RECYCLED CELLULOSE POLYPROPYLENE COMPOSITE FEEDSTOCKS FOR MATERIAL EXTRUSION ADDITIVE MANUFACTURING

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Supporting Information

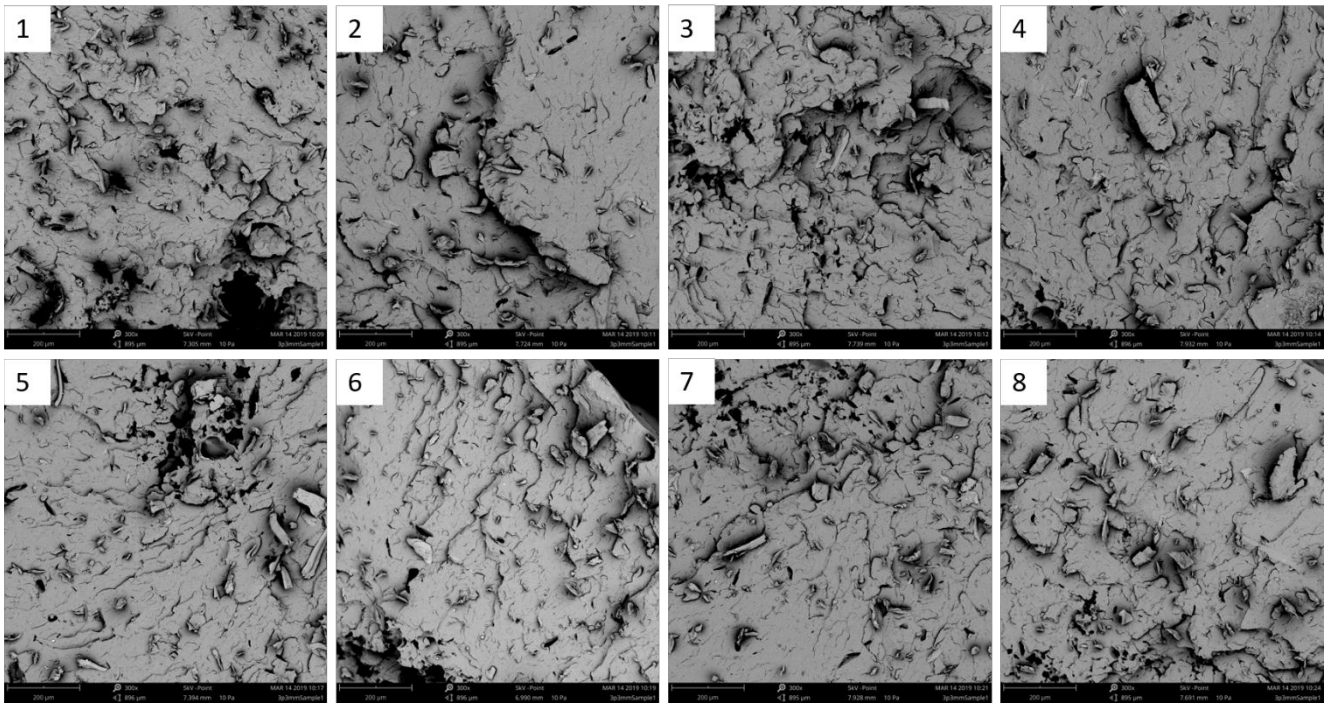

Figure S1. SEM images of cPP/ 10 wt.% CB filament cross-sections along spool (3 ft. apart)

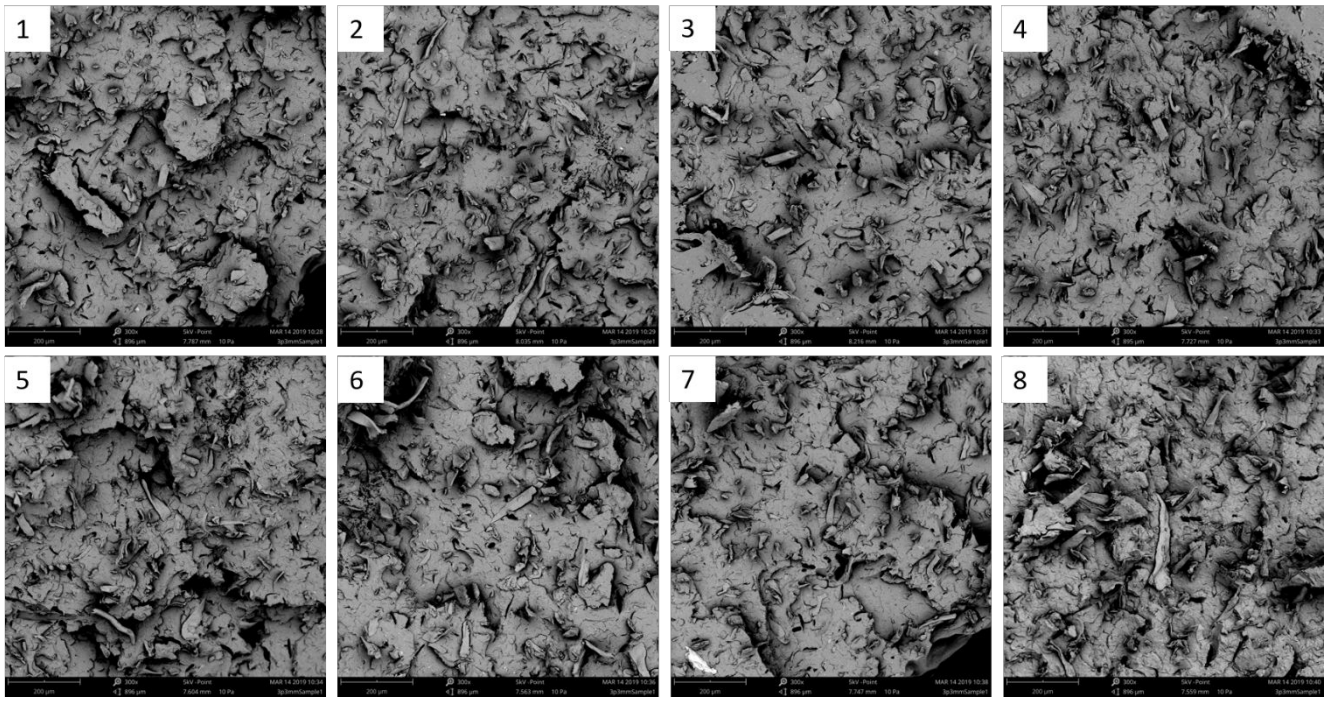

Figure S2. SEM images of rPP/ 10 wt.% CB filament cross-sections along spool (3 ft. apart)

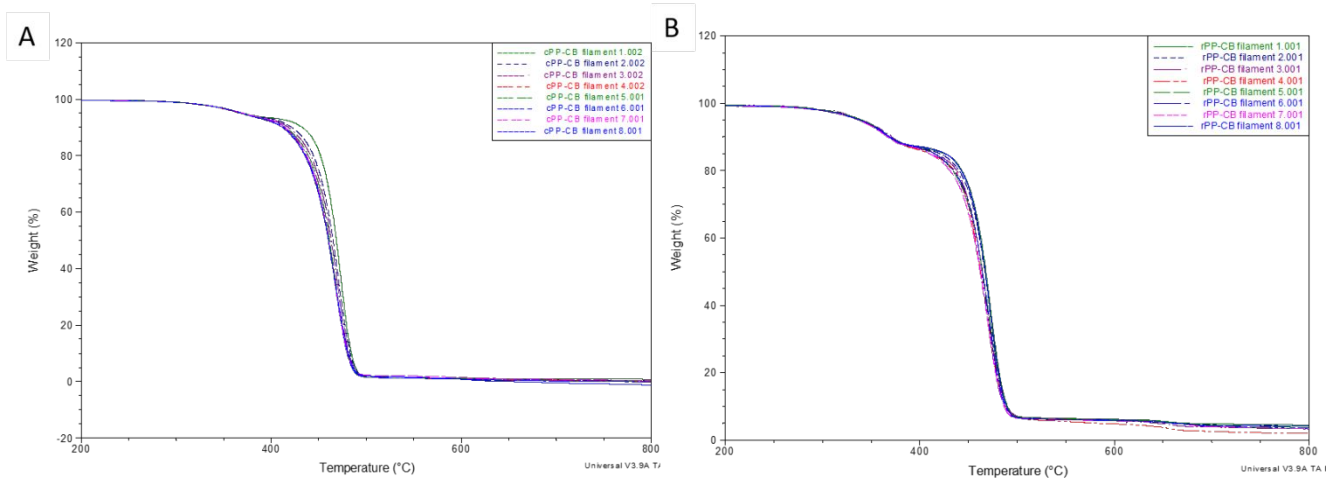

Figure S3. TGA of PP/10 wt.% CB filament along spool (3 ft. apart). (A) cPP, (B) rPP.

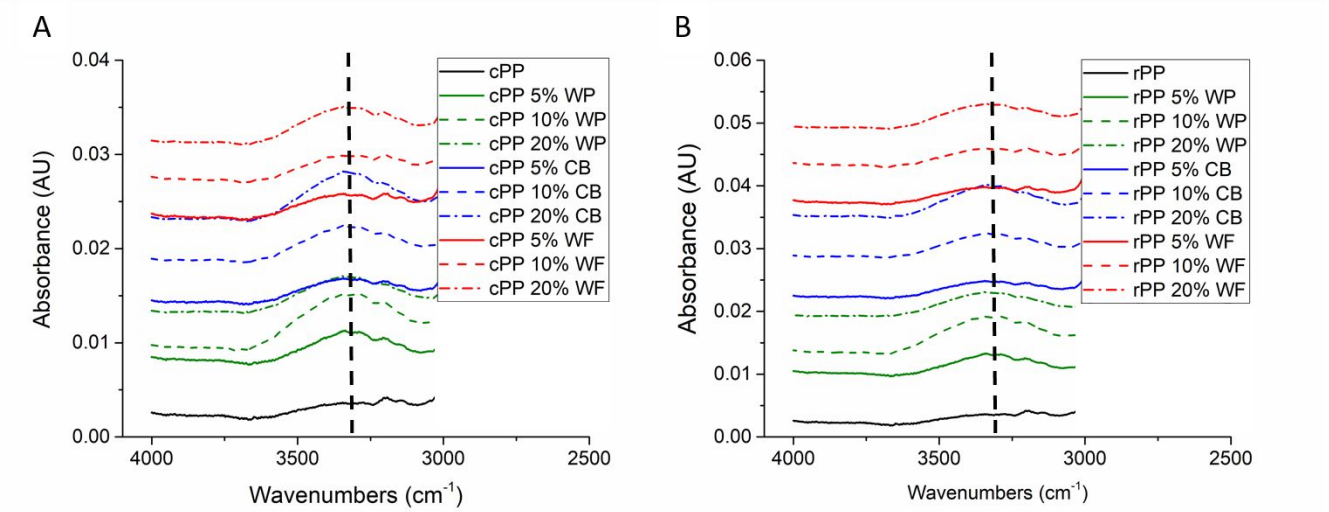

Figure S4. FTIR is printed PP/cellulose (A) cPP, (B) rPP.

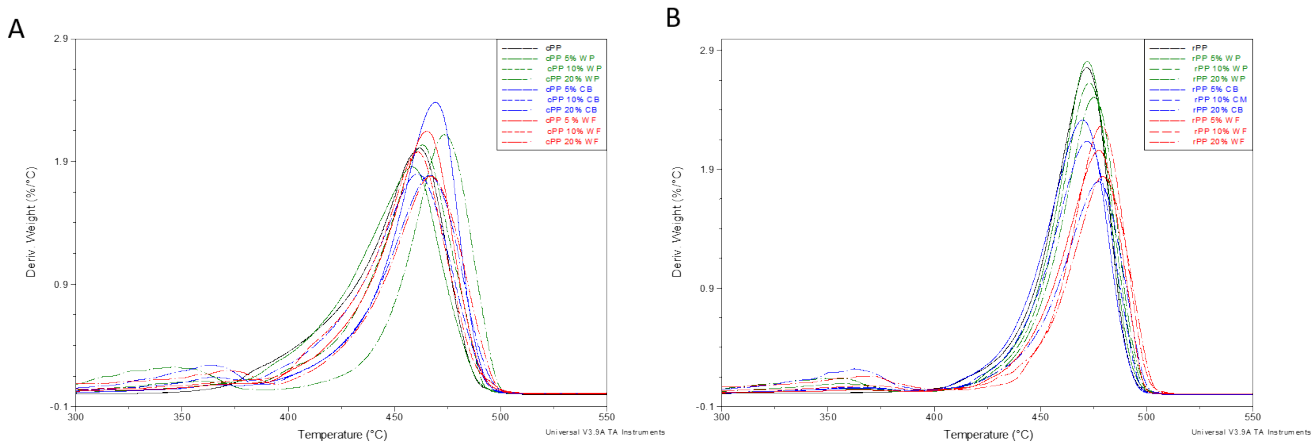

Figure S5. TGA derivative weight percent printed PP/cellulose (A) cPP, (B) rPP. Green curves = paper, blue curves = cardboard, red curves = wood flour.

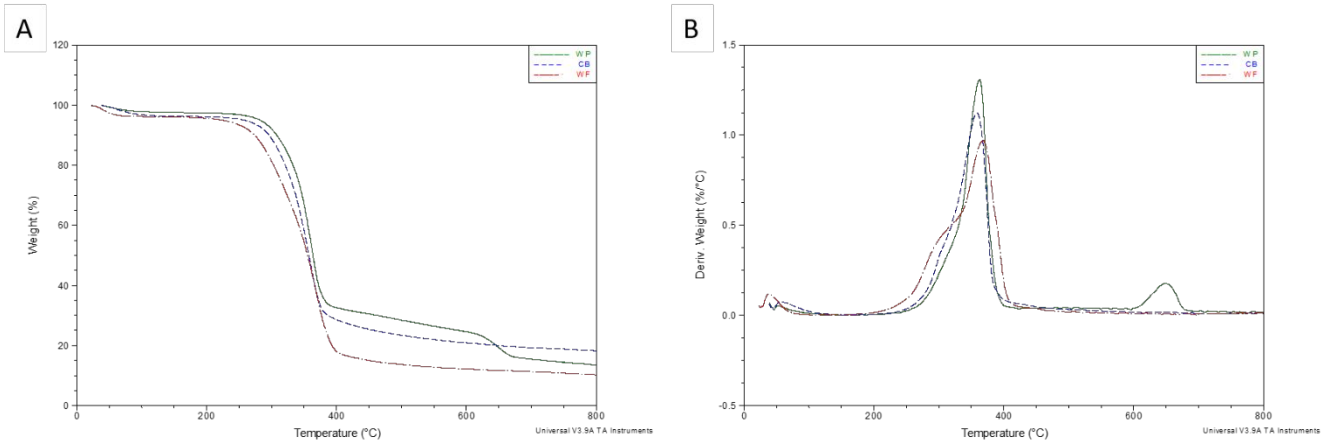

Figure S6. TGA of cellulose fillers (A) Weight loss, (B) Derivative weight. Green curve = paper, blue curve = cardboard, red curve = wood flour.

Table S1. TGA weight percent remaining

Sample	**TGA* (Wt. % at 500 °C)**	**TGA* (Expected Wt. % at 500 °C)**
rPP	-------	-------
rPP 5% WP	0.5	1.4
rPP 10% WP	0.9	2.8
rPP 20% WP	2.5	5.7
rPP 5% CB	4.9	1.2
rPP 10% CB	11.5	2.3

rPP 20% CB	15.6	4.6
rPP 5% WF	19.4	0.7
rPP 10% WF	16.8	1.4
rPP 20% WF	16.8	2.7
cPP	-------	-------
cPP 5% WP	1.5	1.41
cPP 10% WP	2.7	2.8
cPP 20% WP	6.5	5.7
cPP 5% CB	0.9	1.2
cPP 10% CB	2.1	2.3
cPP 20% CB	3.8	4.6
cPP 5% WF	1.3	0.7
cPP 10% WF	1.5	1.4
cPP 20% WF	3.5	2.7
WP	28.3	-------
CB	23.2	-------
WF	13.6	-------

*controls subtracted

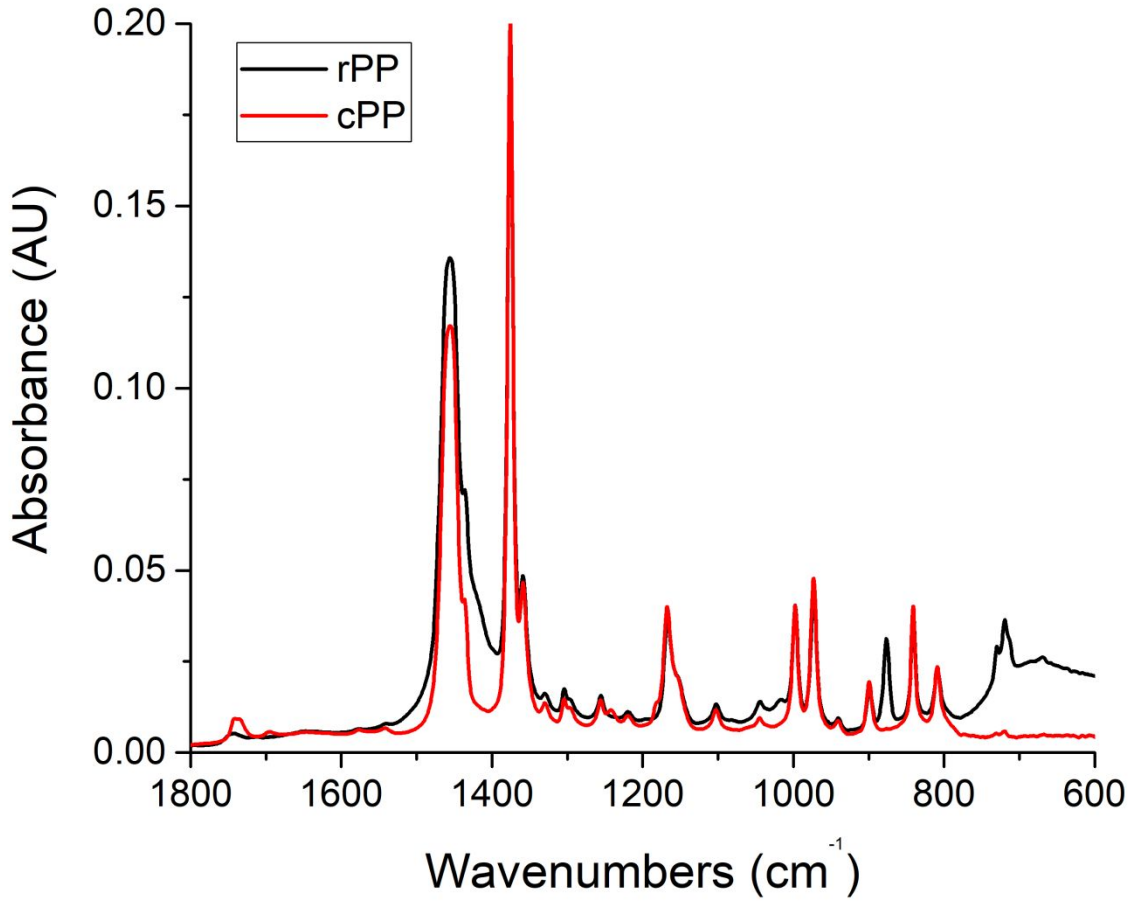

Figure S7. FTIR of rPP and cPP

Table S2. Specific Energy of rPP Composites

Sample	Throughput (g/hr)	Specific Energy (kJ/g)
rPP/ 10 wt.% WP	39.4	2.7
rPP/ 10 wt.% CB	39.2	2.8
rPP/ 10 wt.% WF	39.5	2.7

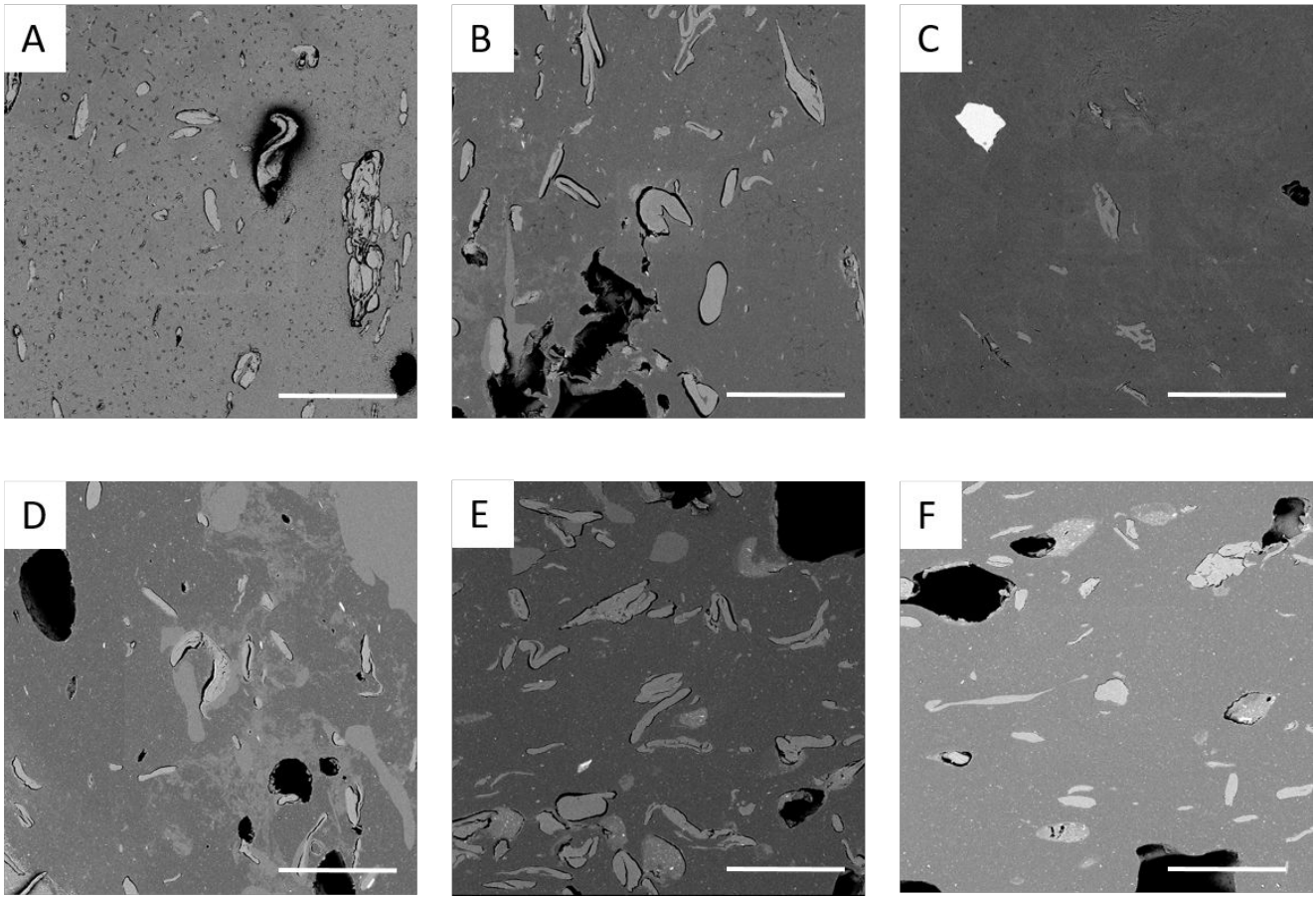

Figure S8. SEM images of polished PP/cellulose fracture surfaces (A) cPP 10% WP, (B) cPP 10 wt. % CB, (C) cPP 10 wt. % WF, (D) rPP 10 wt. % WP, (E) rPP 10 wt. % CB, (F) rPP 10 wt. % WF. Scale bar denotes 80 μm.