Figure S1. Scanning electron microscopy (SEM) of Sawdust before impregnation with KOH (**A**), and after impregnation with KOH (**B**).
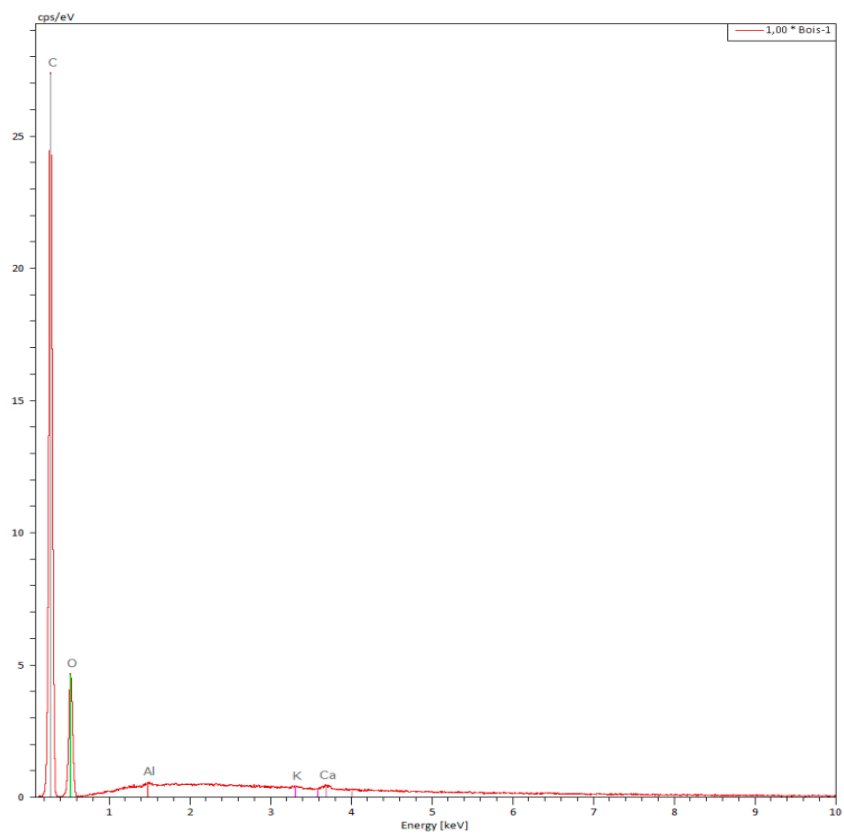

Figure S2. EDX spectrum of biomass (sawdust).

Table S1. XPS spectrum of sawdust.

O 1s (at%)	N 1s (at%)	C 1s (at%)	Si 2s (at%)	B 1s (at%)	Cl 2p (at%)	Ca 2p (at%)	Na 1s (at%)	F 1s (at%)	K 2p (at%)
12.6	5.1	74.1	0.2	0.7	0.1	0.0	0.0	0.5	6.7

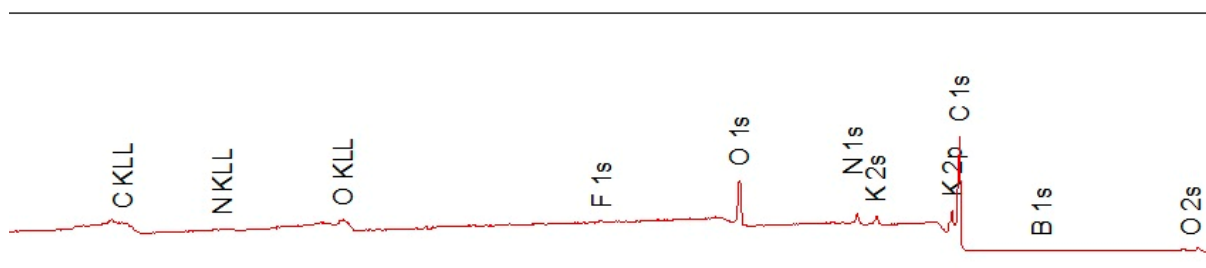**Figure S3.** XPS analysis and complete survey of sawdust.

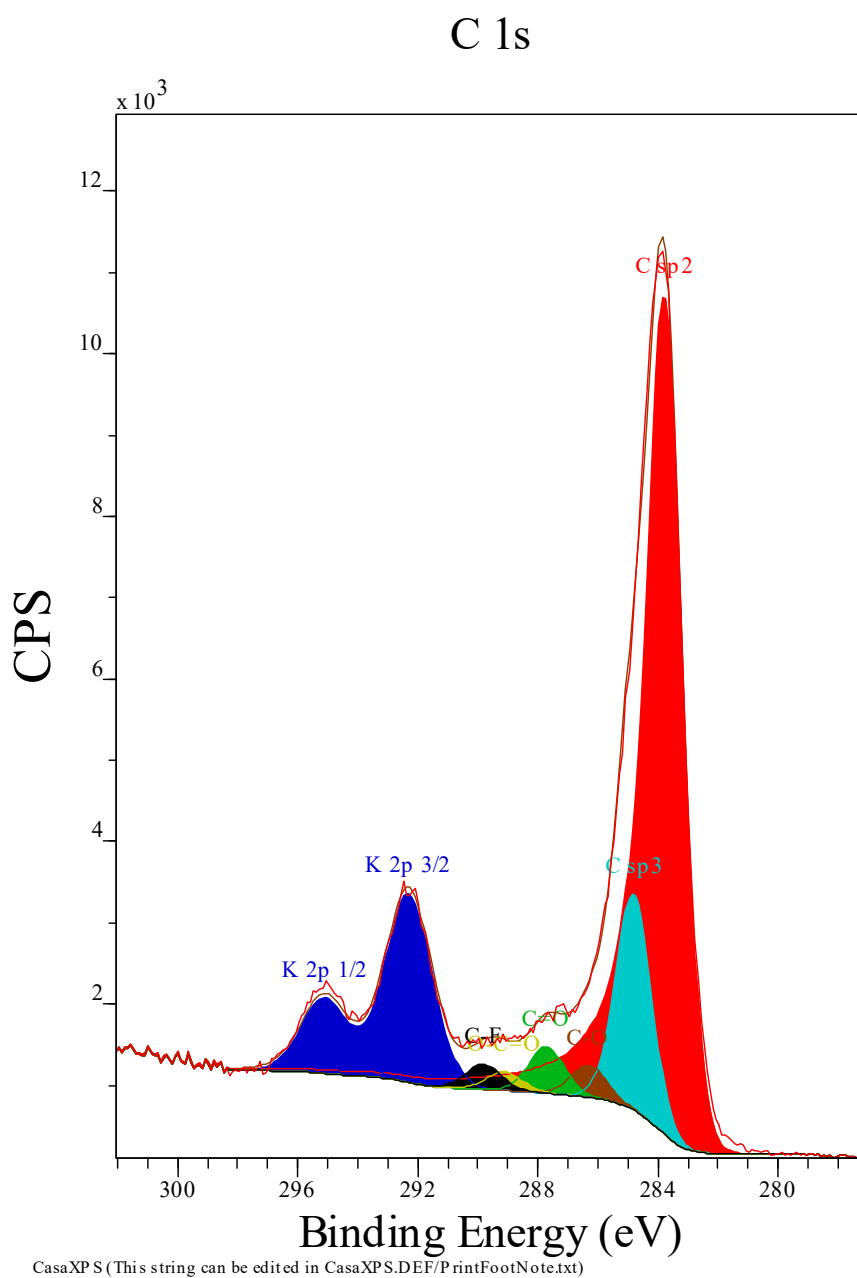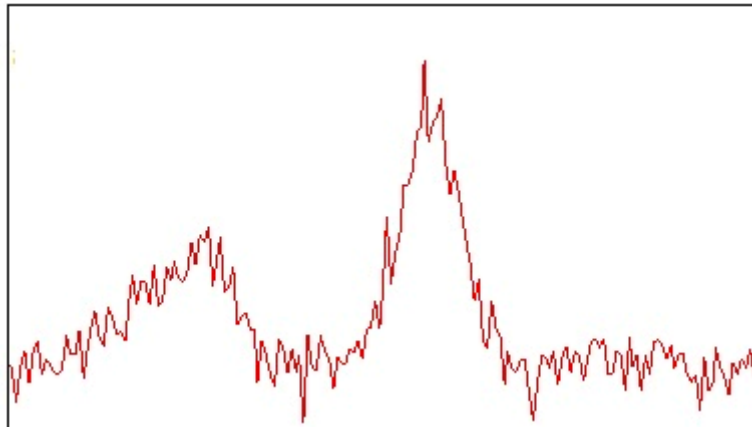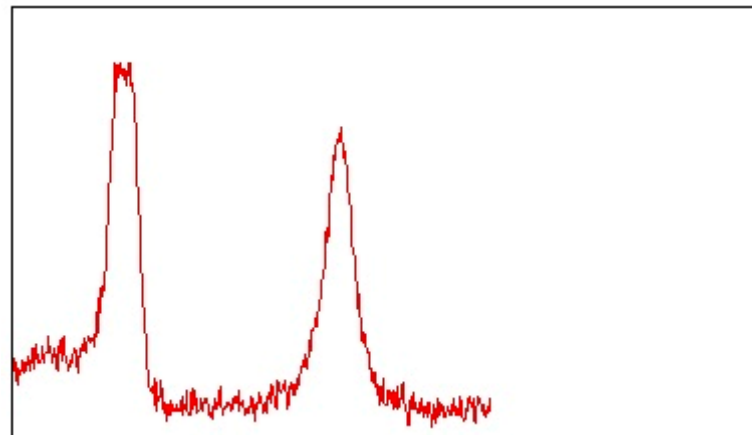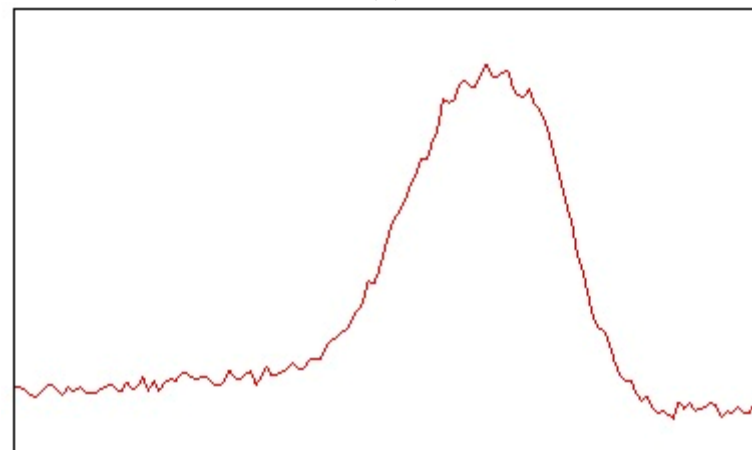## C 1s

CasaXPS (This string can be edited in CasaXPS.DEF/PrintFootNote.txt)

Figure S4. C 1s XPS spectrum of sawdust.
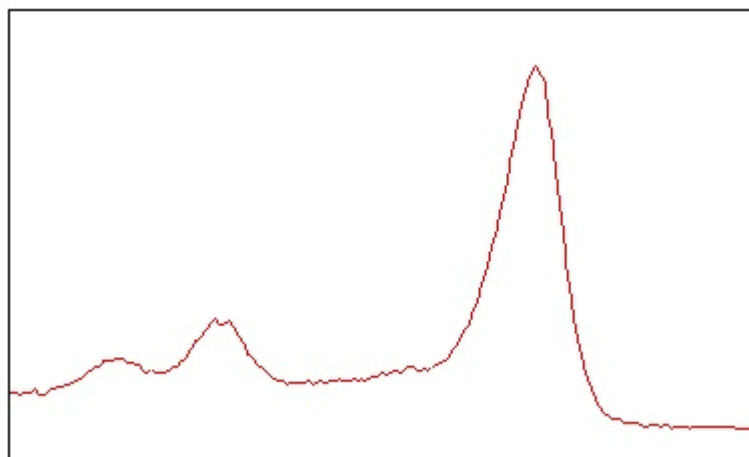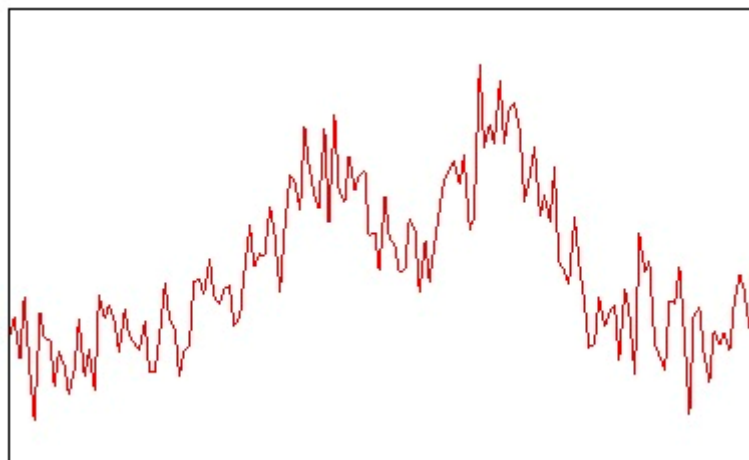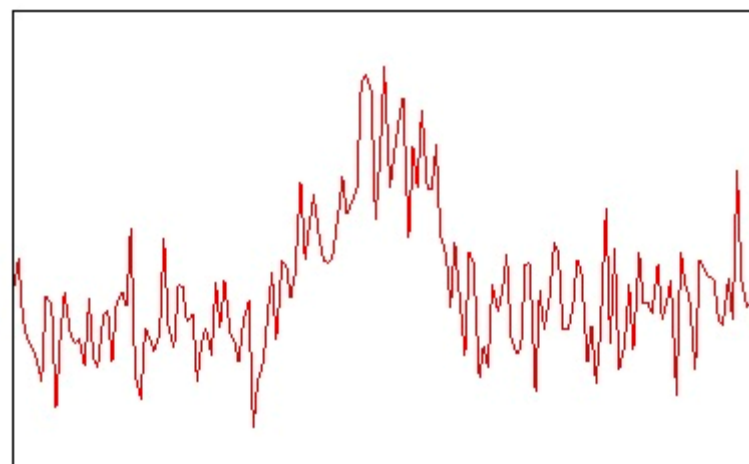
(**a**)

(**b**)

(**c**)

(**d**)

(**e**)

(**f**)

Figure S5. XPS spectrum of sawdust (a) Cl, (b) N 1s and K 2s, (c) O 1s, (d) C 1s, (e) F 1s and (f) Si 2p.

Table S2. Physico-chemical characteristics of sawdust.

Biomass Characterization	Softwood
Humidity level	10%
Granulometry	0.9–1.18 mm
ASH content	0.5 %