

Supporting Information

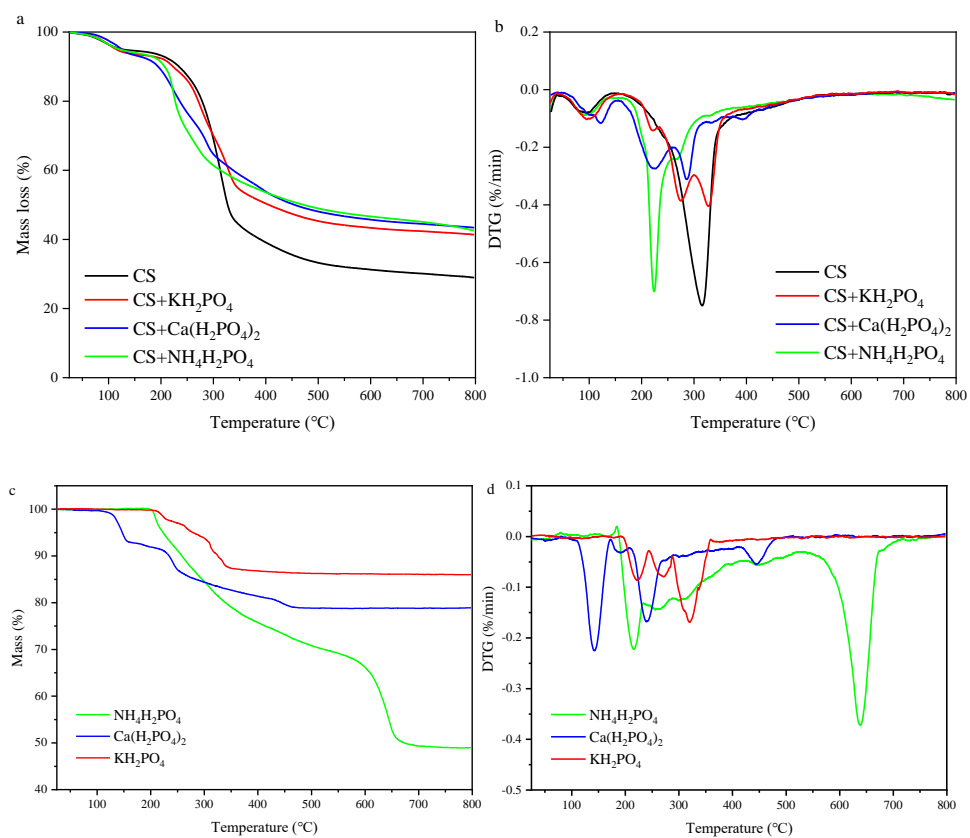
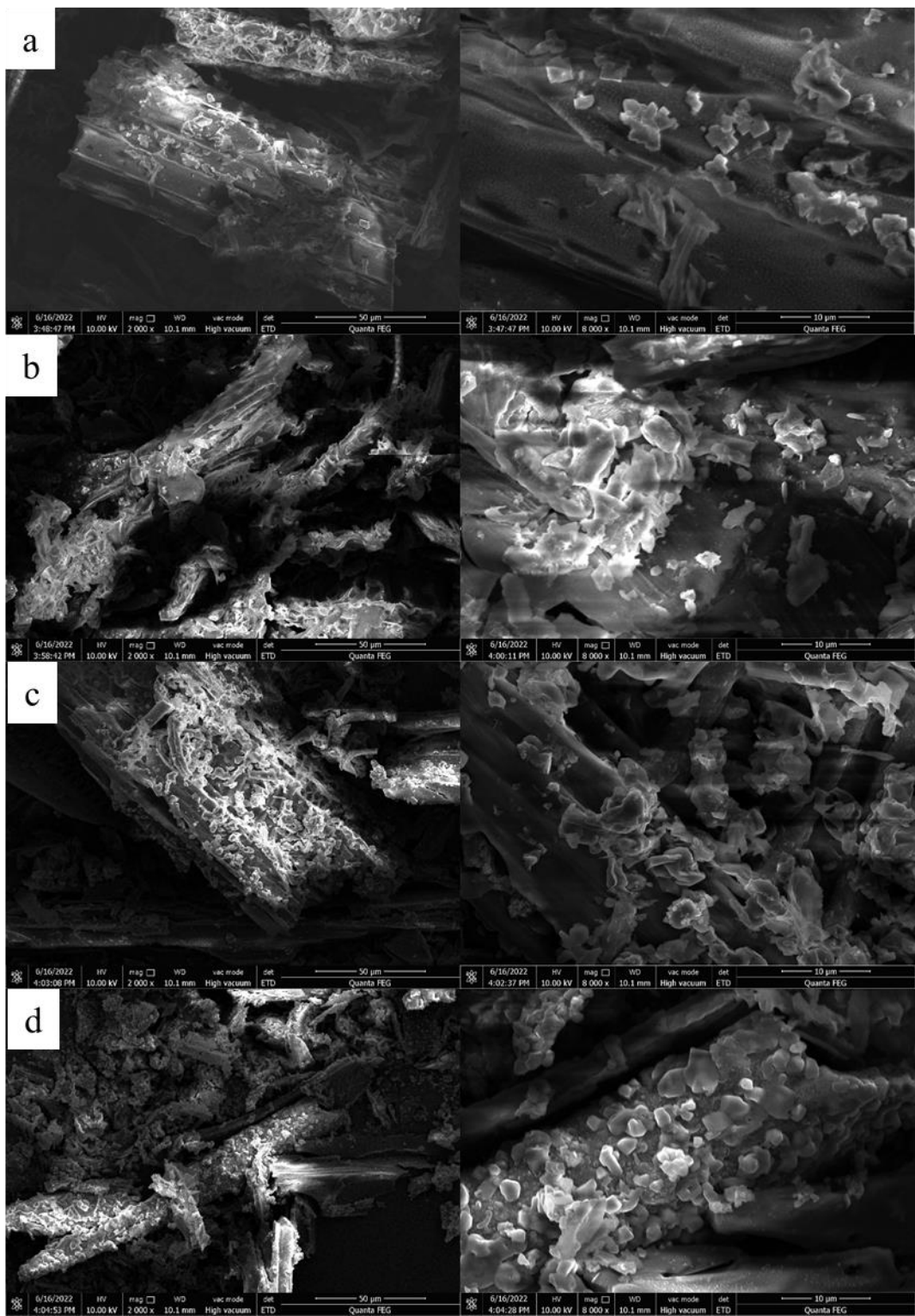
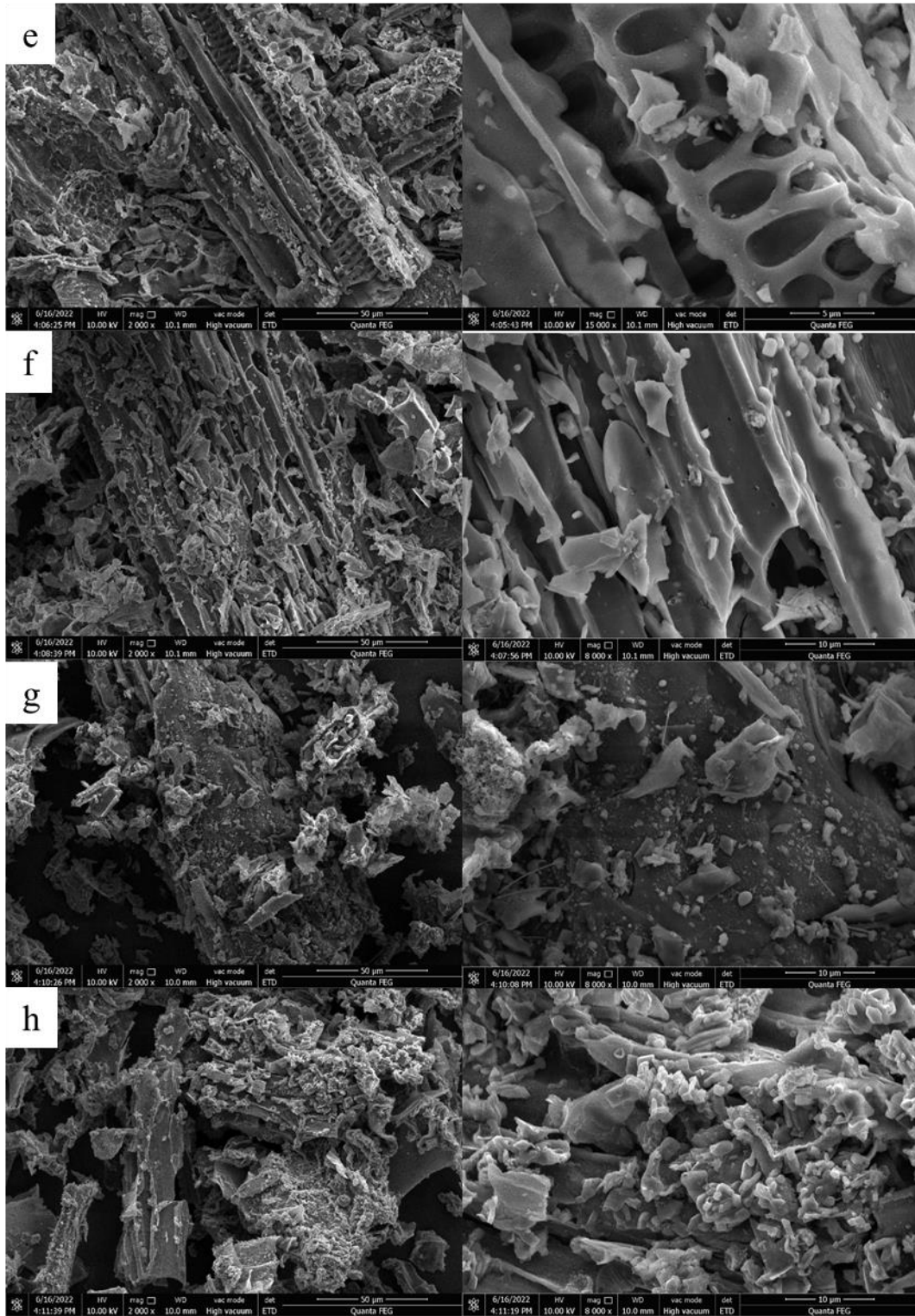


Figure S1 TG and DTG curves of corn straw with or without phosphate (a, b) and single phosphate (c, d) at a heating rate of 10 °C min⁻¹





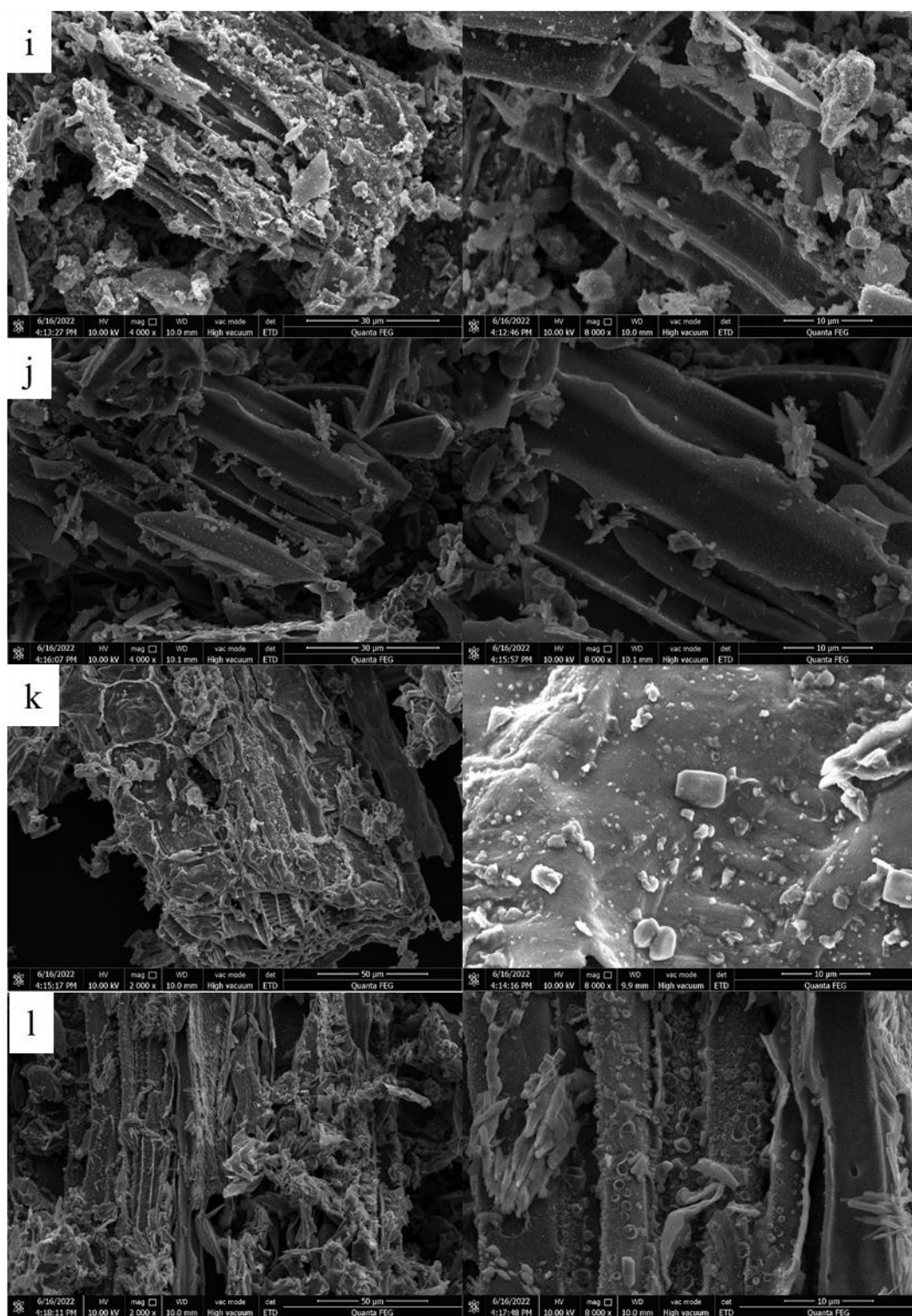


Figure S2 SEM image of the biochars (a-CSB300, b-CSB300+K, c-CSB300+Ca, d-CSB300+N, e-CSB500, f-CSB500+K, g-CSB500+Ca, h-CSB500+N, i-CSB700, j-CSB700+K, k-CSB700+Ca, l-CSB700+N)

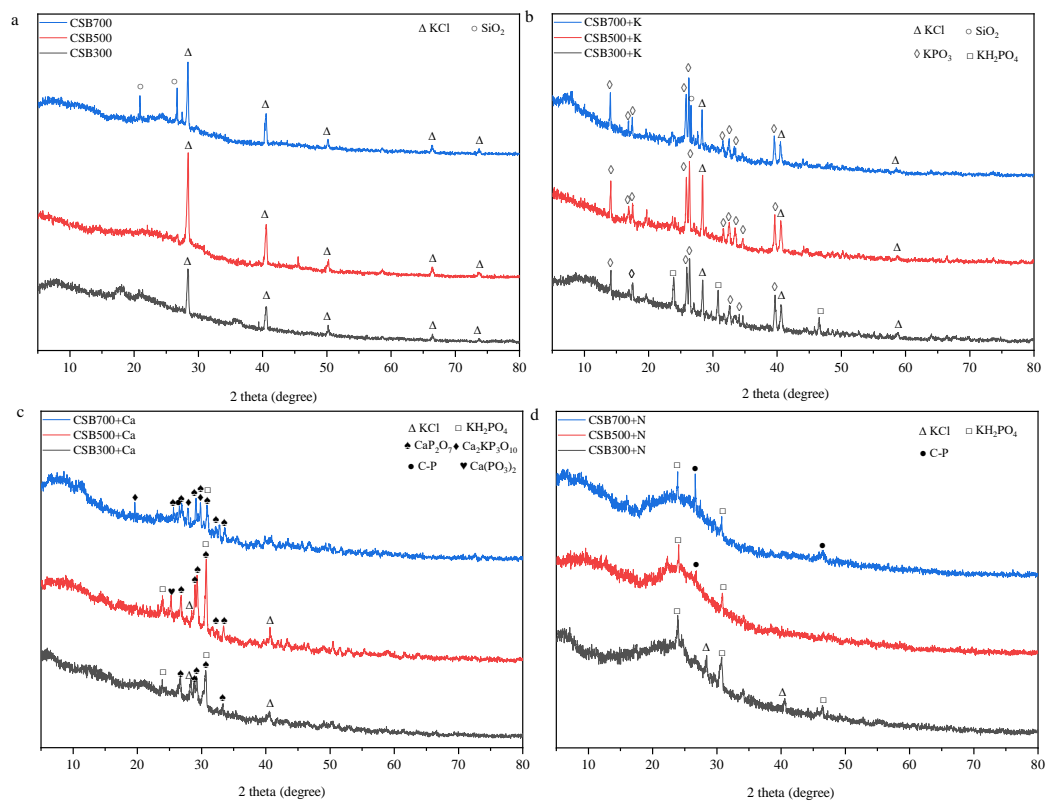


Figure S3 XRD patterns of the biochars

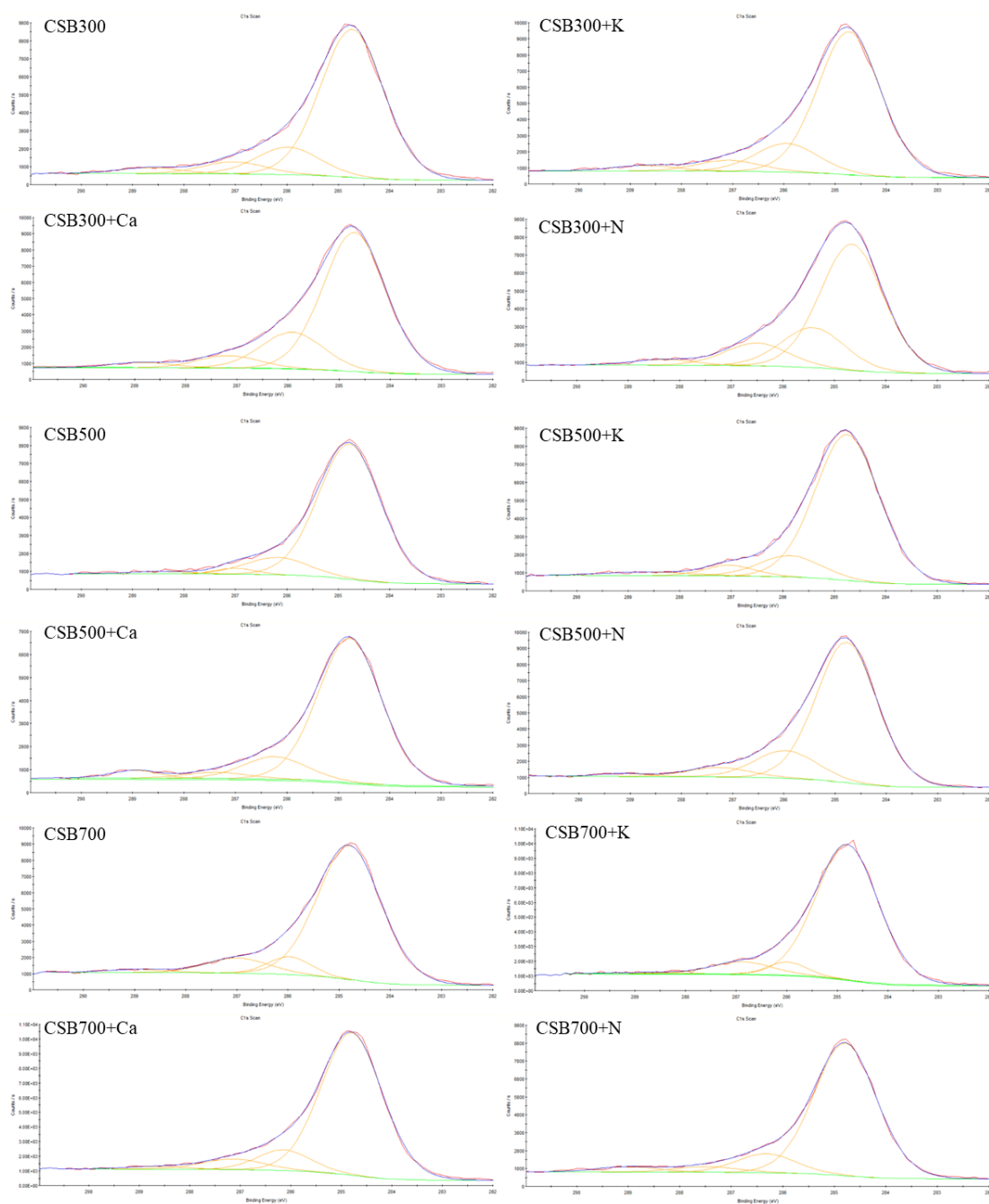


Figure S4 XPS spectra of C_{1s} in biochar

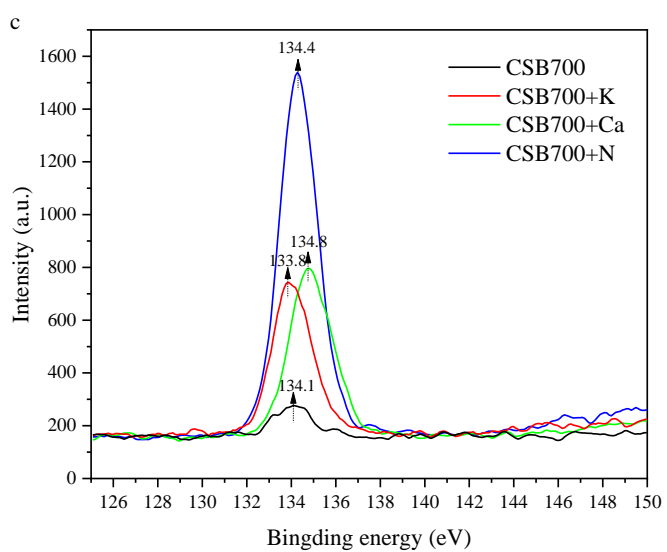
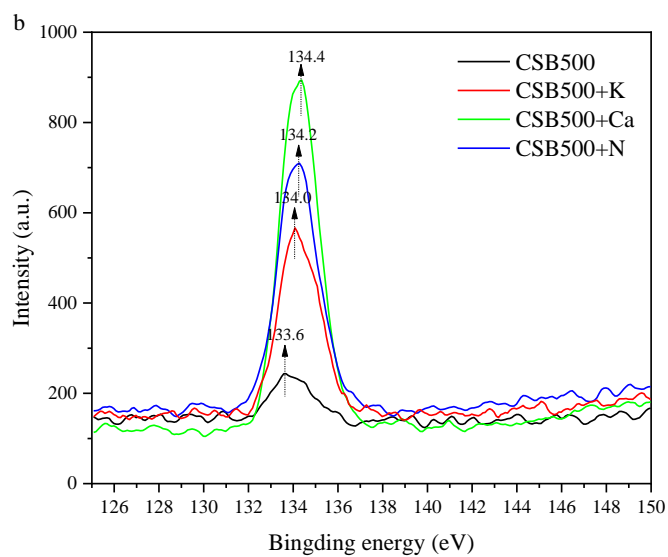
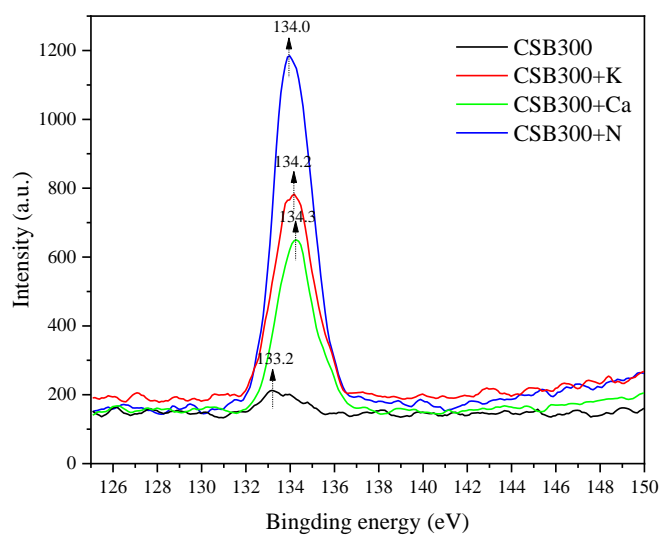


Figure S5 XPS spectra of P_{2p} in biochar

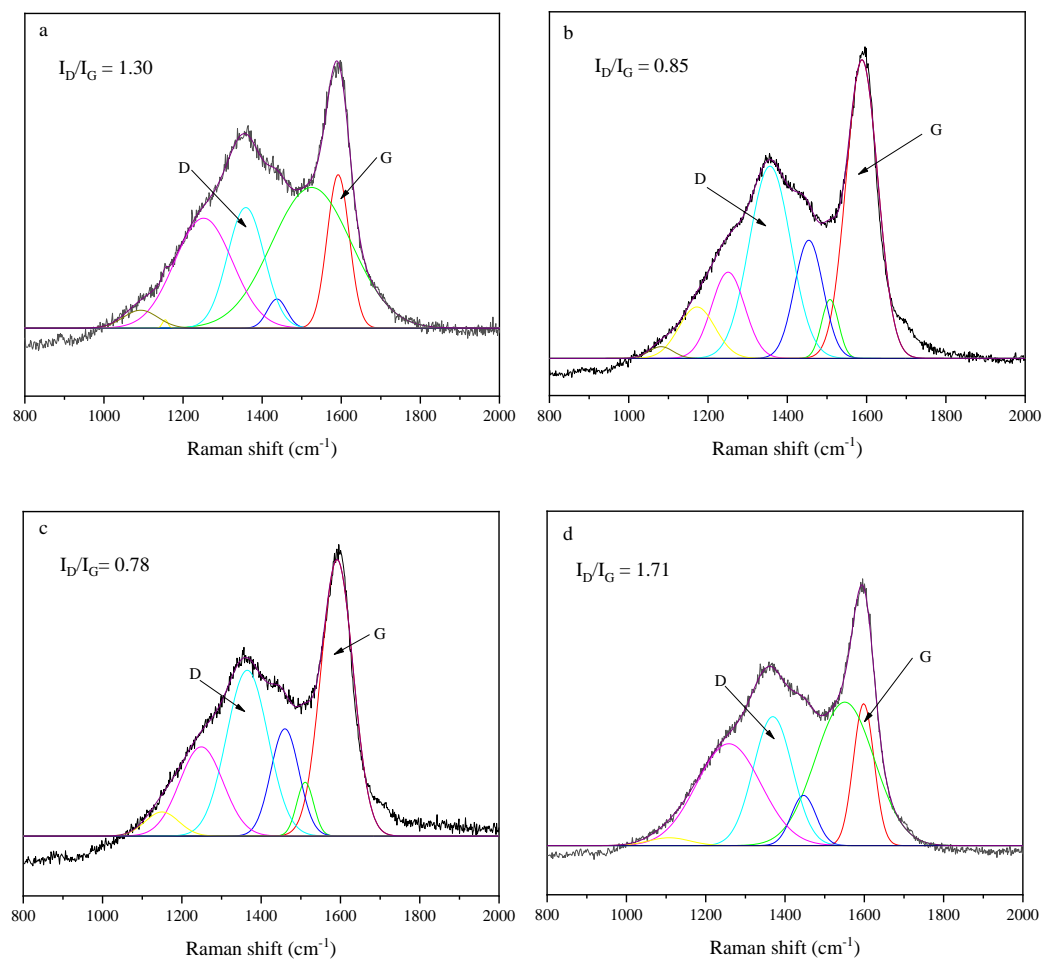


Figure S6 Raman spectra of biochars (a-CSB500, b-CSB500+K, c-CSB500+Ca, d-CSB500+N)

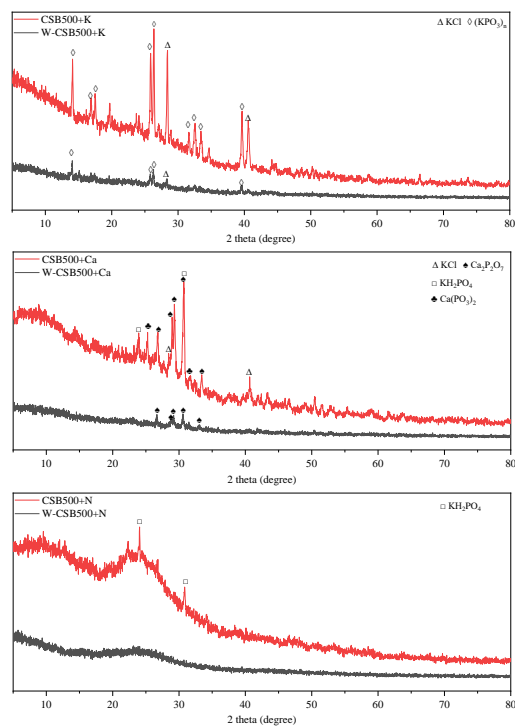


Figure S7 XRD of biochar pyrolyzed at 500 °C before and after P release

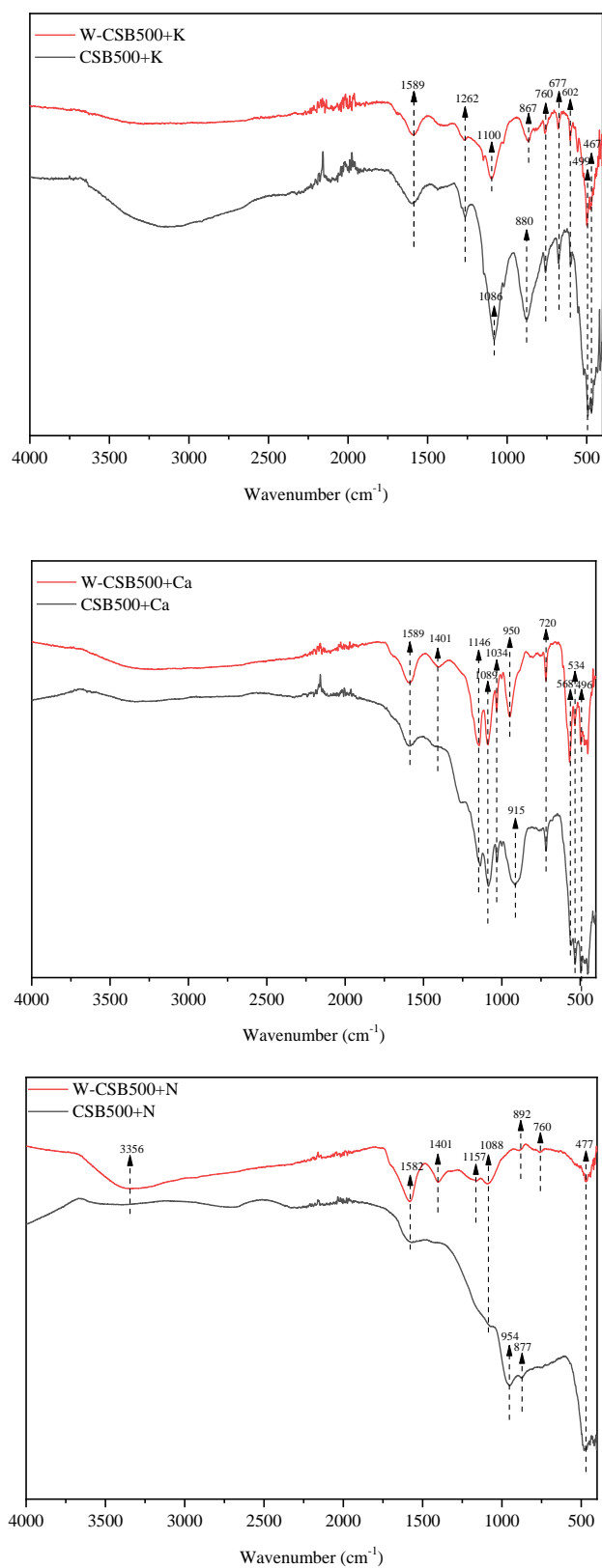


Figure S8 FTIR spectra of biochar pyrolyzed at 500 °C before and after P release

Table S1 Porous structural parameters of biochar pyrolyzed at 500°C

	BET	Total pore volume (cm ³ /g)	Micropore volume (cm ³ /g)	Percentage of micropore volume (%)	Average pore width (nm)
CSB500	9.85	0.014	0.0030	21.43	6.17
CSB500+K	37.65	0.046	0.0079	17.17	4.87
CSB500+Ca	9.95	0.020	0.0033	16.50	7.59
CSB500+N	34.46	0.037	0.0060	16.22	4.60

The specific surface area (SSA), micropore volume was calculated by the Brunauer, Emmett and Teller (BET) equation and the Horvath-Kawazoe equation.