Electronic Supplementary Material (ESI) for Sustainable Energy & Fuels.

Supporting Information

Fundamental Understanding on Electrochemical Catalytic Performance of Carbonized Natural Wood: Wood Species and Carbonization Temperature

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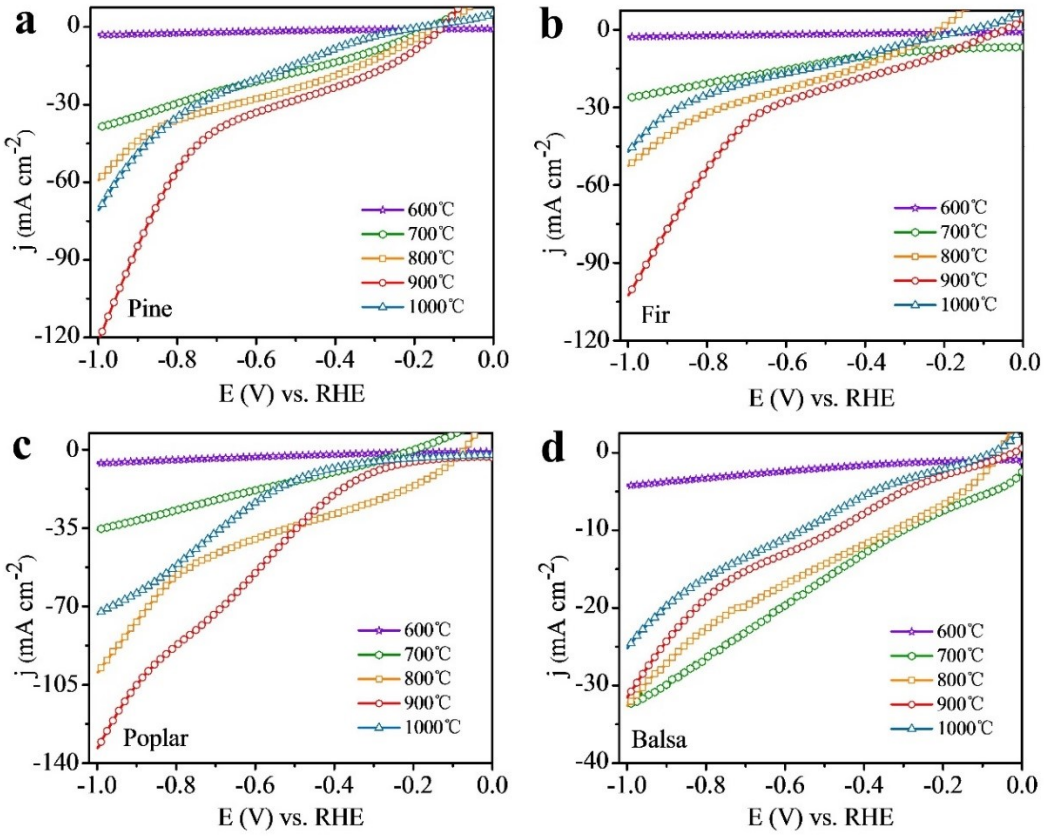


Fig. S1 Electrocatalytic hydrogen evolution reaction. (a-d) LSV curves of the pine, fir, poplar, and balsa carbons in 1 M KOH solution.

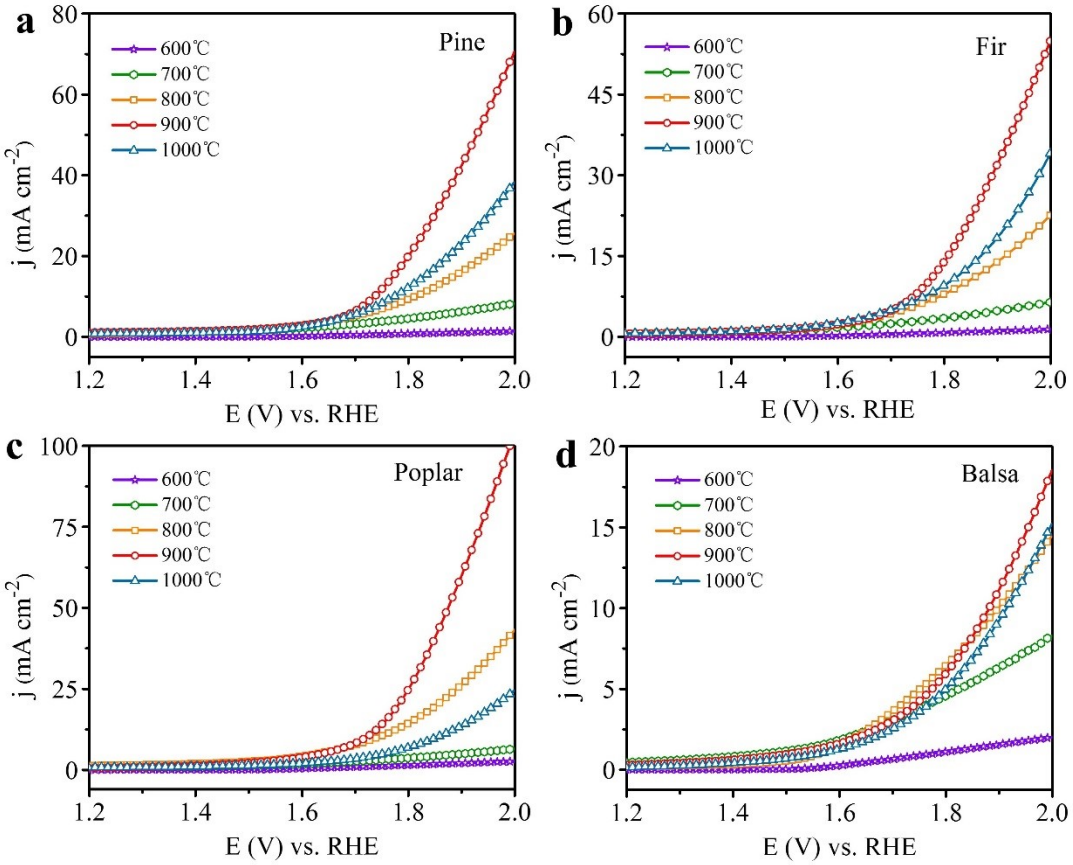


Fig. S2 Electrocatalytic oxygen evolution reaction. (a-d) LSV curves of the pine, fir, poplar, and balsa carbons in 1 M KOH solution.

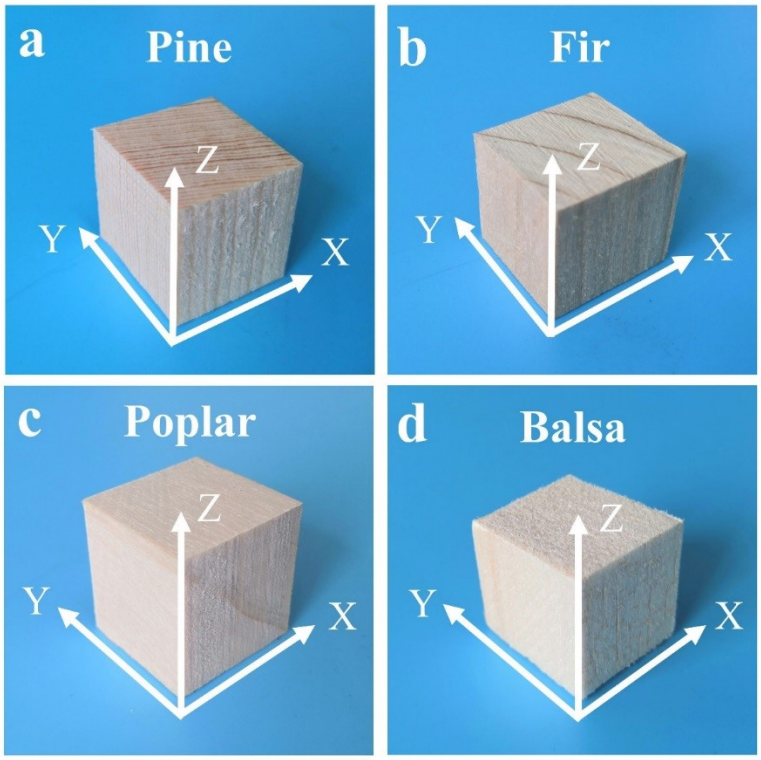


Fig. S3 (a-d) The digital photos for pine, fir, poplar, and balsa woods, respectively.

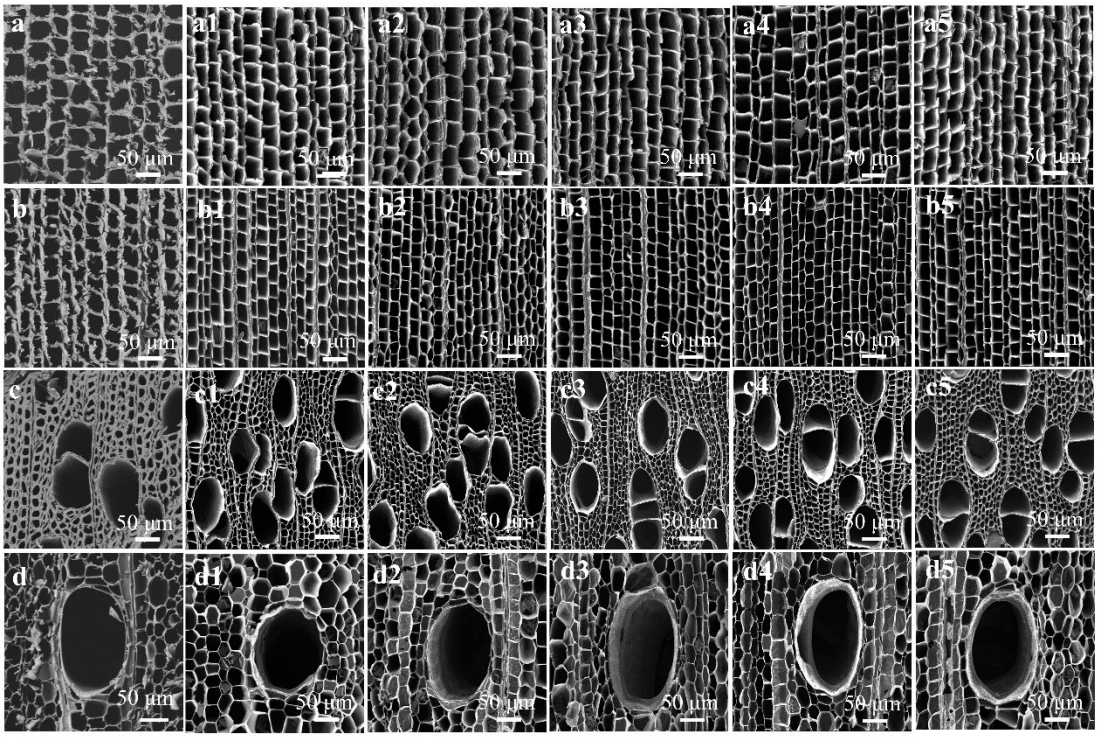
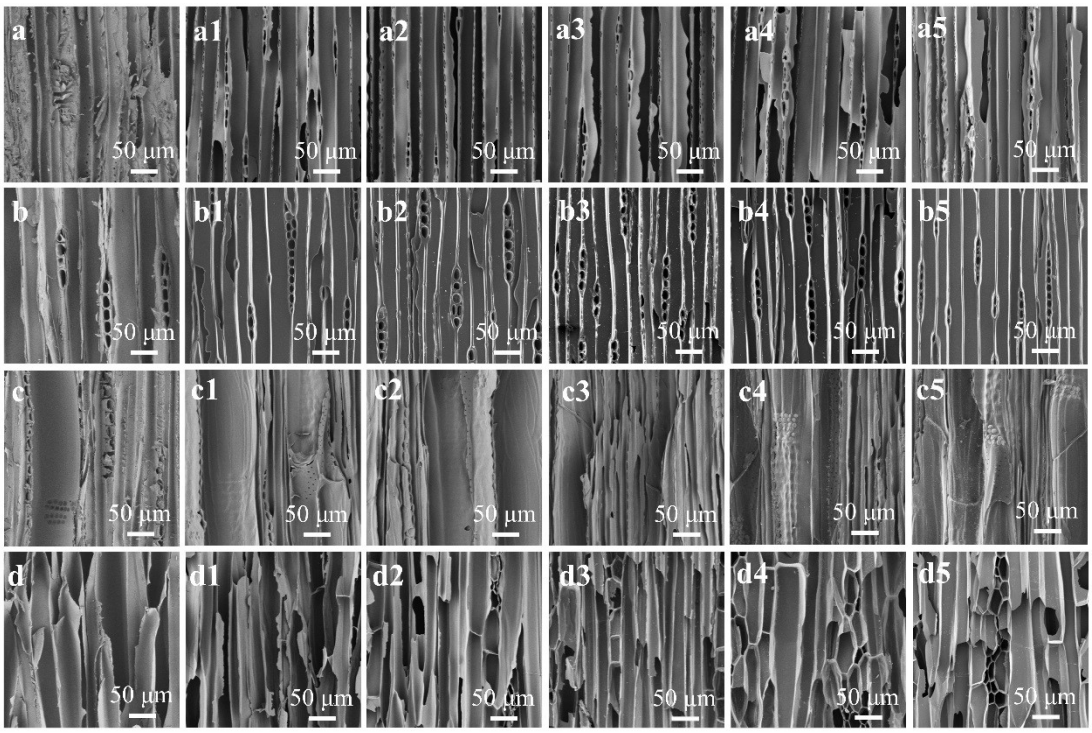


Fig. S4 (a-d) SEM images of cross-sections of natural pine, fir, poplar, and balsa woods. (a1-a5) SEM images of cross-sections of pine carbon obtained at carbonization temperatures of 600 °C , 700 °C, 800 °C, 900 °C, and 1000 °C. (b1-b5) SEM images of cross-sections of fir carbon obtained at carbonization temperatures of 600 °C , 700 °C, 800 °C, 900 °C, and 1000 °C. (c1-c5) SEM images of cross-sections of poplar carbon obtained at carbonization temperatures of 600 °C , 700 °C, 800 °C, 900 °C, and 1000 °C. (d1-d5) SEM images of cross-sections of balsa carbon obtained at carbonization temperatures of 600 °C , 700 °C, 800 °C, 900 °C, and 1000 °C.



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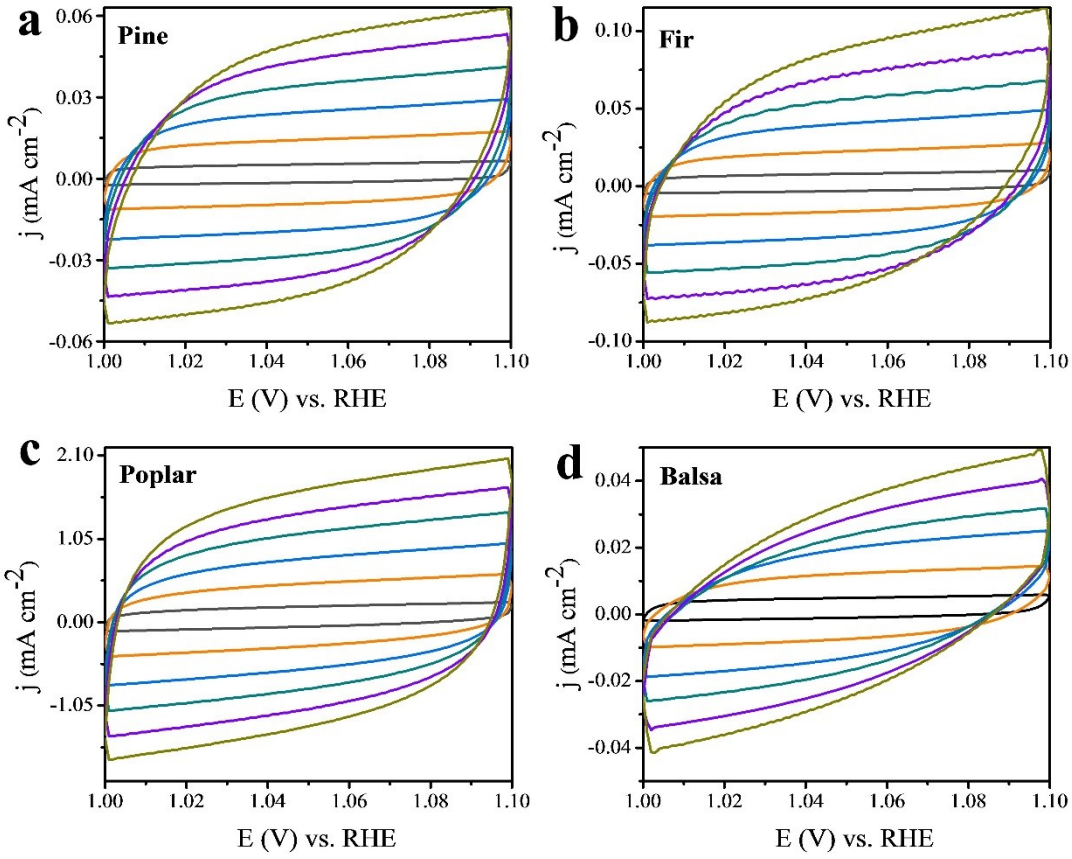

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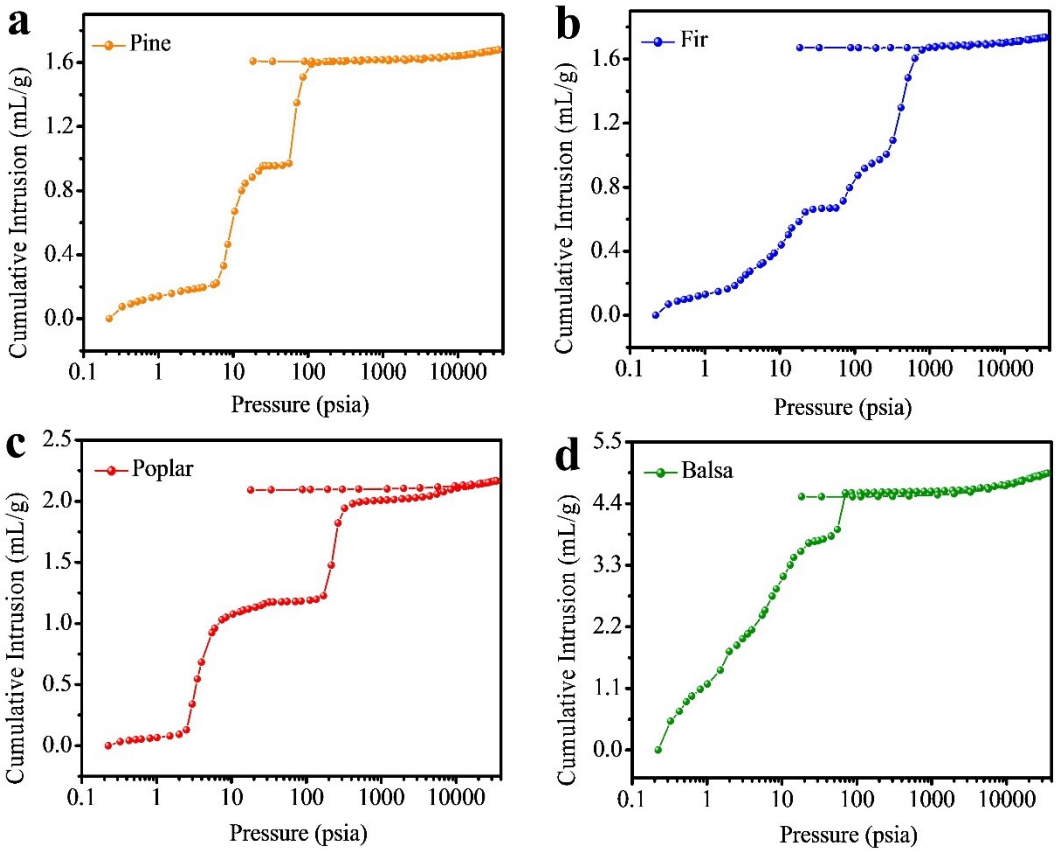

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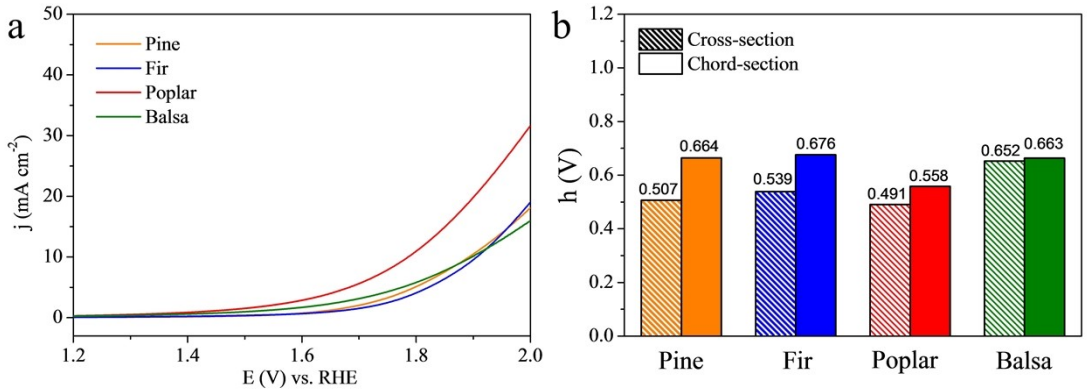

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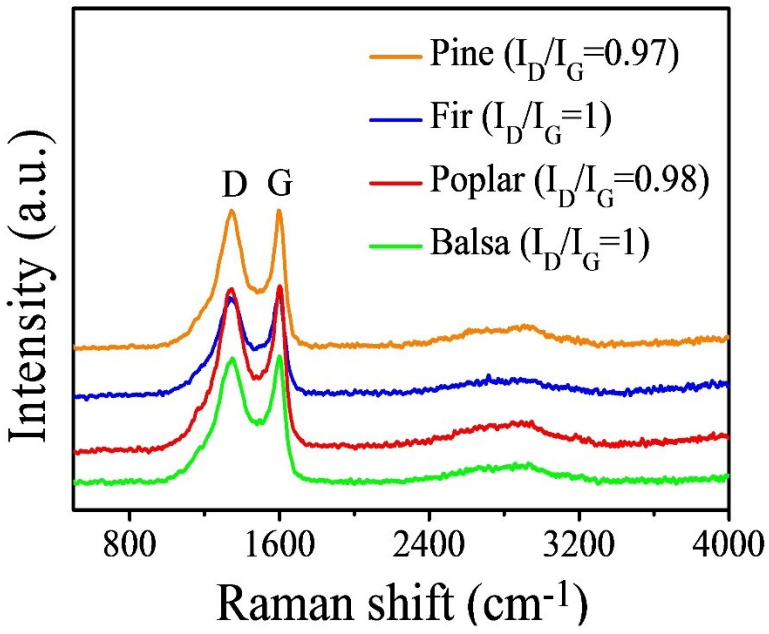

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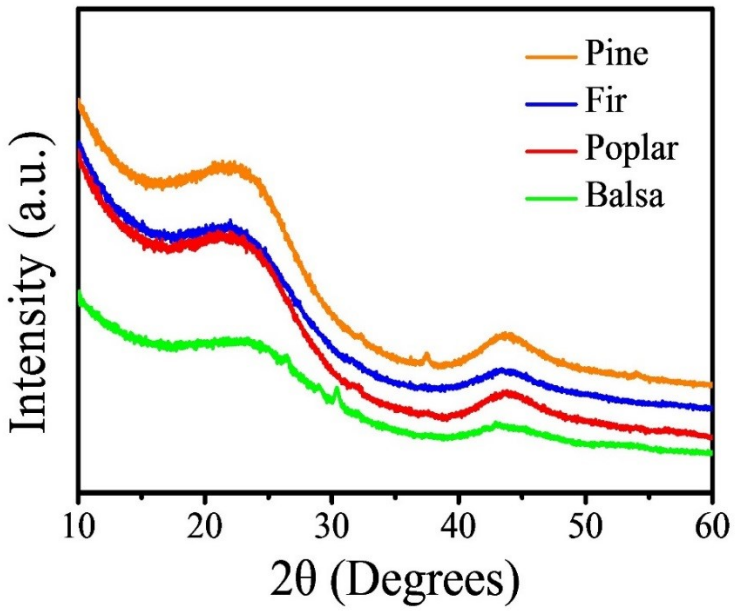

Fig. S10 XRD pattern of the wood carbons obtained by calcination at 900°C.

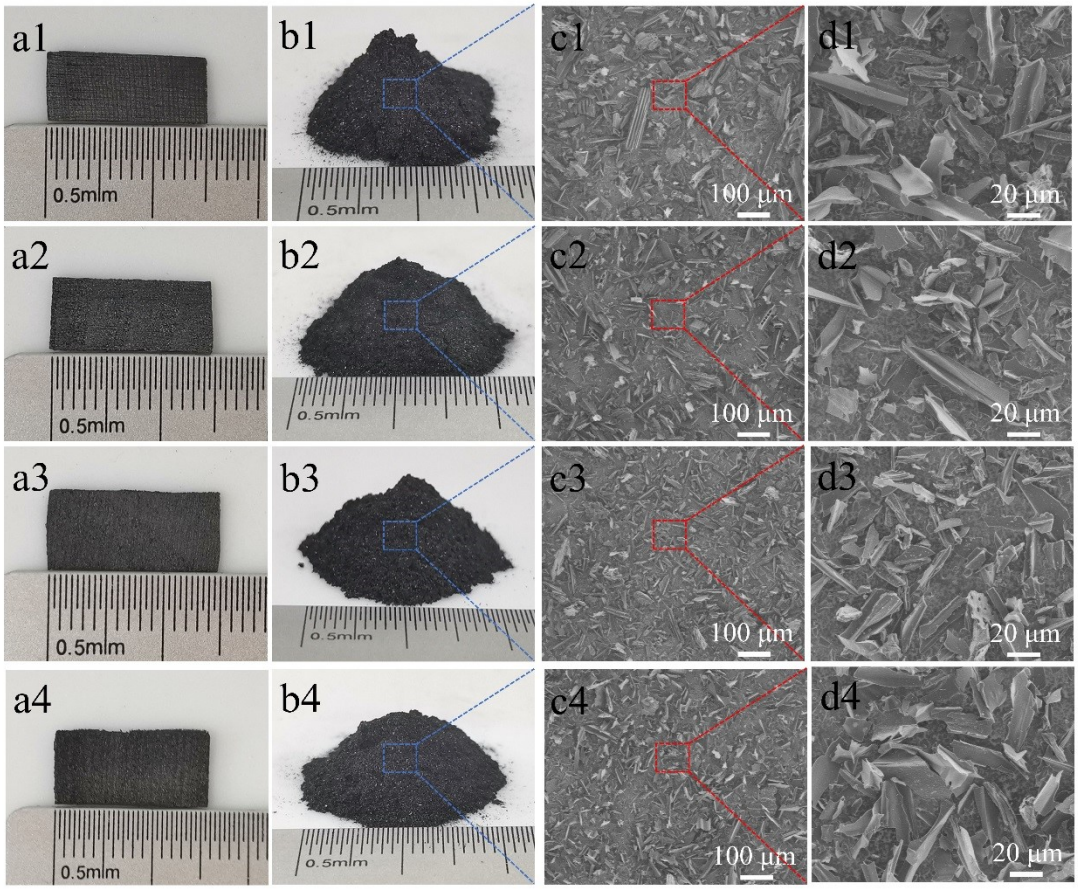

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Table S1 Pore size distribution and specific surface area of wood carbons.

Wood carbon	the pore size of macropores (μm)	Porosity	the pore size of micropores (nm)	Specific surface area ($m^2 g^{-1}$)
Pine	3.03, 25.45	43%	0.73, 1.12	396.26
Fir	0.52, 2.52, 13.91	44%	0.93, 1.27	376.12
Poplar	0.10, 71.95	68%	0.80, 1.27	386.38
Balsa	3.89, 13.91, 28.85, 143.22	22%	0.68, 1.27	482.52

Table S2 Mechanical strength of wood carbons.

Wood carbon	Pine	Fir	Poplar	Balsa
Compressive strength (MPa)	13	19	22	18
Maximum compression force (KN)	2.61	3.82	4.41	3.61