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Supplement of

Gas–particle partitioning and hydrolysis of organic nitrates formed from the oxidation of α -pinene in environmental chamber experiments

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1 **S1. Adjustments to standard ACSM fragmentation table**

2 The ACSM standard fragmentation table was adjusted based on filter measurements taken in each
 3 experiment. The portions of the signals at mass-to-charge ratio (m/z) 29 and m/z 44 that can be
 4 attributed to air ($N^{15}N^+$ and CO_2^+ respectively) were found from filter data using their ratios to m/z 28
 5 (N_2^+). The ratio of m/z 18 (due to gas-phase water) to m/z 28 was also found in filter data to account for
 6 effects of humidity. The portion of m/z 16 attributable to air (O^+) was found and corrected for using the
 7 ratio of m/z 16 to m/z 14 (N^+). The water fragmentation pattern between m/z 16 (O^+), m/z 17 (OH^+), and
 8 m/z 18 (H_2O^+) was corrected for using the filter measurement ratios of m/z 16 to m/z 18 and m/z 17 to
 9 m/z 18. Most ratios were averaged over the course of an experiment and then used in the
 10 fragmentation table. In the case of the m/z 44/28 ratio, only values before the onset of organic aerosol
 11 formation were used as this ratio was found to correlate with OA mass loadings due to the vaporization
 12 of low-volatility organics during the filter period. In some cases measured ratios were quite different
 13 from the values used in the default fragmentation table, for example the average measured m/z 16/18
 14 was 0.35 compared to the default value of 0.04. The portion of m/z 28 attributed to organics (CO^+) was
 15 set to equal that of organics at m/z 44 (CO_2^+). The portion of m/z 18 attributed to organics (default to
 16 equal m/z 44 [CO_2^+] in the standard ACSM fragmentation table) was set to equal 0.79 times the value of
 17 organics at m/z 44 to minimize correlation between PM water and PM organics in dry experiments
 18 (Hildebrandt Ruiz et al., 2014). The values used in the default fragmentation table and the values found
 19 in these experiments are shown in Table S1.

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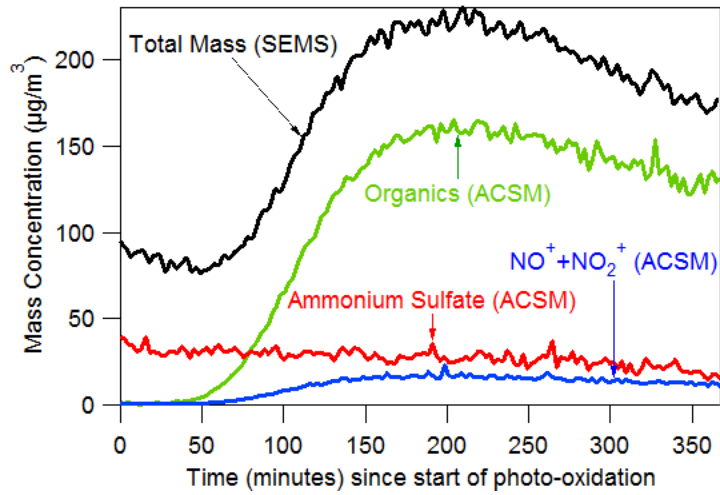
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23 Table S1 – Ratios measured from filter data which were implemented to the ACSM fragmentation table.

Expt #	44/28	29/28	16/14	16/18	17/18	18/28
1	4.39E-04	0.0073	0.475	0.449	0.273	0.082
2	4.35E-04	0.0073	0.473	0.421	0.276	0.091
3	7.65E-04	0.0073	0.447	0.372	0.267	0.091
4	4.51E-04	0.0073	0.427	0.308	0.266	0.105
5	7.62E-04	0.0073	0.425	0.354	0.266	0.092
6	6.79E-04	0.0073	0.414	0.392	0.268	0.085
7	8.84E-04	0.0073	0.408	0.355	0.265	0.092
8	1.53E-03	0.0073	0.380	0.456	0.266	0.062
9	1.91E-03	0.0075	0.461	0.318	0.270	0.094
10	7.38E-04	0.0073	0.456	0.238	0.264	0.117
11	8.06E-04	0.0073	0.523	0.227	0.295	0.139
12	5.79E-04	0.0073	0.685	0.447	0.382	0.111
default	7.34E-04	0.0074	0.353	0.040	0.250	0.010

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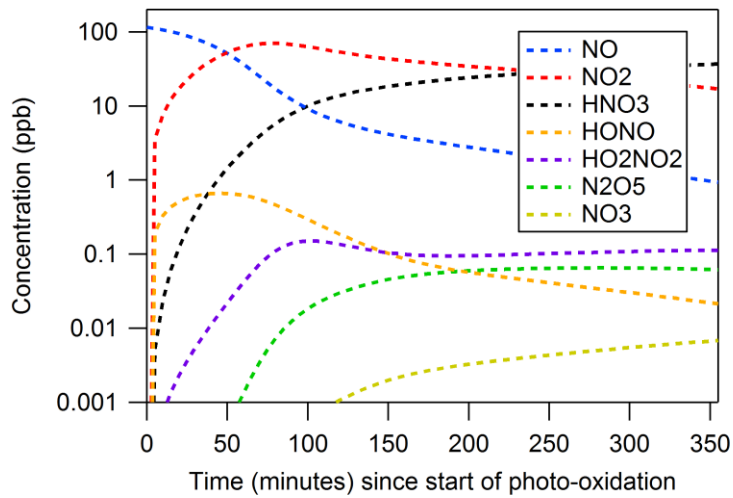


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Figure S1– Time series of particulate mass concentrations in Expt. 7.

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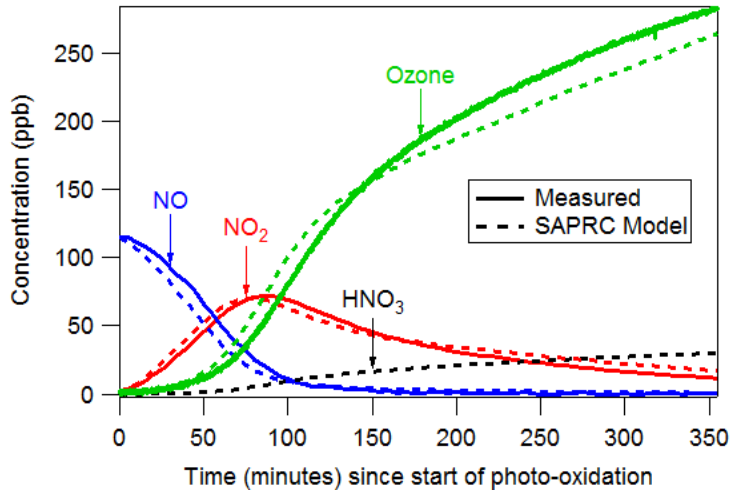


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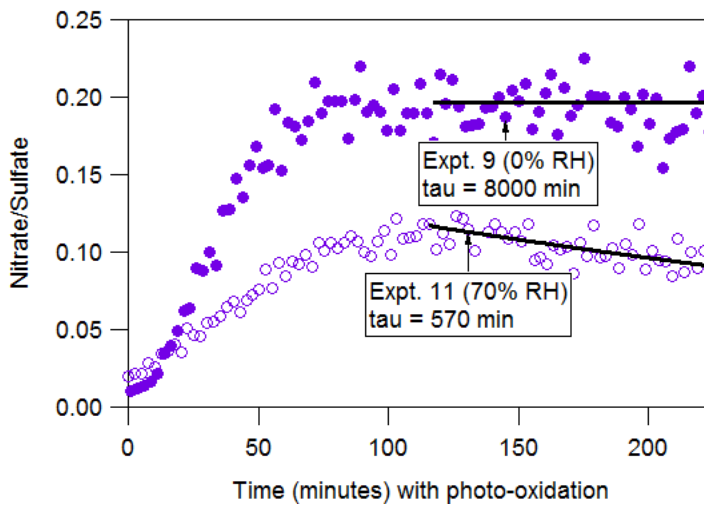
Figure S2 – SAPRC results from Expt. 7 showing significant nitrogen compounds

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32 Figure S3 – The SAPRC modeled and the measured data of ozone, NO, NO₂, and the modeled data for
 33 HNO₃ (Expt. 7)



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35 Figure S4 – Exponential decay for a low RH (Expt. 9) and high RH (Expt. 11) conditions
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