Supplementary Material for

Elemental Analysis of Chamber Organic Aerosol Using an Aerodyne High-Resolution Aerosol Mass Spectrometer

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Table S1: Calibration factors and estimated uncertainties for O/C, H/C, N/C and OM/OC as determined by Aiken et al. (2008).

Table S2: Ratios of particle phase signals of CO^+ to CO_2^+.

Table S3: O/C and H/C ratios of α-pinene ozonolysis SOA determined from offline analysis by Yu et al. (1999, Table XI).

Figure S1: O/C_{HR} and O/C_{44} for glyoxal uptake SOA.

Figure S2: O/C_{HR} and O/C_{44} for a-pinene ozonolysis SOA.

Figure S3: O/C_{HR} and O/C_{44} for isoprene SOA formed under low-NO_x conditions.

Figure S4: O/C_{HR} and O/C_{44} for isoprene SOA formed under high-NO_x conditions.

Figure S5: O/C_{HR} and O/C_{44} for single-ring aromatic SOA.

Figure S6: O/C_{HR} and O/C_{44} for naphthalene SOA formed under low-NO_x conditions.

Figure S7: O/C_{HR} and O/C_{44} for naphthalene SOA formed under high-NO_x conditions.

High-resolution AMS spectra will be available online at http://cires.colorado.edu/jimenez-group/HRAMSsd/.

Ratio	Calibration Factor	Measurement Uncertainty
O/C	0.75	31%
H/C	0.91	10%
N/C	0.96	22%
OM/OC	-	6%

Table S1

System	Organic CO^+/CO_2^+ Estimate
α-pinene-O_3	0.98
Glyoxal Uptake	5.00
Isoprene-OH	1.00
Aromatic-OH	1.03
Naphthalene-OH	1.17

Table S2

		Molar Yield		
Product Name	Formula	6-9-98a	6-9-98b	6-17-98a
Pinic Acid	$C_9H_{14}O_4$	1.8	3.9	2.8
Norpinic Acid	$C_8H_{12}O_4$	0.08	0.09	0.05
Hydroxy pinonaldehydes	$C_{10}H_{16}O_3$	2.4	1.1	2
Pinonic Acid	$C_{10}H_{16}O_3$	1.7	1.6	1.3
Norpinonic Acid and Isomers	$C_9H_{14}O_3$	2.1	4.8	2.8
Pinonaldehyde	$C_{10}H_{16}O_2$	0.8	0.3	0.9
Norpinonaldehyde	$C_9H_{14}O_2$	0.1	0.2	0.2
Hydroxy pinonic acid	$C_{10}H_{14}O_4$	2.1	1.3	2.1
A13	$C_{10}H_{16}O_3$	0.08	0.12	0.1
A14	$C_{10}H_{14}O_3$	0.55	0.48	0.8
O/C		**0.34**	**0.36**	**0.35**
H/C		**1.58**	**1.56**	**1.57**

Table S3

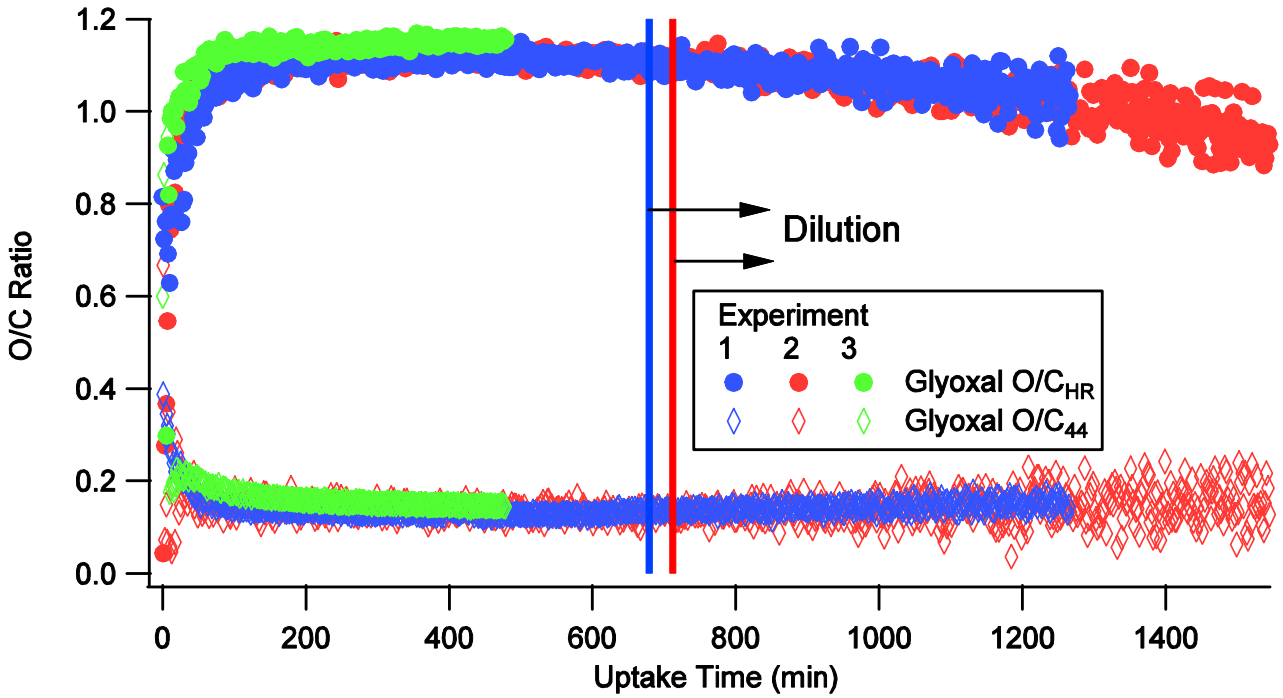
1.2
1.0
0.8
0.6
0.4
0.2
0.0
O/C Ratio
0
200
400
600
800
1000
1200
1400
Uptake Time (min)
Dilution
Experiment
1 2 3
Glyoxal O/C$_{HR}$
Glyoxal O/C$_{44}$

Figure S1

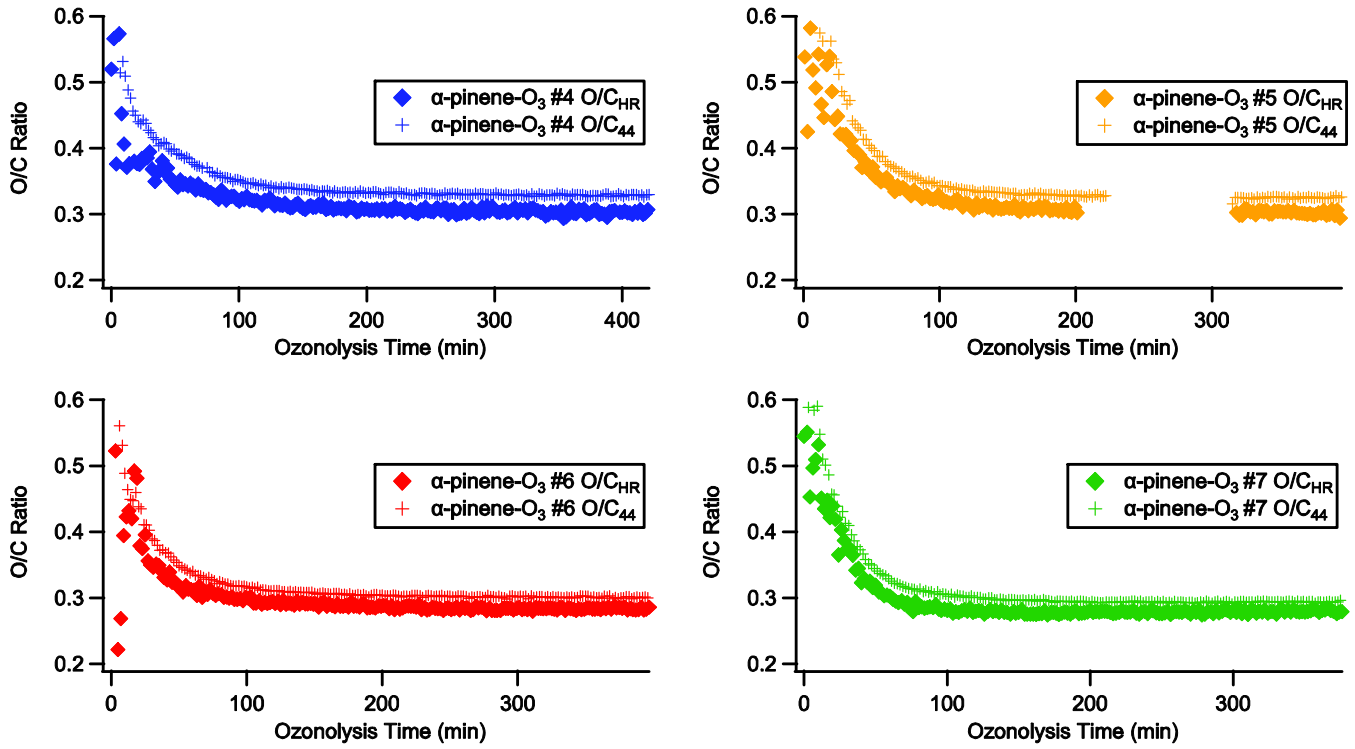
O/C Ratio
Ozonolysis Time (min)
α-pinene-O3 #4 O/CHR
α-pinene-O3 #4 O/C44
α-pinene-O3 #5 O/CHR
α-pinene-O3 #5 O/C44
α-pinene-O3 #6 O/CHR
α-pinene-O3 #6 O/C44
α-pinene-O3 #7 O/CHR
α-pinene-O3 #7 O/C44

Figure S2

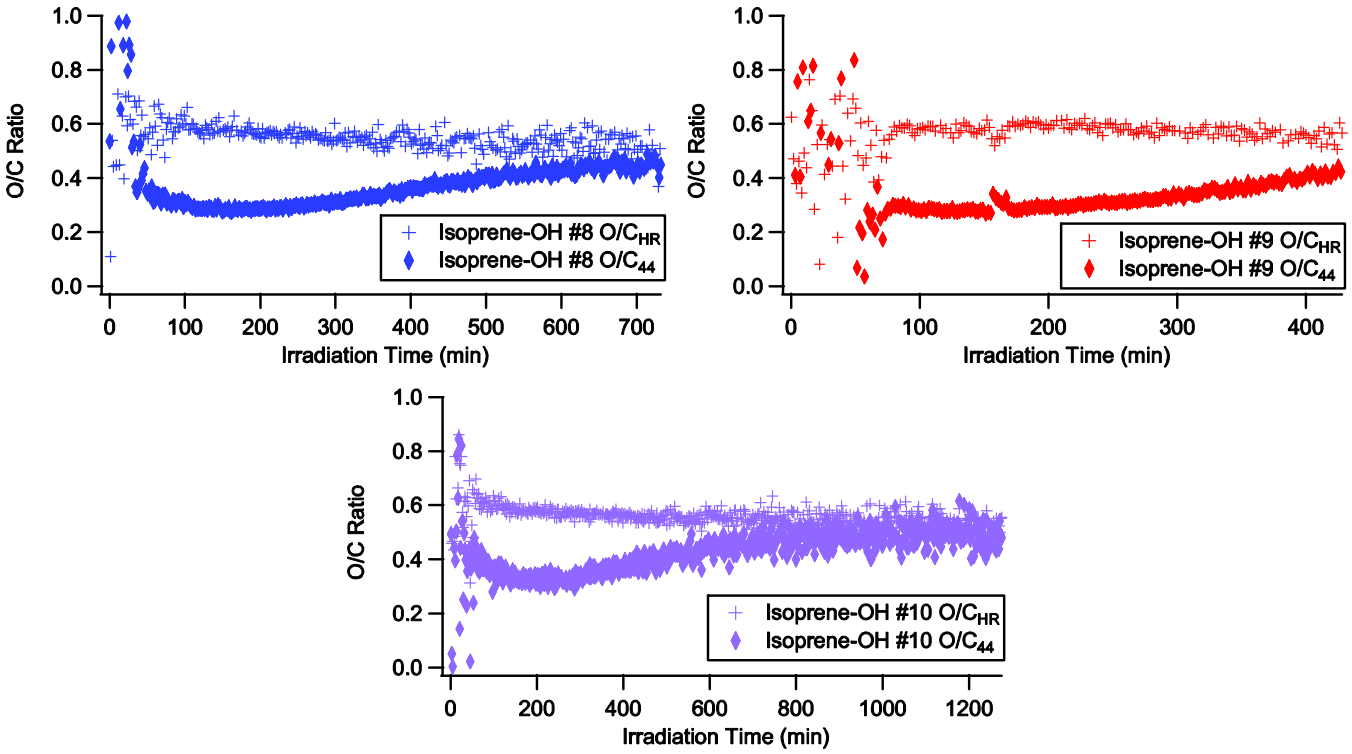
O/C Ratio
Irradiation Time (min)
Isoprene-OH #8 O/C$_{HR}$
Isoprene-OH #8 O/C$_{44}$
Isoprene-OH #9 O/C$_{HR}$
Isoprene-OH #9 O/C$_{44}$
Isoprene-OH #10 O/C$_{HR}$
Isoprene-OH #10 O/C$_{44}$

Figure S3

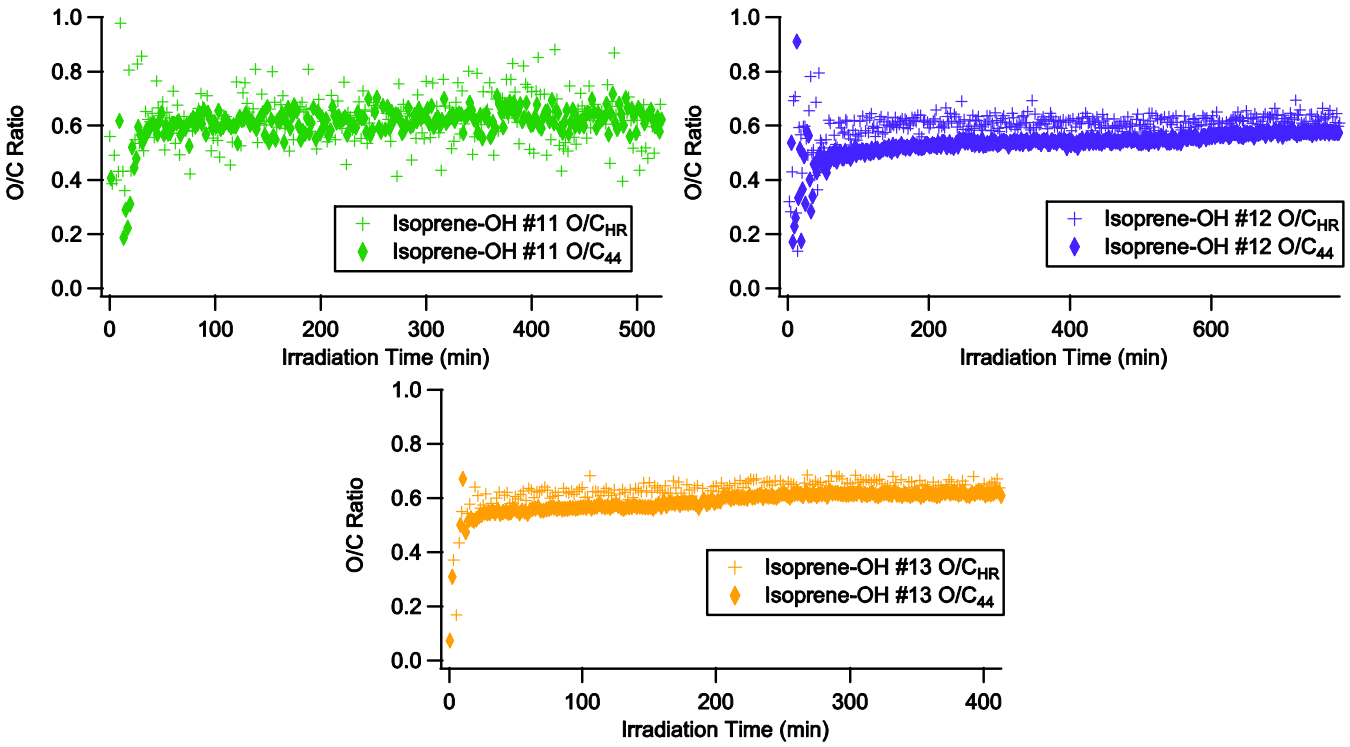
O/C Ratio
Irradiation Time (min)
Isoprene-OH #11 O/C$_{HR}$
Isoprene-OH #11 O/C$_{44}$
Isoprene-OH #12 O/C$_{HR}$
Isoprene-OH #12 O/C$_{44}$
Isoprene-OH #13 O/C$_{HR}$
Isoprene-OH #13 O/C$_{44}$

Figure S4

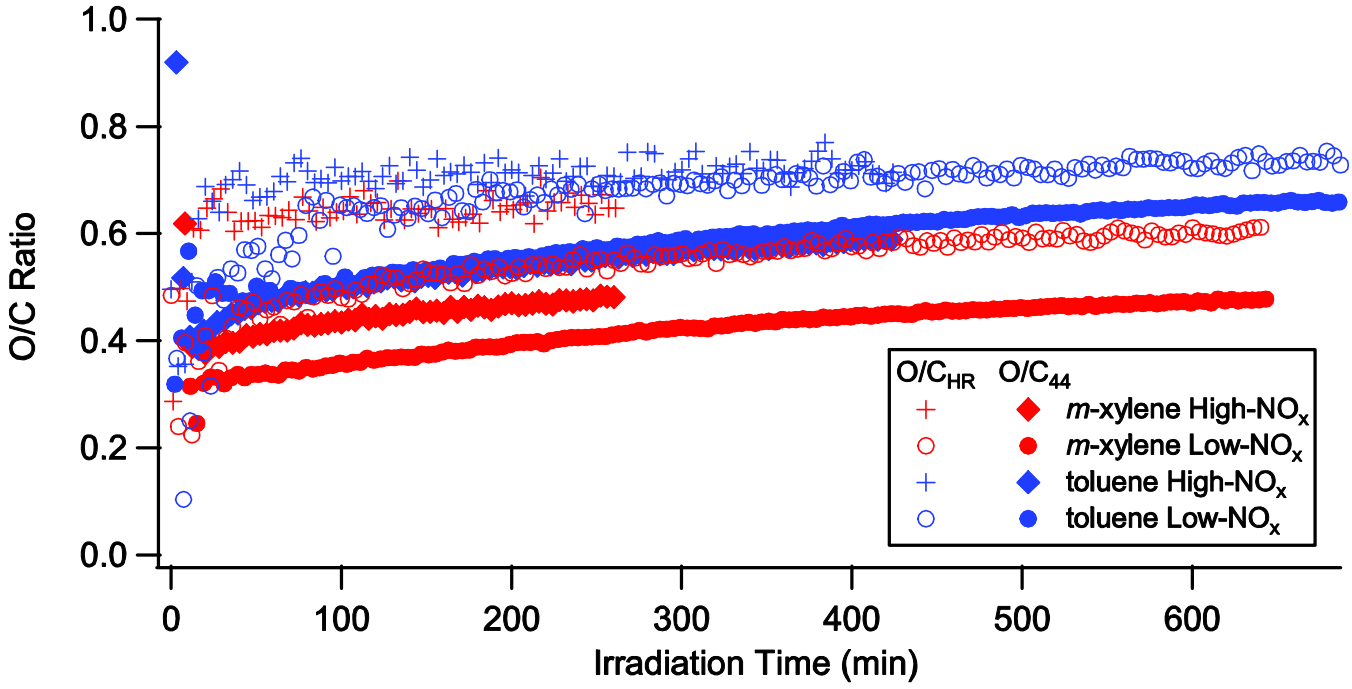
1.0
0.8
0.6
0.4
0.2
0.0
O/C Ratio
0
100
200
300
400
500
600
Irradiation Time (min)
O/C_HR
O/C_44
m-xylene High-NO_x
m-xylene Low-NO_x
toluene High-NO_x
toluene Low-NO_x

Figure S5

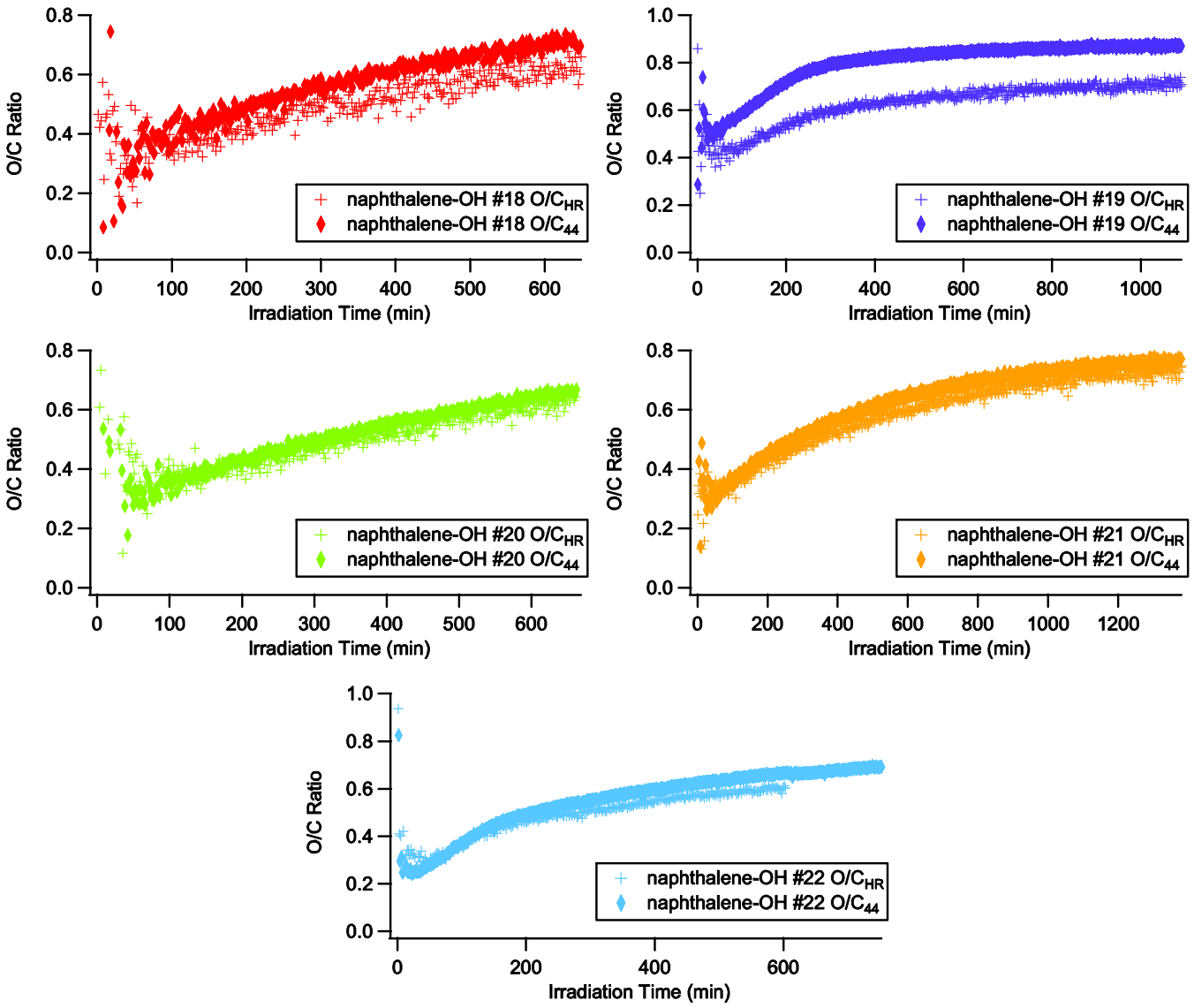
O/C Ratio
Irradiation Time (min)
naphthalene-OH #18 O/C$_{HR}$
naphthalene-OH #18 O/C$_{44}$
naphthalene-OH #19 O/C$_{HR}$
naphthalene-OH #19 O/C$_{44}$
naphthalene-OH #20 O/C$_{HR}$
naphthalene-OH #20 O/C$_{44}$
naphthalene-OH #21 O/C$_{HR}$
naphthalene-OH #21 O/C$_{44}$
naphthalene-OH #22 O/C$_{HR}$
naphthalene-OH #22 O/C$_{44}$

Figure S6

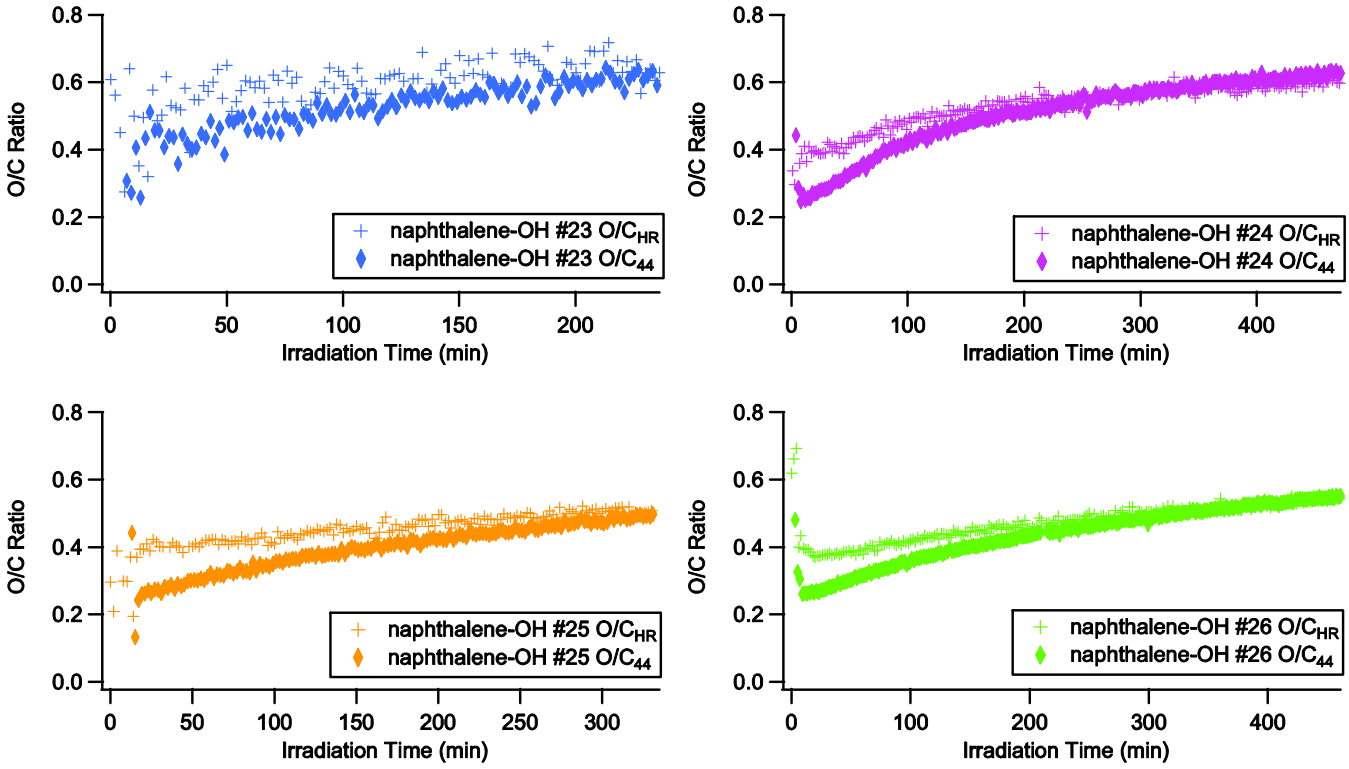
O/C Ratio
Irradiation Time (min)
naphthalene-OH #23 O/C$_{HR}$
naphthalene-OH #23 O/C$_{44}$
naphthalene-OH #24 O/C$_{HR}$
naphthalene-OH #24 O/C$_{44}$
naphthalene-OH #25 O/C$_{HR}$
naphthalene-OH #25 O/C$_{44}$
naphthalene-OH #26 O/C$_{HR}$
naphthalene-OH #26 O/C$_{44}$

Figure S7

References

Aiken, A. C., Decarlo, P. F., Kroll, J. H., Worsnop, D. R., Huffman, J. A., Docherty, K. S., Ulbrich, I. M., Mohr, C., Kimmel, J. R., Sueper, D., Sun, Y., Zhang, Q., Trimborn, A., Northway, M., Ziemann, P. J., Canagaratna, M. R., Onasch, T. B., Alfarra, M. R., Prevot, A. S. H., Dommen, J., Duplissy, J., Metzger, A., Baltensperger, U., and Jimenez, J. L.: O/C and OM/OC ratios of primary, secondary, and ambient organic aerosols with high-resolution time-of-flight aerosol mass spectrometry, Environ. Sci. Technol., 42, 4478–4485, doi:10.1021/Es703009q, 2008.

Yu, J. Z., Cocker, D. R., Griffin, R. J., Flagan, R. C., and Seinfeld, J. H.: Gas-phase ozone oxidation of monoterpenes: Gaseous and particulate products, J. Atmos. Chem., 34, 207–258, 1999.