Supplementary Materials

Effects and Mechanism of Biochar Derived from Different Biomass Sources on Regulating Soil Acidification

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Table S1. Acid-neutralization performance of maize straw-derived biochar at different pyrolysis temperatures

Time	MBC300	MBC500	MBC700	MBC900
0	5.5	5.5	5.5	5.5
3min	5.52	5.56	5.58	5.59
6min	5.55	5.61	5.64	5.66
9min	5.58	5.64	5.67	5.69
12min	5.62	5.69	5.72	5.71
15min	5.66	5.74	5.77	5.76
30min	5.69	5.76	5.81	5.83
1h	5.71	5.79	5.85	5.87
1.5h	5.73	5.80	5.88	5.89
2h	5.75	5.82	5.92	5.93
4h	5.78	5.85	5.94	5.95
8h	5.80	5.86	5.97	5.97
12h	5.81	5.86	5.99	6.00
24h	5.83	5.87	6.01	6.03
48h	5.84	5.89	6.02	6.05
72h	5.85	5.87	6.04	6.06
120h	5.85	5.89	6.05	6.08
168h	5.86	5.89	6.06	6.09

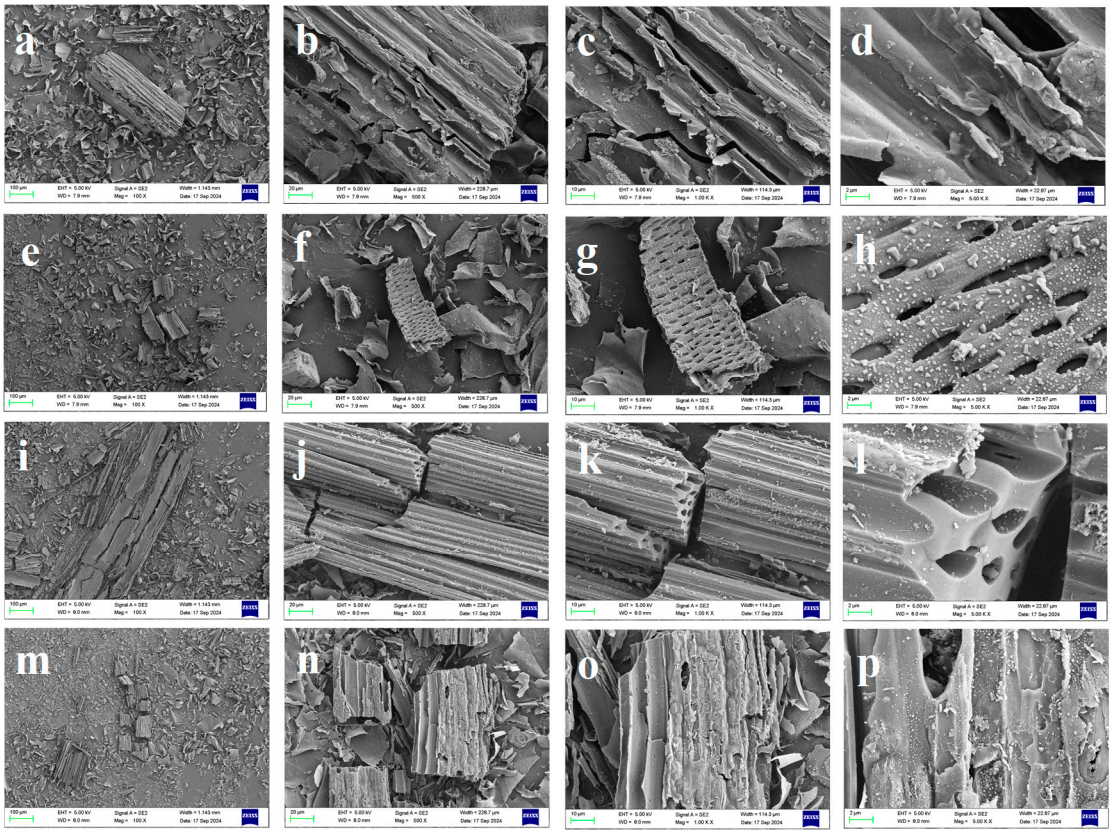


Figure S1. SEM images of maize straw-derived biochar at different pyrolysis temperatures: (a–d) 300 °C, (e–h) 500 °C, (i–l) 700 °C, and (m–p) 900 °C.

Table S2 Acid-neutralization performance of different biochar

Time(h)	MBC	RBC	SBC	CBC
0	5.5	5.5	5.5	5.5
0.1	5.64	5.65	5.6	5.62
0.2	5.72	5.74	5.66	5.69
0.25	5.77	5.78	5.73	5.75
0.5	5.81	5.83	5.78	5.8
1	5.85	5.86	5.81	5.83
1.5	5.88	5.91	5.84	5.87
2	5.92	5.94	5.87	5.89
4	5.94	5.97	5.89	5.92
8	5.97	5.99	5.92	5.95
12	5.99	6	5.95	5.97
24	6.01	6.01	5.96	5.98
48	6.02	6.02	5.96	5.99
72	6.04	6.00	5.97	5.99
120	6.05	6.01	5.98	6.00
168	6.06	6.02	5.99	6.00

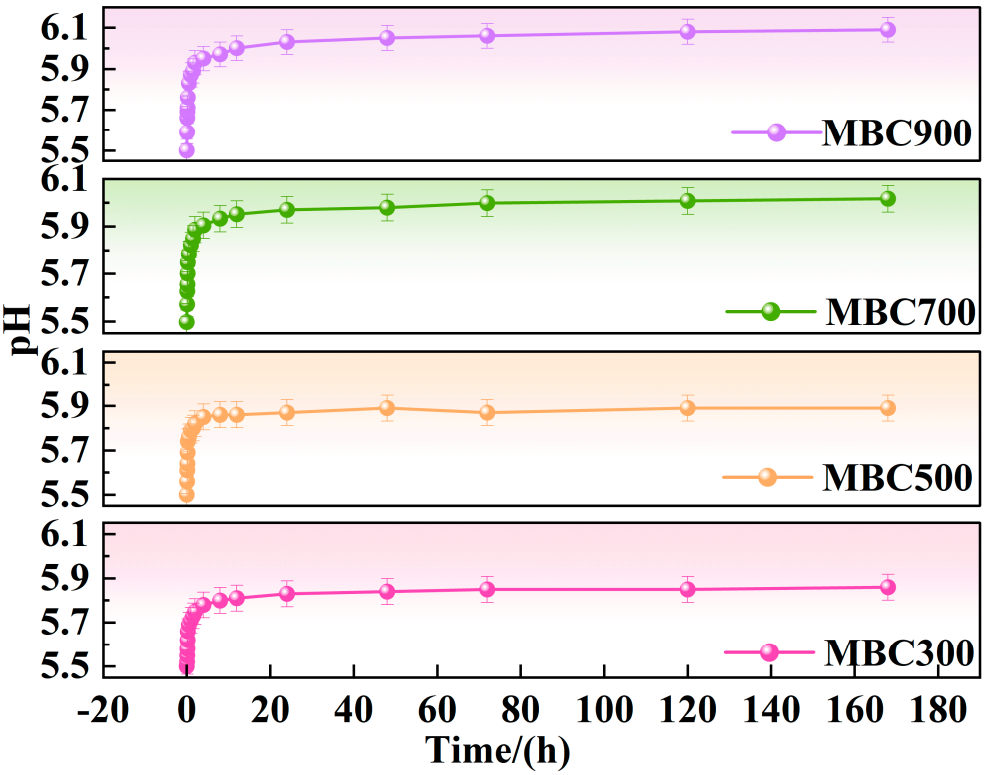


Figure S2. Acid-neutralization performance of biochar (168 h)

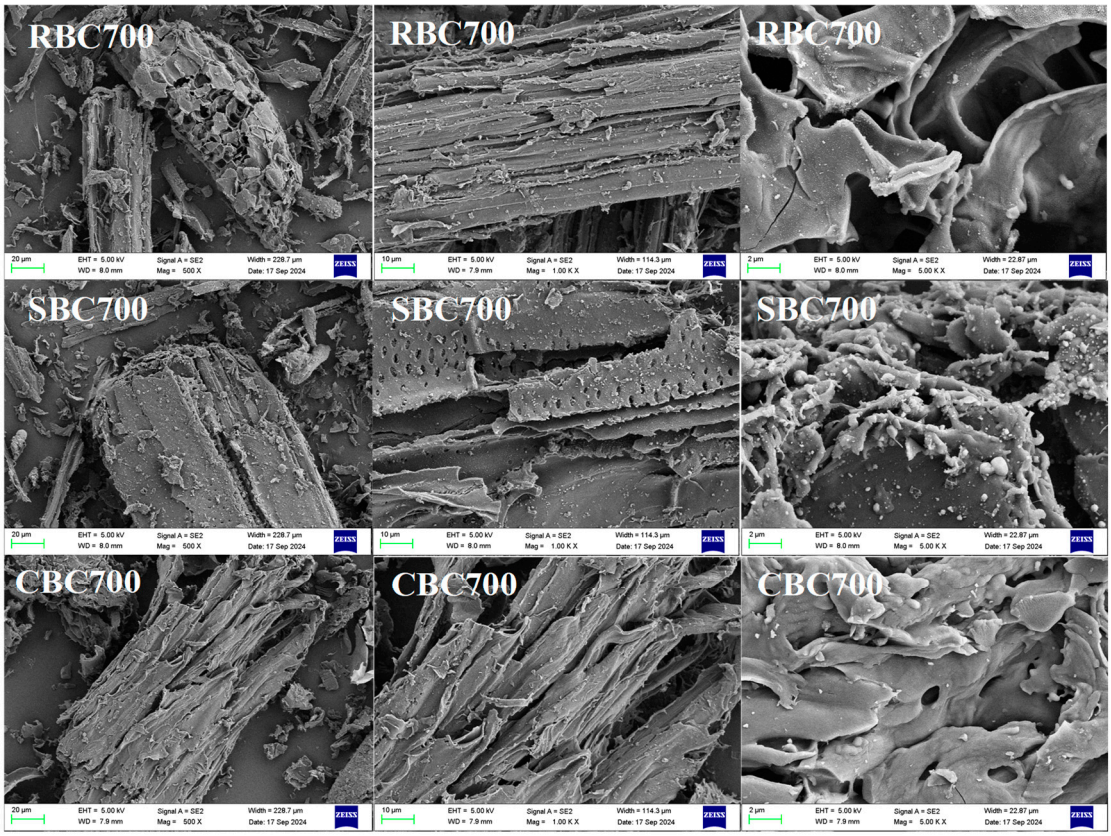


Figure S3. SEM images of biochar at 700 °C with different biomass.

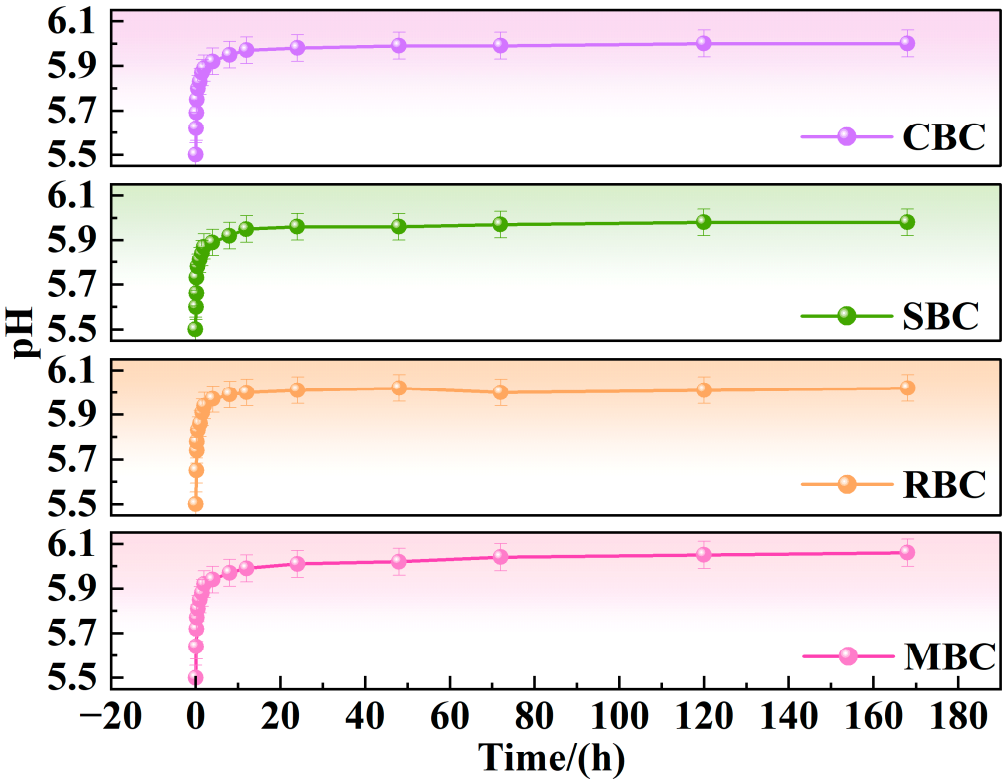


Figure S4. Acid-neutralization performance of biochar (168 h).

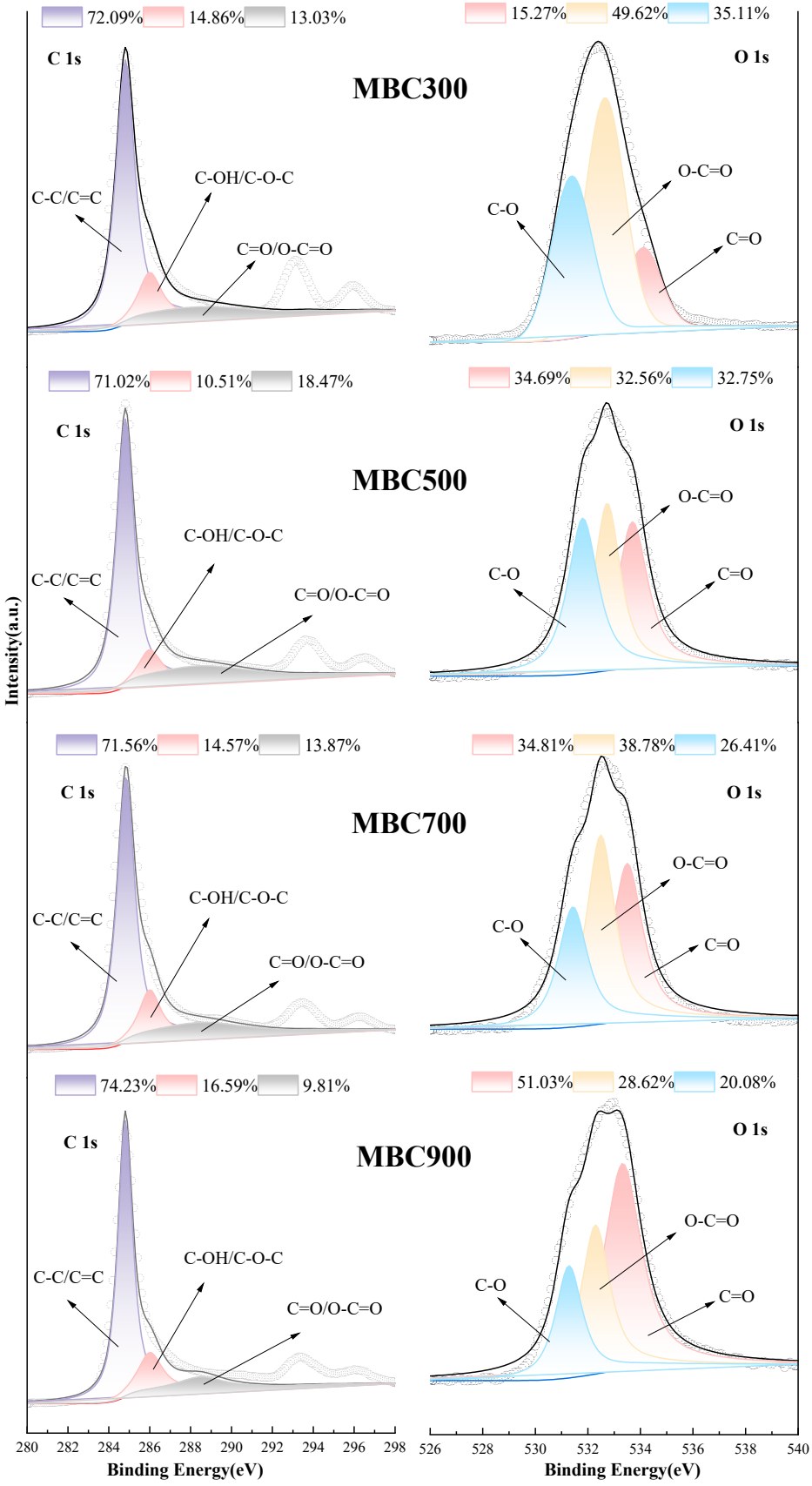


Figure S5. XPS spectra of maize straw-derived biochar at different pyrolysis temperatures (Figure 1. (c) in manuscript).

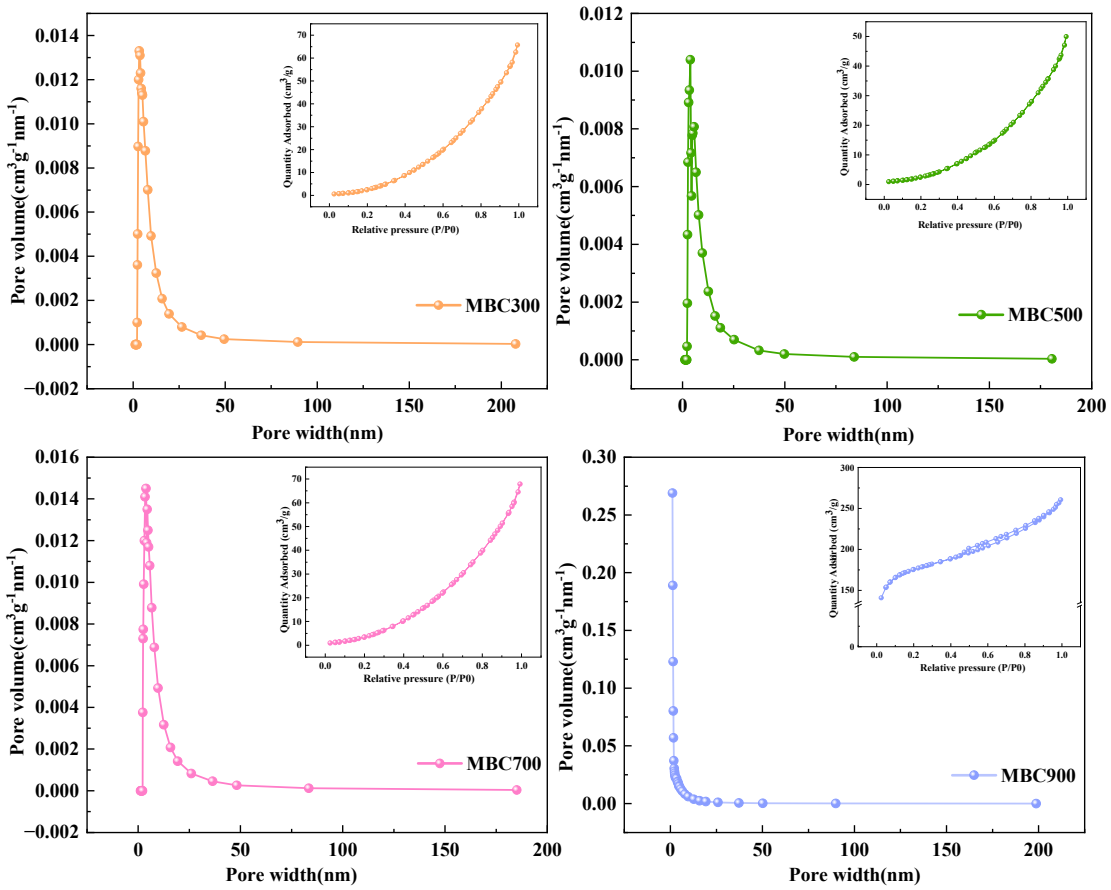


Figure S6. N_2 adsorption-desorption isotherms and pore size distributions (Figure 3. (b) in manuscript).

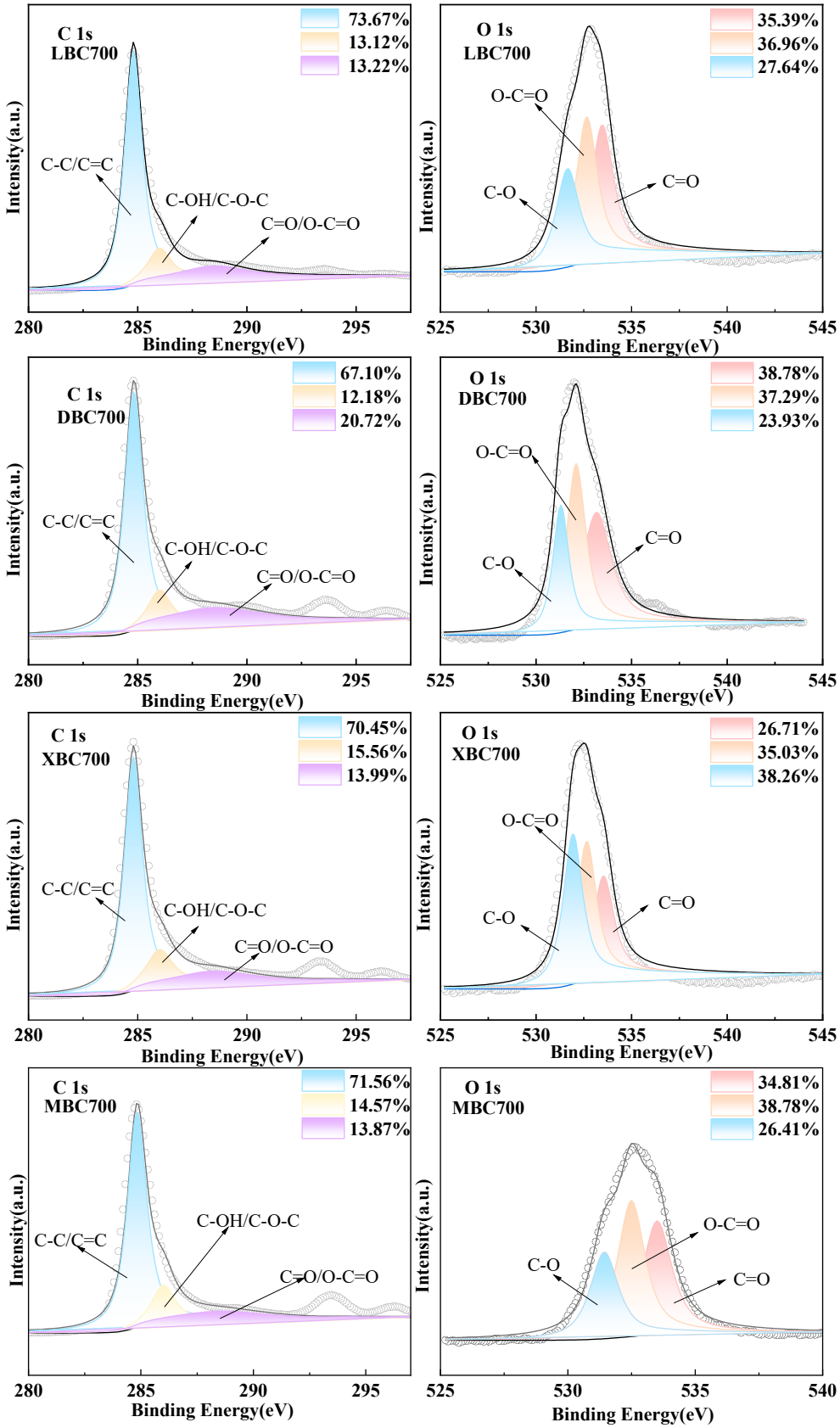


Figure S7. XPS spectra of biochar produced from varied biomass sources under consistent thermal conditions (700°C), showing C 1s and O 1s core-level spectra with deconvoluted peaks (Figure 5. (b) in manuscript).

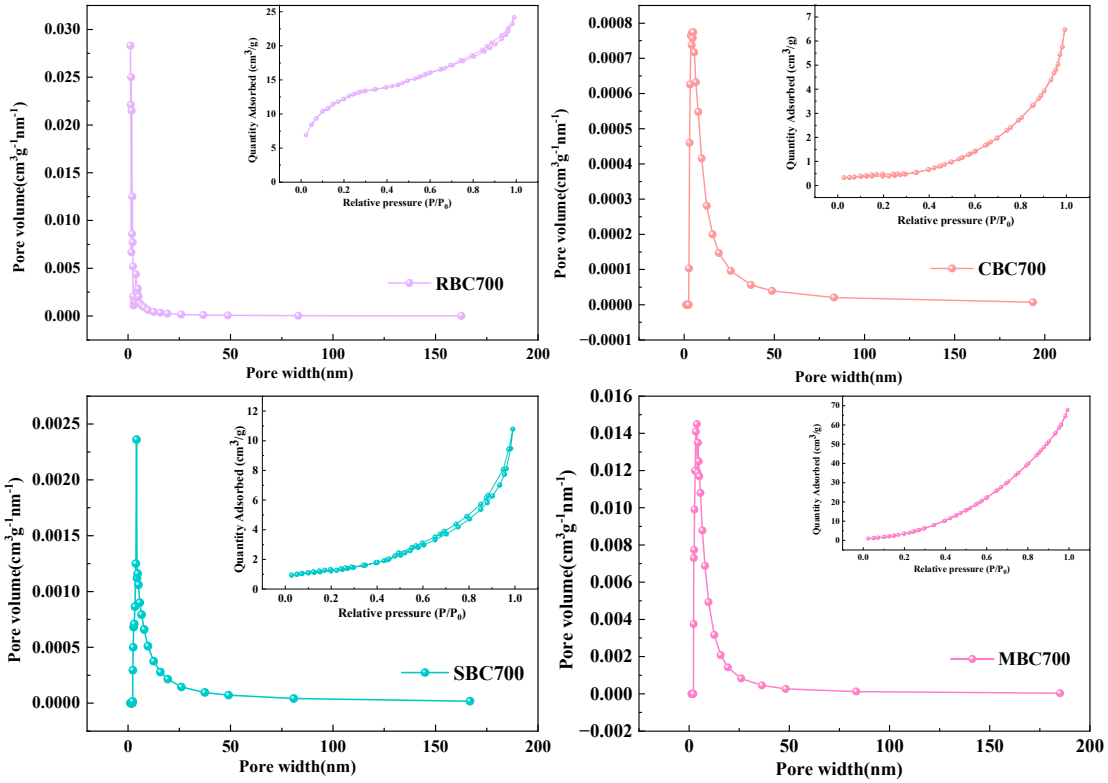


Figure S8. N_2 adsorption–desorption isotherm and pore size distribution (Figure 6. (b) in manuscript).