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Supplement of

Chemically distinct particle-phase emissions from highly controlled pyrolysis of three wood types

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I.1 Changes to the standard fragmentation table for high resolution analyses

The CO^+ fragment was the primary contributor to total organic mass loading but could only be fit and quantified at high signal levels due to its proximity to N_2^+. This reduces our ability to quantify the comparatively low loading at the start and end of each experiment. When CO^+ was not quantifiable at low loadings, but CO_2^+ was, the experiment median CO^+/CO_2^+ ratio was used to quantify CO^+. When CO_2^+ was below detection (defined as 3σ of filtered air), the data were not used for chemical analysis.

Another change from the standard high-resolution AMS analysis was to use the HR fragmentation table for m/z 15. Using standard fitting, some of the CH_3^+ signal was apportioned to NH^+ because the CH_3^+ signal was so large. Upon further inspection there was no correlation between NH^+ and other ammonium-related fragments, so NH^+ in the high resolution fragmentation table was set equal to 0.1*NH_2^+, the same relationship as in the unit mass resolution fragmentation table (Allan et al. 2004).

Table S1. Median fractional contribution of each ion to total organic mass in Figure 5.

Temp (°C)	Size	Wood	$f\mathrm{CO}^+$	$f\mathrm{C_2H_4O_2}^+$	$f\mathrm{CHO}^+$	$f\mathrm{C_9H_7}^+$	$f\mathrm{C_9H_{11}O_3}^+$	$f\mathrm{C_9H_{11}}^+$
400	S	Maple	0.14	0.027	0.042	2.8E-03	8.1E-03	3.6E-04
400	S	Maple	0.14	0.026	0.044	2.7E-03	7.8E-03	3.7E-04
500	S	Maple	0.15	0.025	0.038	4.3E-03	5.0E-03	4.0E-04
500	S	Maple	0.14	0.027	0.038	4.6E-03	5.6E-03	3.9E-04
600	S	Maple	0.22	0.018	0.030	5.4E-03	4.4E-04	2.1E-04
600	S	Maple	0.22	0.017	0.030	5.6E-03	5.1E-04	2.1E-04
500	S	Oak	0.22	0.025	0.048	3.0E-03	4.7E-03	4.7E-04
500	M	Oak	0.22	0.024	0.047	3.0E-03	5.3E-03	4.5E-04
500	L	Oak	0.19	0.027	0.046	3.5E-03	5.7E-03	4.6E-04
600	S	Oak	0.25	0.025	0.049	4.0E-03	1.0E-03	3.8E-04
600	M	Oak	0.24	0.027	0.047	4.6E-03	9.5E-04	4.1E-04
600	L	Oak	0.20	0.031	0.043	6.0E-03	5.8E-04	4.2E-04
500	S	Fir	0.18	0.048	0.061	1.7E-03	4.0E-05	2.7E-03
500	M	Fir	0.15	0.035	0.066	2.2E-03	6.6E-06	2.6E-03
500	L	Fir	0.14	0.029	0.058	2.4E-03	2.6E-05	1.5E-03

600	S	Fir	0.20	0.044	0.075	1.9E-03	3.5E-05	1.1E-03
600	M	Fir	0.13	0.032	0.072	2.3E-03	0.0E+00	9.8E-04
600	L	Fir	0.12	0.030	0.067	2.8E-03	0.0E+00	1.2E-03

Table S2. Median fractional contribution of each ion to total organic mass in Figure S2.

Temp (°C)	Size	Wood	$\boldsymbol{f}C_2H_3O^+$	$\boldsymbol{f}CO_2^+$	$\boldsymbol{f}C_3H_5O_2^+$
400	S	Maple	0.051	0.013	0.012
400	S	Maple	0.051	0.014	0.012
500	S	Maple	0.039	0.015	0.010
500	S	Maple	0.041	0.013	0.011
600	S	Maple	0.022	0.022	0.006
600	S	Maple	0.023	0.022	0.006
500	S	Oak	0.033	0.020	0.011
500	M	Oak	0.035	0.019	0.011
500	L	Oak	0.039	0.017	0.012
600	S	Oak	0.028	0.031	0.010
600	M	Oak	0.029	0.025	0.011
600	L	Oak	0.030	0.019	0.012
500	S	Fir	0.033	0.018	0.015
500	M	Fir	0.031	0.020	0.011
500	L	Fir	0.032	0.019	0.010
600	S	Fir	0.033	0.026	0.013
600	M	Fir	0.031	0.024	0.010
600	L	Fir	0.030	0.023	0.009

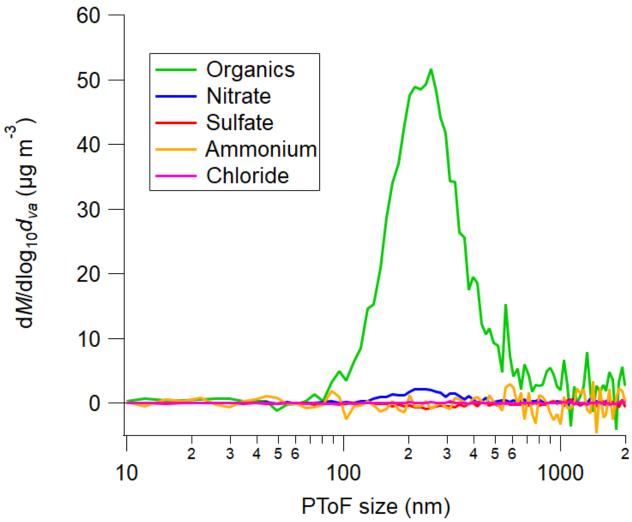

Figure S1. An example size distribution from Fir pyrolyzed at 600°C, size large wood.

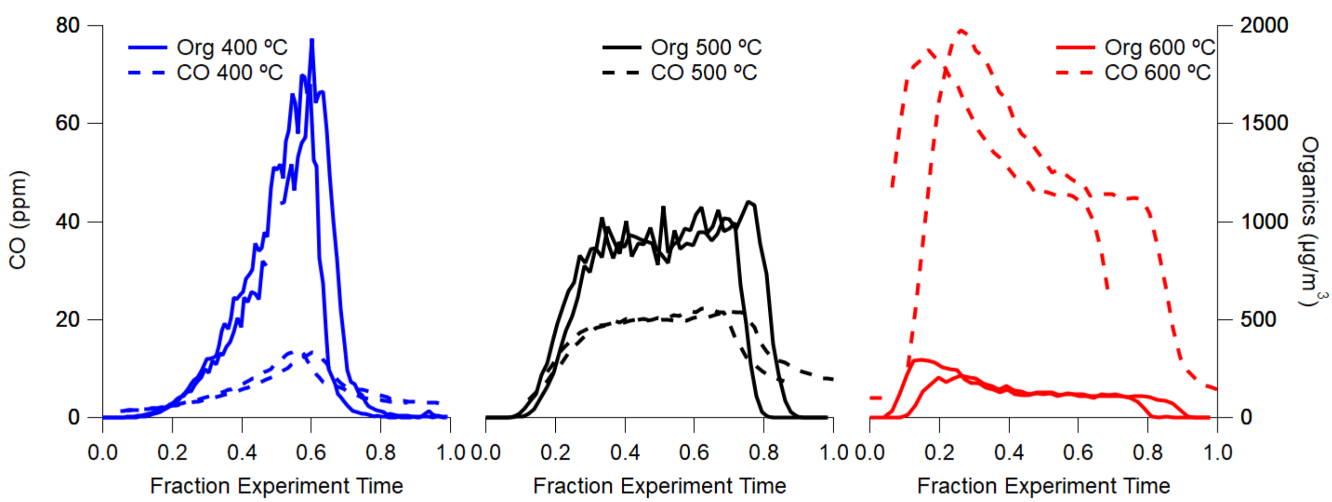

Figure S2. Small maple CO gas (left axis, dashed lines) and organic aerosol (right axis, solid lines) at each reactor temperature. Other woods showed a similar relationship between CO and organic aerosol with temperature change, where higher temperatures correspond to more CO and less aerosol.

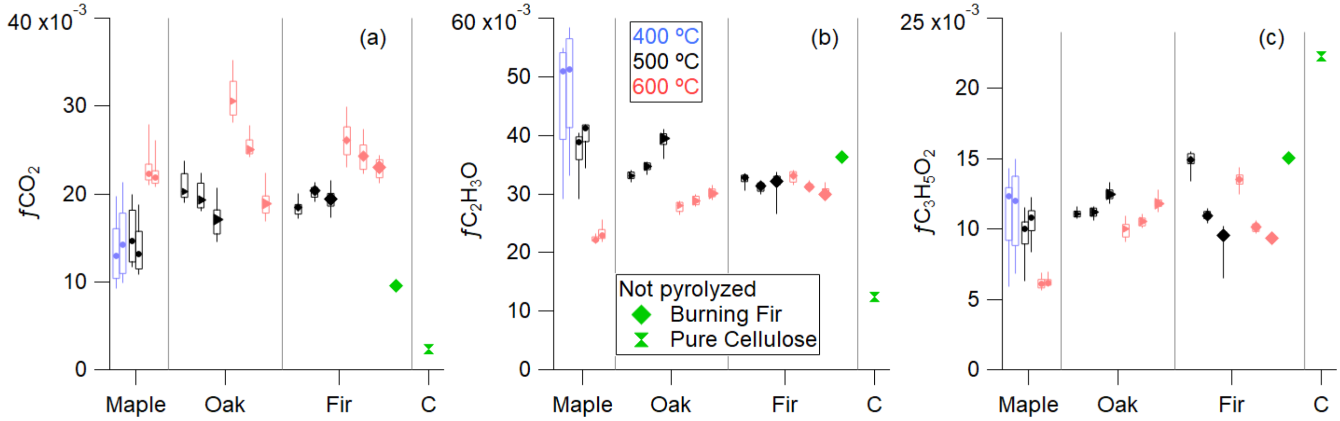

Figure S3. The fraction of $C_2H_3O^+$ (a), $C_3H_5O_2^+$ (b), and CO_2^+ (c) in total organics for maple, oak, Douglas fir, burning fir and cellulose (C). Each plot is ordered by fuel, then temperature, then size and markers at median are sized by wood size. Bars of the box correspond to 25th and 75th percentiles, and whiskers correspond to 10th and 90th percentiles.