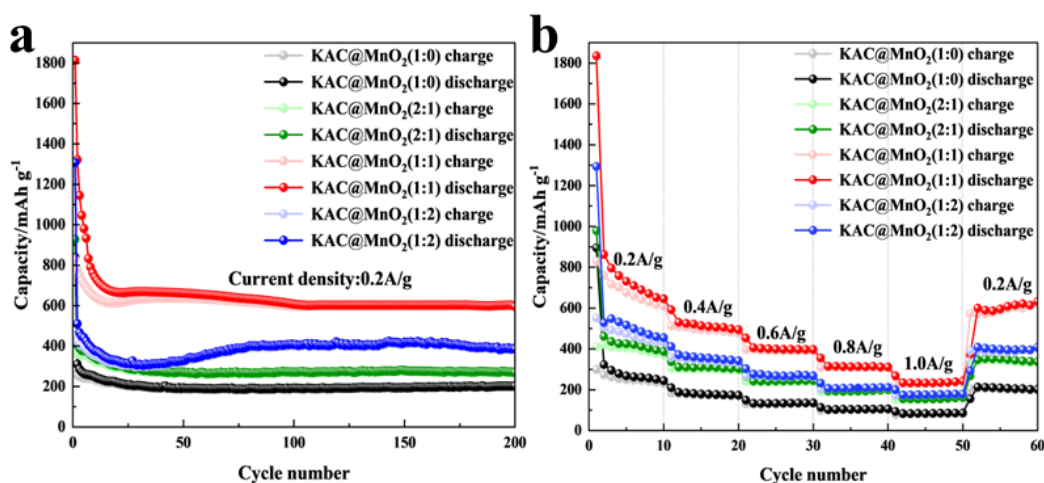


Fig. S7 Electrochemical performance of KAC@MnO₂(X: Y) anodes materials: (a) at 0.2 A g⁻¹ after 200 cycles, (b) rate performance at 0.2 A g⁻¹, 0.4 A g⁻¹, 0.6 A g⁻¹, 0.8 A g⁻¹, 1.0 A g⁻¹ and back to 0.2 A g⁻¹.

Table S1 Elemental composition of KAC@MnO₂(X: Y).

Sample	XPS /(at%)			
	C	O	N	Mn
KAC@MnO ₂ (1:0)	90.4	7.8	1.8	—
KAC@MnO ₂ (2:1)	54.6	34.4	1.3	9.7
KAC@MnO ₂ (1:1)	38.0	42.1	1.4	18.5
KAC@MnO ₂ (1:2)	42.2	40.6	1.6	15.6