

Supplemental information for “Secondary organic aerosol yields of 12-carbon alkanes”

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Contains Tables S1-5 and Figure S1.

Table S1: CO^+ -to- CO_2^+ ratios calculated from “W-mode” used in HR-AMS fragmentation table.

Expt.	$\text{CO}^+/\text{CO}_2^+$	Change in CO^+ from $\text{CO}^+ = \text{CO}_2^+$ (%)
ML1	1.0	0
ML2	1.0	0
ML3	N/A ^a	N/A
DL1	N/A ^a	N/A
DL2	1.0	0
HL1	1.0	0
HL2	1.7	4-8
CL1	1.0	0
CL2	2.3	10-15
CL3	2.6	10-15
DH1	0.45	-(5-10)
DH2	1.0 ^b	0
DH3	1.0 ^b	0
MH1	3.5	30
MH2	1.4	3-7
HH1	1.3	4-5
HH2	1.3	3-5
CH1	1.9	10-15
CH2	2.4	10-15

^aThe AMS was not run on this experiment.

^bThe AMS was run in “V-mode” only. A ratio of unity was used.

Table S2: Low- NO_x experimental details for combined experiments.

Expt.	Irradiation (h)	Alkane	Seed vol. ($\mu\text{m}^3 \text{cm}^{-3}$)	HC_o (ppbv)
ML2a	18	2-methylundecane	16.7 ± 5.0	27.3 ± 0.9
ML2b	36	2-methylundecane	15.5 ± 4.5	29.8 ± 1.0
DL2a	18	dodecane	12.1 ± 3.6	33.0 ± 1.1
DL2b	36	dodecane	13.1 ± 3.9	34.9 ± 1.1
HL1a	18	hexylcyclohexane	11.2 ± 3.4	16.2 ± 0.5
HL2b	36	hexylcyclohexane	4.2 ± 1.3	14.9 ± 0.5
CL2a	18	cyclododecane	15.3 ± 4.6	9.8 ± 0.3
CL2b	36	cyclododecane	15.8 ± 4.7	11.0 ± 0.4

Table S3: Mass-to-charge ratios (m/z) monitored using the CIMS, and their proposed chemical assignments.

m/z	Ion	Molecular Wt.	Formula	Family
123	$[\text{R}\cdot\text{F}]^-$	104	$\text{C}_4\text{H}_8\text{O}_3$	$\text{C}_n\text{H}_{2n}\text{O}_3$
135	$[\text{R}\cdot\text{F}]^-$	116	$\text{C}_6\text{H}_{12}\text{O}_2$	$\text{C}_n\text{H}_{2n}\text{O}_2$
149	$[\text{R}\cdot\text{F}]^-$	130	$\text{C}_7\text{H}_{14}\text{O}_2$	$\text{C}_n\text{H}_{2n}\text{O}_2$
151	$[\text{R}\cdot\text{F}]^-$	132	$\text{C}_6\text{H}_{12}\text{O}_3$	$\text{C}_n\text{H}_{2n}\text{O}_3$
163	$[\text{R}\cdot\text{F}]^-$	144	$\text{C}_8\text{H}_{16}\text{O}_2$	$\text{C}_n\text{H}_{2n}\text{O}_2$
165	$[\text{R}\cdot\text{F}]^-$	146	$\text{C}_7\text{H}_{14}\text{O}_3$	$\text{C}_n\text{H}_{2n}\text{O}_3$
177	$[\text{R}\cdot\text{F}]^-$	158	$\text{C}_9\text{H}_{18}\text{O}_2$	$\text{C}_n\text{H}_{2n}\text{O}_2$
191	$[\text{R}\cdot\text{F}]^-$	172	$\text{C}_{10}\text{H}_{20}\text{O}_2$	$\text{C}_n\text{H}_{2n}\text{O}_2$
204	$[\text{R}\cdot\text{CF}_3\text{O}]^-$	119	$\text{C}_3\text{H}_5\text{NO}_4$	$\text{C}_n\text{H}_{2n-1}\text{NO}_4$
205	$[\text{R}\cdot\text{F}]^-$	186	$\text{C}_{11}\text{H}_{22}\text{O}_2$	$\text{C}_n\text{H}_{2n}\text{O}_2$
206	$[\text{R}\cdot\text{CF}_3\text{O}]^-$	121	$\text{C}_3\text{H}_7\text{NO}_4$	$\text{C}_n\text{H}_{2n+1}\text{NO}_4$
218	$[\text{R}\cdot\text{CF}_3\text{O}]^-$	133	$\text{C}_4\text{H}_7\text{NO}_4$	$\text{C}_n\text{H}_{2n-1}\text{NO}_4$
220	$[\text{R}\cdot\text{CF}_3\text{O}]^-$	135	$\text{C}_4\text{H}_9\text{NO}_4$	$\text{C}_n\text{H}_{2n+1}\text{NO}_4$
232	$[\text{R}\cdot\text{CF}_3\text{O}]^-$	147	$\text{C}_5\text{H}_9\text{NO}_4$	$\text{C}_n\text{H}_{2n-1}\text{NO}_4$
246	$[\text{R}\cdot\text{CF}_3\text{O}]^-$	161	$\text{C}_6\text{H}_{11}\text{NO}_4$	$\text{C}_n\text{H}_{2n-1}\text{NO}_4$
248	$[\text{R}\cdot\text{CF}_3\text{O}]^-$	163	$\text{C}_6\text{H}_{13}\text{NO}_4$	$\text{C}_n\text{H}_{2n+1}\text{NO}_4$
260	$[\text{R}\cdot\text{CF}_3\text{O}]^-$	175	$\text{C}_7\text{H}_{13}\text{NO}_4$	$\text{C}_n\text{H}_{2n-1}\text{NO}_4$
262	$[\text{R}\cdot\text{CF}_3\text{O}]^-$	177	$\text{C}_7\text{H}_{15}\text{NO}_4$	$\text{C}_n\text{H}_{2n+1}\text{NO}_4$
276	$[\text{R}\cdot\text{CF}_3\text{O}]^-$	191	$\text{C}_8\text{H}_{17}\text{NO}_4$	$\text{C}_n\text{H}_{2n+1}\text{NO}_4$
288	$[\text{R}\cdot\text{CF}_3\text{O}]^-$	203	$\text{C}_9\text{H}_{17}\text{NO}_4$	$\text{C}_n\text{H}_{2n-1}\text{NO}_4$
290	$[\text{R}\cdot\text{CF}_3\text{O}]^-$	205	$\text{C}_9\text{H}_{19}\text{NO}_4$	$\text{C}_n\text{H}_{2n+1}\text{NO}_4$
302	$[\text{R}\cdot\text{CF}_3\text{O}]^-$	217	$\text{C}_{10}\text{H}_{19}\text{NO}_4$	$\text{C}_n\text{H}_{2n-1}\text{NO}_4$
304	$[\text{R}\cdot\text{CF}_3\text{O}]^-$	219	$\text{C}_{10}\text{H}_{21}\text{NO}_4$	$\text{C}_n\text{H}_{2n+1}\text{NO}_4$

Table S4: Pearson's correlation coefficients for SOA yield and mass fraction of familyCH ions with 9-12 carbons.

NO_x condition	Yield bound	C_9	C_{10}	C_{11}	C_{12}
High	Lower	0.907	0.900	0.853	0.835
High	Upper	0.768	0.763	0.690	0.669
Low	Lower	0.732	0.774	0.732	0.802
Low	Upper	0.860	0.887	0.852	0.763

Table S5: Pearson’s correlation coefficients for SOA yield and mass fraction of familyCHO1 ions with 9-12 carbons.

NO _x condition	Yield bound	C ₉	C ₁₀	C ₁₁	C ₁₂
High	Lower	0.748	0.871	0.907	0.671
High	Upper	0.603	0.740	0.762	0.526
Low	Lower	0.709	0.809	0.707	0.792
Low	Upper	0.761	0.850	0.845	0.575

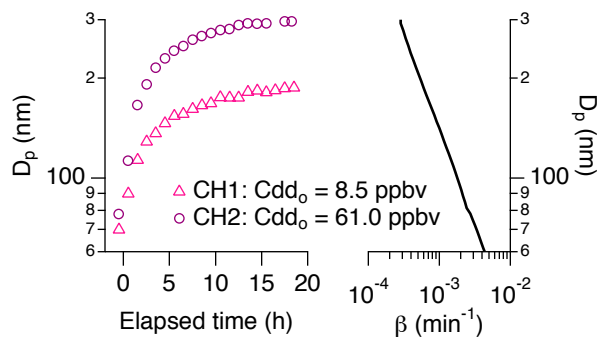


Figure S1: Comparison of size distribution peak diameter for two cyclododecane high-NO_x experiments (left panel). Also shown is the size-dependent particle wall loss rate constant, β , measured in a separate calibration experiment (right panel).